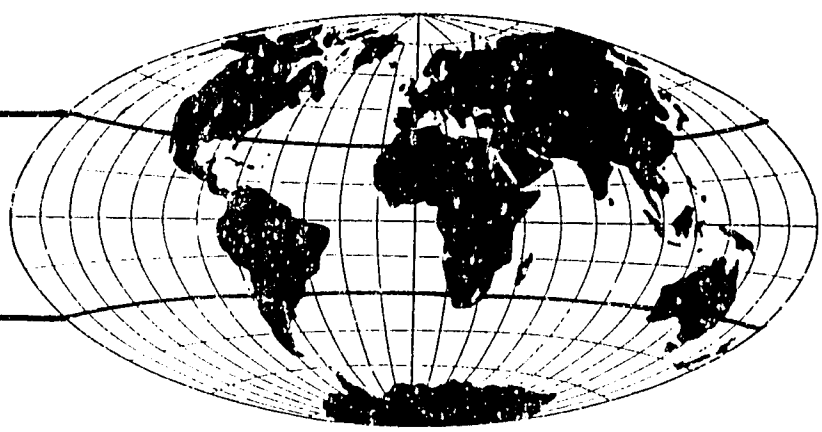
COOPERATIVE AGREEMENT ON SETTLEMENT AND RESOURCE SYSTEMS ANALYSIS

EXECUTIVE SUMMARY AND RECOMMENDATIONS:
THE AFRICAN EXPERIENCE WITH RIVER BASIN DEVELOPMENT

by

Thayer Scudder

July 1988



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Preface

Since 1983 the Africa Bureau and the Bureau of Science and Technology have directed and sponsored research on river basin development in Africa. A series of background reports published under the title Problems and Issues in African River Basin Planning culminated in a presentation by Clark University and the Institute for Development Anthropology (IDA) at a 1985 USAID conference on River Basin Development, Irrigation, and Land Tenure. Considering the relevance of the issues identified at this conference, USAID's Africa Bureau requested a substantial follow-on research activity organized by SARSA, entitled Africa River Basin Planning II.

Drawing on their knowledge of specific river basins and of the literature on African river basin development, a team of SARSA river basin analysts at Clark University and the Institute for Development Anthropology implemented the present study with comparative fieldwork subsequently carried out in the Senegal, Volta, Nile, Tana, Pangani, and Zambezi basins. In completing these studies, researchers from Clark and IDA worked with a number of African and U.S. consultants, including the former Chief Executive of the Volta River Authority (Ghana) and the former Chief Planner of the Tana and Athi River Development Authority (Kenya). SARSA core personnel and consultants also drew on their experience with development in other African river basins, including the Gambia, the Bandama (Ivory Coast), the Niger, and the Lake Chad basins in West Africa; the Juba (Somalia) and Kagera basins in East Africa. Further literature searches and discussions with experts and organizations operating in river basins were also undertaken.

The River Basins II project was completed in 1988 producing the following SARSA reports:

1. EXECUTIVE SUMMARY AND RECOMMENDATIONS. Thayer Scudder.

2. OVERVIEW OF THE AFRICAN EXPERIENCE WITH RIVER BASIN DEVELOPMENT: ACHIEVEMENTS TO DATE, THE ROLE OF INSTITUTIONS AND STRATEGIES FOR THE FUTURE. Thayer Scudder.

3. INSTITUTIONAL ISSUES IN AFRICAN RIVER BASIN DEVELOPMENT. Eileen Berry and Len Berry.

4. PLANNING FOR AFRICAN RIVER BASINS. Richard Perritt and Harry Schwarz.

5. THE PANGANI RIVER BASIN. Eileen Berry, Len Berry, Ophelia Mascarenhas, and Josephine Msangi.

6. COMPARATIVE ANALYSIS OF INSTITUTIONAL EXPERIENCES WITH RIVER BASIN DEVELOPMENT IN AFRICA: THE CASE OF THE TANA BASIN, KENYA. Peter Little.

7. RIVER BASIN DEVELOPMENT: CASE STUDIES WITHIN THE TANA RIVER BASIN OF KENYA. John Kimani.

8. AN ANALYSIS OF THE EXPERIENCES OF INSTITUTIONS INVOLVED IN THE DEVELOPMENT OF THE MIDDLE ZAMBEZI BASIN. John T. Milimo.

9. IRRIGATION ACTIVITIES AND INSTITUTIONS IN KENYA'S LAKE VICTORIA BASIN. C.O. Okidi.

10. AN ANALYSIS OF THE VOLTA RIVER BASIN DEVELOPMENT IN GHANA AS ADMINISTERED BY THE VOLTA RIVER AUTHORITY. Richard Perritt.

11. *THE SENEGAL RIVER BASIN DEVELOPMENT PROGRAM: A RETROSPECTIVE ASSESSMENT. Vito Stagliano.

12. PROCEEDINGS TO THE CONFERENCE ON THE AFRICAN EXPERIENCE WITH RIVER BASIN DEVELOPMENT: ACHIEVEMENTS TO DATE, THE ROLE OF INSTITUTIONS, AND STRATEGIES FOR THE FUTURE. Richard Perritt.

13. THE VOLTA RIVER PROJECT. E.L. Quartey.

All of these studies are available on request at Clark University, Settlement and Resource Systems Analysis (SARSA), Room 110, CENTED Building, 950 Main Street, Worcester, MA 01610.

*This document, although not SARSA-contracted, was included for its importance as a contribution to the River Basin Conference held in Easton, Maryland, reporting on the Senegal River Basin.

The recommendations and conclusions of the Executive Summary reflect the SARSA perspective and attempt to integrate some of the most important guidelines identified by the more than fifty international and African river basin experts who participated in the 1988 African River Basin Conference in Easton, Maryland. This conference was sponsored by the USAID Africa Bureau with the objective to disseminate the SARSA research findings.

Purpose. The aim of SARSA's River Basin Planning II study was twofold. First, SARSA proposed to examine the record to date for river basin development in tropical Africa. The second purpose was to examine in more detail the role and performance of institutions in this record of African river basin development. SARSA's choice of a broad approach encompassing both an examination of the overall experience of river basin developments and investigation of specific institutions and basins requires justification.

Justification. Two points of justification are relevant. First is the SARSA conclusion that the experience of institutions with river basin development is best assessed against outcomes -- namely, the extent to which the resources of Africa's river basins have actually been developed in recent years and the role that institutions have played in that development. Such an approach is necessary since, not infrequently, institutional structures are praised and institutional performance is rated as "satisfactory" (as in World Bank project completion reports and evaluations) while economic rates of return and financial performance of projects implemented are rated as "unsatisfactory."

The second point of justification concerns the increasing need for a more balanced assessment of achievements to date, of the potential of river basins for development, and of strategies for realizing that potential in order to bridge the growing gap between pro-big dam and anti-big dam thinking. Both sides have strong but one-sided arguments to support their position. The

former emphasize that the management of Africa's water resources for urban-industrial development and for food self-sufficiency requires the construction of large-scale dams. The latter emphasize the very serious negative environmental and socioeconomic effects that have accompanied African dam construction to date. Is there a middle position which can broaden benefits to include both rural and urban populations without environmental degradation? Believing that there may be, the SARSA team's analysis has led to a wider range of development options.

The objective of the conclusions and recommendations presented in this Executive Summary and the complete SARSA River Basin II studies is to stimulate riparian states, USAID, the World Bank, and other donor and lending organizations to widen their perspective on African river basin development, and to approach that development in a more systematic and long-term fashion, with the formulation of policies and strategies preceding rather than following program and project implementation.

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EXECUTIVE SUMMARY AND RECOMMENDATIONS

A. EXECUTIVE SUMMARY

1. Introduction

The purpose of this executive summary is threefold. The first purpose is to review and summarize the record with river basin development in tropical Africa. The second purpose is to examine the role of institutions in African river basin development. The third purpose is to propose environmentally sound strategies for development for the rest of this century which will benefit larger numbers of people through increased production, enterprise development, and employment generation. While these strategies may also be applicable to other regions, they are tailored to African conditions including the aridity of much of tropical Africa, the irregular flood regimes of most of the continent's major rivers, and the dependence of millions of people and their livestock on annual (or biannual) flooding.

Definitions of such terms as "development" and "institutions" reflect the assumption that African river basin development is justifiable only if it can lead to the integrated development of a basin's human, land, and water resources in an environmentally sustainable fashion. As used here, the definition of development is influenced by the concept of multiobjective planning, which requires that impacts be assessed and compared at national, regional, local, and environmental levels. In regard to such large national projects as mainstream dams, development occurs when sustainable production, incomes, and living standards for large numbers of people increase at local, regional, and national levels.

Because of the increasing adversarial relationship between river basin "developers" and "conservationists," there is a pressing need for a more

balanced assessment of achievements to date, of the potentials of river basin development, and of strategies for realizing those potentials. Both sides have strong but one-sided arguments to support their position. The developers emphasize that the management of Africa's water resources for urban-industrial development and for food self-sufficiency requires the construction of large-scale dams. The conservationists emphasize the very serious negative environmental and socioeconomic effects that have accompanied African dam construction to date. Is there a middle position which can broaden benefits to include both rural and urban populations without environmental degradation? Believing that there may be, this analysis emphasizes a wider range of development options, including expansion of the purposes of major dams to include controlled downriver flooding and regularized reservoir drawdown. It is hoped that such an analysis will help AID, the World Bank, and other donors to widen their perspective as it relates to African river basin development and to approach that development in a more systematic and long-term fashion.

2. The Record To Date

The narrow focus of most planning studies, and of most development, on river basins as hydrological systems has tended to restrict development, on the one hand, to water resource management, and, on the other hand, to national accounting in terms of electricity generation and crop production on large-scale irrigation projects. Local, regional, and environmental accounting systems have been de-emphasized, with adverse effects on riverine habitats and communities and on national development goals.

Equating river basin development with water resource management is a long-standing failing. Within African countries, this bias is illustrated by

the fact that river basin development usually is the institutional responsibility of ministries, commissions, and authorities concerned not with planning and integrated area development but rather with energy, irrigation, and public works. The Kariba was the responsibility of the Federal Power Board and later, after the independence of Zambia, of the Central African Power Corporation. In Nigeria, the Kainji was the responsibility of the Niger Dams Authority with close cooperation with the Electricity Corporation of Nigeria. In the Sudan, the Jonglei Canal Commission was an outgrowth of the Ministry of Irrigation, while members of the OMVS Council of Ministers have been drawn almost exclusively from ministries concerned with public works and energy development. While the Volta River Authority was more broadly conceived, since the retirement in the late 1970s of Chief Executive Quartey (himself the former head of the national electricity agency), its mission has been redefined to deal primarily with power generation.

The same bias exists among multilateral and bilateral donors. Still the main proponent of large-scale dams in Africa, the World Bank places such projects under its energy divisions. Though feasibility analyses may address multiobjective criteria, the final project remains essentially an energy project in the World Bank's portfolio, the Kainji being a major example. As for the Volta, it was the World Bank which pressured the Volta River Authority to narrow its focus, while in the 1980s the World Bank's energy division has ignored the bank's own environmental and resettlement guidelines in regard to the recently completed Kiambere Project. Historically, AID had the same bias during the 1950s and 1960s. While broadening perspectives and the Sahelian drought reduced this bias in the 1970s and 1980s, they did not eliminate it.

The inadequacy of techniques for project appraisal and the lack of evaluations of the impacts of large-scale dam construction have contributed to this bias. Far too often appraisals place too little emphasis on the total resource base, on indigenous knowledge relating to that resource base, and on local production systems for resource utilization. Too much emphasis is placed on economic rates of return (which are easily manipulated in studies) at the national level while redistribution effects and multipliers are ignored. Especially inadequate are least cost solutions for electricity generation, since they tend to compare dams with thermal stations and other power sources as if they existed in a vacuum. As for benefit-cost analyses as currently carried out, too often they do not deal with the development outcomes that heads of state wish to realize -- namely multiplier effects. The lack of evaluations dealing with environmental, economic, and sociopolitical impacts of large-scale river basin development projects is disturbing, since it suggests a lack of interest in accountability. Donors should address appraisal and evaluation deficiencies as soon as possible. If existing assessment methodologies, including rapid appraisal, are not sufficient, new tools need be developed that make use of a wider range of expertise (including social science and natural resource management expertise).

The most important single conclusion resulting from this assessment is that African nations have been developing the hydroelectric potential of their rivers at the expense of their ecological resiliency, human populations, and agricultural potential (agriculture is broadly defined to include livestock management, forestry and agro-forestry, and fisheries in addition to crop agriculture). Furthermore, since very little electrification has occurred among the rural majority, this hydroelectric potential has been tapped largely

for the benefit of the urban commercial, industrial, and residential sectors. Not only do these sectors cater to the minority of Africa's population, but the provision of cheap hydropower has not stimulated industrial development to the extent expected.

Though irrigation has been receiving increasing emphasis as a secondary objective, the priority given to medium- and large-scale projects is hard to justify on either economic or financial grounds. Capital development costs have been escalating with some exceeding $20,000 and even $30,000 per hectare. Even with double cropping of high value crops, it is not possible to pay off such costs; indeed, frequently projects do not even cover recurrent costs. While families on irrigated settlement schemes may be better off than they were before the project, many do not move beyond subsistence. In comparison to households dependent on rainfed and flood water agriculture, irrigation, except in the Sudan, benefits a relatively small minority.

While planners have over-estimated the benefits to be derived from hydropower generation and irrigation and underestimated the environmental and socio-economic costs of dams, they have also underestimated a number of benefits associated with reservoir formation. Fisheries are an example. During the mid-1970s sales of fish from Lake Volta exceeded revenue from sales of electricity, while fish landings at Kariba currently exceed the most optimistic pre-inundation estimates. The potential of reservoir drawdown areas for flood recession cultivation and grazing has also been underestimated. Such benefits have been overlooked by critics of dam construction, as have the potential benefits of a regularized downstream flood for riverine habitats and communities.

Because of aridity and irregular flooding, African nations must develop their river basins. While it is possible that the potential of the major basins can only be realized through the construction of appropriately designed dams, to date dam construction has been premature in two senses. On the one hand, decisions by national policy makers have been made to proceed before the necessary studies have been completed. On the other hand, in favoring the urban-industrial sector, the plans that were implemented have made agricultural development harder for river basin inhabitants due to the reduction or elimination of natural flooding. The implications of this resource transfer from rural to urban areas for future development are not encouraging in regard to both economic and social equity considerations.

During the early stages of industrialization, the driving force in development is the increased productivity, disposable income, and consumption of millions of small-scale rural producers, many of whom live within river basins. Drawing on case material from a number of countries including Zambia, India, China, and Malaysia this conclusion has been generalized for the tropics and subtropics (see, for example, Johnston and Kilby, 1975). Not only does most agricultural production come from such small-scale producers, but their increasing consumption of locally and nationally produced goods and services as they move beyond subsistence can catalyze a process of regional development. For such a process to occur in river basins, much more attention needs to be paid to the enhancement of riverine and lacustrine (including reservoir) habitats and the development of local production systems.

Most African nations have access to only one or two river basins. Potential heartlands in the world's most arid continent, these river basins are major national resources whose development is essential for increasing

agricultural and industrial production, and for increasing the living standards of rural and urban households. As previously noted, development to date has concentrated more on tapping the hydroelectric potential of Africa's rivers (at least 30 percent of the world potential) than on a broader utilization of each basin's human, land, and water resources. Generally speaking, future dams are not justified unless they can combine hydropower generation more effectively with irrigation and with the enhancement of local production systems and riverine habitats. Whether or not this is possible remains to be demonstrated. If such a combination is not possible, the construction of additional mainstream dams becomes an unattractive option because of their very serious adverse impacts on downstream habitats, productivity, and populations.

3. The Nature And Potential Of Riverine Habitats And Production Systems.

Riverine habitats from small upland tributaries to the deltas of Africa's major rivers are a most valuable resource throughout the continent. This is especially the case with such major wetlands as the inland delta of the Niger, the Lake Chad basin, the Sudd, and the Kafue Flats which are found in arid and semi-arid Guinea and Sudan-sahelian habitats. Though much smaller in scale than the other examples, Bingham (1982) has labeled the Kafue Flats Zambia's "most valuable agricultural entity," while Williams and Howell (1977) note that "the biological productivity of an area such as the Kafue Flats may in the long run prove to be vastly more important to mankind than its short-term value as a modified water storage for the generation of electric power."

The development potential of this biological productivity has been largely ignored by both national and international development planners. The same is true of the riverine populations that have been tapping this productivity for

thousands of years, supporting moderate population densities without environmental degradation. The key to their survival has been the annual floods that dam construction throughout the continent has either eliminated or altered in an adverse fashion.

Much of tropical Africa is drained by a relatively small number of major river systems, in most of which seasonal rainfall is reflected in extreme variation in annual flows. Though problem-prone habitats, these river basins have played a major role in the origins of sedentary communities, crop agriculture, and state formation. Currently they are inhabited by tens of millions of people, and by large numbers of domestic animals. The livelihood of both people and animals is tied to the annual flood.

The production systems of riverine populations are multi-faceted and dynamic. Their most important components are rainfed and flood water agriculture, small-scale irrigation, livestock management, artisanal activities, trade and other small-scale commercial ventures, fishing, hunting and gathering, and -- of increasing importance in recent years -- wage labor. Such systems are found in river basins throughout tropical Africa, their origins in the Nile Valley and the inland delta of the Niger dating back thousands of years. Over the millennia, riverine communities have evolved their own cultigens for flood water cultivation including floating rice, flood-tolerant varieties of sorghum, and various early maturing varieties. While cereal production is relatively low (tending to range between 400 and 800 kilograms per hectare), yields from flood water cultivation are more reliable than those harvested from larger rain-fed fields. Double cropping is also frequently possible on annually flooded riverine alluvia, hence enhancing their value to cultivators as reflected in elaborate land tenurial arrangements.

As for livestock management, after the recession of the annual flood, floodplains provide critically important pasture lands during the latter part of the dry season when vegetation elsewhere is scarce. At that time, livestock converge on floodplains from the surrounding uplands, with floodplain pastures able to sustain relatively high stocking rates. The productivity of riverine fisheries, like agriculture and livestock raising, is also dependent upon annual flooding, with fishing providing both employment and low cost, highly nutritious protein. Annual yields, for example, from the Lake Chad, Niger, Nile, and Zambezi fisheries alone provide over 500,000 tons of fish, while African inland fisheries provide an important source of employment for both rural and urban populations during recessions and depressions.

In terms of development, riverine production systems have a number of important advantages. First, they already support millions of people who are familiar with the major components of each river system, hence, providing the opportunity to build on existing economies. Second, there is room for both expansion and intensification. The potential of flood water agriculture, for example, is reflected by the fact that millions of hectares are available for cropping, including approximately two million hectares in Nigeria alone of which only about half is currently under cultivation. As for intensification, research suggests that yields can be increased two to threefold by improved water management, improved varieties (in terms of early maturation, and drought-and-bird-resistance), and improved cropping techniques. In the case of Nigerian riverine habitats, Adams notes that "the productivity and extent of floodplain land cultivated using traditional techniques . . . can be contrasted with the poor performance, small area, and high cost of formal irrigation schemes . . . . About one million ha are cultivated under some kind of

traditional irrigation of flood-adapted cropping in Nigeria, compared with only 30,000 ha developed for formal irrigation" (1986:20).

4. Constraints To Developing Riverine Production Systems

While policy makers and researchers alike have underestimated the potential of riverine habitats and riverine production systems, care must be taken not to underestimate constraints to realizing that potential. Afflicted by serious diseases and characterized by irregular flooding and irregular rainfall throughout much of their length, Africa's riverine habitats have never been paradises. Furthermore, in recent decades they have come under increasing pressure due to a combination of factors including population increase, drought, environmental degradation, and current strategies for river basin development. In regard to river basin development strategies, not only has dam construction failed to realize expected benefits, but it has adversely affected riverine habitats and communities. Due to less flooding, flood plains have shrunk in size. Fish landings and the availability of critical grazing for livestock toward the end of the dry season and of land for flood recession agriculture have been significantly reduced. Production and living standards have dropped as a result. Well documented cases include the Middle Zambezi, the Kafue Flats, the Lower Volta, the Sokoto-Rima system, and the Niger River below Kainji. The impacts on downstream floodplains and communities of the Bakolori Dam in the Sokoto-Rima system have been so adverse that Adams concludes that their inclusion within the economic appraisal "should have been enough to prevent development of the project" (1985b: 300).

Local populations alone are not able to deal with such constraints. If they are to be resolved, a range of local, national, and international

institutions must be involved. Control of river blindness and human sleeping sickness and of grasshoppers and locusts, for example, require international cooperation and the involvement of both bilateral and multilateral donors. The same is true in regard to formulation of sustainable policies and the implementation of plans for truly integrated river basin development.

5. The Enhancement Of Riverine Habitats And Production Systems

a. New Policies and Strategies

To correct the unsatisfactory record to date will require new policies and strategies on the part of both national and donor agencies. It will also require improved water management and institutional development. In regard to new policies and strategies, the starting point is a willingness to consider a wider range of alternatives relating to river basin development. These need not be mutually exclusive, since a range of options might be implemented over a period of several decades. For example, initial emphasis might be placed on the intensification of rainfed agriculture, which continues to support the majority of Africa's citizens. Subsequently, major infrastructure including irrigation projects and dams might be built, provided the necessary studies justified their construction. One option involving major infrastructure would be dam construction that combines hydropower generation (the revenue from which is needed for debt service) with irrigation and the enhancement of riverine habitats and production systems.

In the policy arena, the donor community (and especially the World Bank whose new president has at least enunciated the goal of the bank becoming part of the solution rather than remaining part of the problem) will probably have to play the lead role. Especially important are high level consultations with

heads of states and ministers to demonstrate to them that existing policies are not achieving the expected multiplier effects. Since river basin development projects tend to be the lead projects in national development plans, donors should also consider linking new strategies with structural reforms relating to closer linkages between agriculture and industry, to the reorganization of such government parastatals as river basin authorities and irrigation agencies, and to a stronger role for nongovernmental institutions including local organizations, private sector firms, and nongovernmental organizations.

b. Improved Water Management

While more favorable policies are a requirement, the key to the enhancement of riverine production systems is improved water management. While local economies are dependent on annual or biannual flooding, all too frequently those economies are adversely affected by ill-timed flooding, excessive flooding, or inadequate flooding. Simmons (1986) notes, for example, that farmers in the inland delta of the Niger are adversely affected by irregular flooding every three to five years. Because of the extreme variation in riverine flood regimes, infrastructure providing partial control has proved unsatisfactory in tropical Africa. As a result, the question arises as to whether or not the construction of major dams for the release of a controlled downriver flood, which could also be combined with drawdown regularization in the reservoir basin, might be the best management tool.

Aside from convincing hydropower advocates that a proportion of stored water is better used for a controlled downriver flood than for hydropower generation, controlled flooding faces two major problems. First is the extent to which it will actually enhance flood water agriculture, livestock

management, and fisheries development as well as a range of options like tube-well irrigation and reforestation associated with aquifer recharge. A controlled downriver flood is not the same as natural flooding. For one thing, the very irregularity of natural flooding may play an important ecological role in flushing out salts and maintaining riverine forests -- a role which controlled flooding may not simulate. Another unknown is whether the duration of flooding will be sufficient for aquifer recharge and enhancing the productivity of flood recession agriculture. Natural flooding in good years may cover extensive floodplain areas for several months. Will a controlled flood of 15 to 30 days provide sufficient benefits, since longer-duration flooding probably is not justified in terms of decreased reservoir storage for hydropower generation?

The second major problem concerns the trade-offs between hydropower generation and controlled flooding. The latter requires release of water through floodgates rather than through turbines, hence reducing the amount of electricity generated. It is estimated by the World Bank, for example, that inundating 50,000 hectares for flood recession agriculture in the Middle Senegal Valley will reduce the generating capacity of the Manantali Dam by about 25 percent. Trade-offs in such a situation are complicated. Assuming that benefits from the two alternatives can be measured, hydropower provides benefits primarily to the urban industrial sector while the principal benefits of controlled flooding go to rural populations living within the river basin. In contemporary Africa not only do political elites live in urban areas but urban residents have far more political clout than does the rural majority.

Another problem relates to loan repayment. While such direct benefits from controlled flooding as increased production, rising living standards, and

such multipliers as enterprise development and increased nonfarm employment may more than offset reduced hydropower generation, sale of electricity in a city like Dakar not only provides a much more easily tapped source of revenue for debt servicing but also provides revenue at an earlier date. At the expense of longer term development, donors are currently pushing for a single line from Manantali to Dakar (which would bypass the most densely settled portions of the Senegal River Valley) as opposed to two lines (with one serving the Middle and Lower valleys) in part because of their concern about debt repayment.

The recent completion of the Manantali Dam provides an exceptional opportunity to provide answers to such fundamental questions. Dam construction was completed in 1987, with the reservoir beginning to fill during the 1987 rains. Due to funding constraints, the first turbine will not be operational until 1993 at the earliest. Starting in August-September, 1988, a controlled downriver flood will be released for the benefit of downstream users and especially for flood recession cultivators in the Middle Valley. It is of great importance for the riparian states and for the rest of Africa that the impacts of this controlled flooding be carefully studied over the next five years. This is because Manantali provides the first opportunity in tropical Africa to monitor and evaluate the impacts of controlled flooding from a major mainstream dam and to compare those impacts with the expected costs and benefits of other development outcomes, including hydropower generation and irrigation without controlled flooding.

Impact assessments at Manantali need to address a broad range of issues, including increased biological productivity associated with controlled flooding and the proportion of that productivity that is tapped through such activities as flood recession cultivation; well irrigation permitted by aquifer recharge

(and involving buckets, shadoof, tubewell and other devices), livestock management (related to improved pasture resources during the dry season), fishing, and agro-forestry. Through the Human Settlement and Natural Resource Systems Analysis Cooperative Agreement (SARSA), AID is funding three years of studies relating to the response of local populations to controlled flooding in the Middle Valley. While this is an important initiative, it need be complemented with other studies that address such topics as aquifer recharge and the impacts of flooding on biological productivity. Still other studies are needed in the Upper Valley and within the Manantali reservoir area. While some of these may be funded by GTZ (Manantali reservoir planning) and AID (Upper Valley Master Plan), a more systematic attempt is needed to identify, fund, and execute the research necessary to assess the "electricity cum controlled downstream flood and reservoir drawdown" option, the implications of which extend well beyond the Senegal River Basin.

c. Institutional Involvement

In regard to institutional involvement, river basin development is too important and too complex a process to leave to river basin authorities and national parastatals and international donors, consultants, and contractors alone. Riparian populations as represented by local organizations must be involved throughout. There is also an important role for private voluntary organizations to play in enhancing local production systems and facilitating local level institution building. Indeed, over 30 different kinds of institutions have played an important role in attempts to develop Africa's river basins.

6. The Roles Of Institutions

Granted the frequency with which inadequate management is mentioned as a African constraint, the topic of institutional capabilities is a crucial one. In the paragraphs that follow, however, emphasis is placed not just on problems but also on "success stories" where local organizations, river basin authorities, and other types of institution have played an effective role in river basin development, even though their policies may have been wanting. Because of the importance of riverine communities, local organizations are considered first. Though most need periodic external assistance, the timing, nature, and duration of that assistance need be more carefully assessed so that, unwittingly, it does not undermine the initiative and enterprise that outside agencies are trying to encourage.

a. Local Organizations

The lack of information on successful local organizations in tropical Africa suggests their absence. Granted the recent literature on the positive relationship between local participation and project success (see especially Development Alternatives, 1975, in regard to rural development and Radosevich, 1979, in regard to irrigation), such an absence could be a major constraint to development in tropical Africa. Fortunately, a closer examination of the African scene shows that an amazingly diversified and effective set of producers' organizations have appeared in river basins during the past 20 years. While some of these are rooted in indigenous social organizations as in the Senegal Basin, in other cases they are of recent origin. Furthermore, as at Kibirigwe (Kenya) with its use of sprinkler irrigation and dependence on the

difficult market for horticultural produce, some have been able to handle technically sophisticated infrastructure and complicated market situations.

Unfortunately, throughout Africa such district level organizations as development committees and local councils have been less successful in part because of the failure of governments to combine programs of political decentralization with fiscal decentralization and in part because governments are apt to bypass them in regard to the planning and implementation of national projects.

As Kimani (1987) has noted in connection with Kenya's Mwea Amalgamated Rice Growers' Cooperative, in many of these organizations participants have shown themselves ready to shoulder additional responsibilities. Such a record should not lead to overconfidence, however, since many of the organizations are still comparatively new and have yet to prove their ability to sustain activities over time. Seemingly essential for success are three factors. The first is that local organizations should be "demand driven," that is, local people should see not only the need for an organization but should be strongly motivated to initiate and maintain it. The second is the presence of strong leaders at the right time. The third is the proper amount of external help in the form of both technical and financial assistance. While external assistance at some point in time appears crucial, too little will prove insufficient to deal with the problems at hand, while too much substitutes outside control for local control, undermines local initiative, and runs the risk of creating factionalism, dependency, or both. Such is especially the case with expatriate advisory assistance, no matter how well-meaning.

Though directed at government organizations, Okidi's (1987) analysis of Kenya's Provincial Irrigation Units is also applicable to local organizations:

> . . . the PIUs have evinced a central weakness in the foreign aid aspect. They are dominated by the foreign experts and money, therefore the control at overall policy level is largely foreign. The foreign irrigation experts take advantage of the absence of the local irrigation experts to perpetuate their stay and domination. The notion of training for the local counterparts does not work as the latter are easily diverted to other functions. Thus, a dependency situation is established and perpetuated.

Similar situations involving local organizations were observed by SARSA personnel in the Tana Basin as well as in the Middle Zambezi Valley and the Senegal River Basin. Clearly, there is a major risk involved which needs to be carefully assessed prior to project initiation and, where expatriate experts become subsequently involved, monitored and evaluated. The situation appears so difficult that technical assistance should be provided to the extent possible by the regular government technical agencies, and even then major assistance should be sporadic rather than continual. The ideal situation would appear to be illustrated by the Kangocho case in Kenya where the Irrigation and Drainage Branch, on request from participating farmers, helped with the design and construction of an offtake structure and then withdrew. Just as neighboring Island Farms did not have the skills to survey their fourth furrow, so Kangocho farmers did not have the necessary skills to provide the necessary offtake structure. While institution building for local organizations requires a more sustainable form of assistance, which is best provided by a wider range of institutions, including private voluntary organizations, it too should be carefully tailored to the task at hand and assessed in regard to its impacts on continued local participation.

b. River Basin Organizations

The critical question is not whether or not satisfactory river basin organizations can survive in Africa. The histories of the Volta River Authority, the Central African Power Corporation, and the Tana and Athi River Development Authority show that they can. Rather the critical question is whether or not such organizations can address themselves to a wider range of river basin development options, including those that do not involve the construction of major dams. The record to date is not encouraging, there being no examples yet of either international or national river basin authorities which have played an effective role in planning and coordinating the integrated development of a single river basin. Explanations for this deficiency include national preoccupation with hydropower generation as the major priority of river basin development and donor support for that prioritization. The end result is that river basin authorities become the executing agencies for that coalition of developers that continues to advocate the construction of dams and medium- and large-scale irrigation projects. In the process, such other options as rainfed agriculture, flood water cultivation, and livestock management tend to be ignored as is the participation of local organizations in the planning, implementation, and evaluation of development projects and programs.

This is a problem that needs further analysis. Is there a fundamental incompatibility between the pursuit of multiobjective development goals and river basin authorities? At the moment, the answer appears to be "yes," although for reasons that are not very clear. In part, the deficiency may be due to the nature of river basin authorities as centralized, hierarchical organizations whose senior staff find it very difficult to decentralize responsibilities to regional and project offices and to hand over managerial

and other responsibilities to other organizations, including local organizations. Another problem relates not so much to the nature of river basin authorities as organizations but rather to their establishment by heads of state and other senior officials, with the mandate to build dams, with the strong backing (indeed, in some cases the insistence) of donors. A major result of these characteristics is that river basin authorities are more effective during the construction phase of development than during the subsequent development phase. A solution to this deficiency may be to restrict the functions of authorities to planning, coordination, the raising and disbursement of funds, and monitoring; with the implementation and management of development programs and projects, including dam construction and operation, being the responsibility of other organizations.

For political as well as economic reasons, states which participate in international river basin authorities allocate most implementation of development projects to national institutions, with the major exception of dam construction. The member states in the the Middle Zambezi and the middle and lower Senegal Basin are examples. CAPCO's interests were largely restricted to dam construction for electricity generation and transmission. While the OMVS has belatedly recognized the importance of small-scale irrigation and has begun to recognize advantages which might be associated with `the hydropower plus controlled reservoir drawdown and downriver flood option,' would such options, along with others, have received more serious attention if international river basin development agencies were not given the responsibility from the start for building mainstream dams as opposed to planning how best to develop a given river basin?

National river basin authorities are more apt to engage in a wider range of implementation activities. Examples include the VRA and TARDA. While their efforts show that both organizations had the managerial capacity for carrying out a wider range of responsibilities, there is an increasing risk of conflicts of interest when authorities add implementation responsibilities to planning and coordinating ones. While the VRA has divested most of its non-power responsibilities (exceptions being Kpong Farms and Volta Lake transport), TARDA has been moving toward greater involvement in project implementation -- at the expense of its ability to coordinate and to mediate between different users within the Tana River Basin.

A major recommendation of SARSA is that serious consideration should be given to initially restricting the responsibilities of both national and international river basin authorities to planning and coordination, to raising and disbursing funds, and to monitoring project implementation. The question as to what organizations should construct or otherwise implement, manage, and evaluate specific projects (including dams) should be left until after plans have been assessed and specific options selected. While such a recommendation would not preclude river basin authorities from being implementing agencies in regard to pilot projects, dam construction, and other development efforts (such as lake transport), there is an underlying assumption in the SARSA recommendation that implementation and management should be handed over to other agencies, and that the intention of such handing over should be stated from the outset.

Since planning skills within river basin authorities are inadequate, they need be upgraded. The same is true of planning units, especially in such international river basin authorities as the OMVS, OMVG and NBA. On the one hand, such units need the political support of senior officials -- often a

delicate matter since those officials are apt to be under political pressure to proceed with dam construction before the necessary feasibility studies have been completed. On the other hand, they need a greatly improved capability to gather, store, access and analyze information and to present the results of analysis to policy makers in the form of a broad range of alternatives. Improved monitoring is also required. While evaluation is best left to other organizations (such as national universities and research institutions), planning units should also have a capability to assess evaluations. In all of these areas there is need for increased donor assistance.

c. Donors

Though deficiencies are emphasized in this section, in all fairness it should be stressed at the start not only that there are individuals within bilateral and multilateral agencies who are well aware of such deficiencies, but also that a corrective trend is underway. For example, AID has pioneered over the years the increasing incorporation of socioeconomic studies within environmental impact assessments. At the multilateral level, the World Bank has begun to look more closely at the environmental impacts of dam construction. The bank also has been taking increasing responsibility for ensuring that populations displaced in connection with dam construction do not suffer as a result of removal.

In the 1950s and 1960s, the World Bank ignored population relocation which was considered strictly a host country responsibility in the Kariba and Volta cases. Indeed at Volta, only part of the financing of the resettlement of over 80,000 people was considered a project cost. By the 1970s, however, the World Bank not only insisted at Kpong that relocation be considered a project cost

and its implementation a project responsibility, but resettlement expertise was included within bank appraisal missions. In the 1980s, the bank took the lead among donor agencies in pressing for equitable resettlement policies, being the first to formulate a set of guidelines for resettlement. Still more recent efforts in regard to the resettlement component of a number of projects in Africa, Asia, and Latin America illustrate that the bank is taking its own resettlement guidelines very seriously, even in the face of strong resistance from member countries. This statement applies both to new projects like Nangbeto Hydroelectric Project in Benin/Togo and to old ones, like Kiambere Hydroelectric Power project in Kenya where belated efforts are being made to assess the damage done where the bank's 1982 guidelines were ignored by bank personnel during both appraisal and supervisory missions.

It is too early, however, to known whether or not riverine states will actually implement the plans that they have formulated in response to World Bank guidelines, and it is too early to know whether or not the bank will take the necessary steps to require compliance after dam construction begins. The same problem applies to environmental guidelines, which also pertain more to plans than implementation of those plans. Furthermore, river basin development in Africa continues to be primarily the responsibility of the Energy Division so that dams are still viewed primarily as single purpose projects for hydro-power generation -- as illustrated by the titles of the Nangbeto and Kiambere projects. Rather than to facilitate sustainable development, the purpose of environmental and resettlement guidelines is to mitigate dam-induced adverse impacts. As a result, the World Bank continues to be "part of the problem" and will continue to be so until responsibility for river basin development is taken out of the hands of bank divisions responsible for energy and irrigation.

Most donor deficiencies are shared by bilateral and multilateral agencies alike. While donors have biases for or against different approaches toward river basin development, no policy or strategy papers were found by the SARSA teams. This is a serious failing. On the one hand, it perpetuates an outdated water resource management emphasis as opposed to the integrated development of land, water, and human resources. On the other hand, it makes it difficult for donors to follow through systematically on programs for river basin development which require not years but decades of careful policy formulation, conversion of policies into plans, and implementation, evaluation, and modification of those plans.

Another major problem, not easily resolved since major political and economic issues are at stake, is inadequate coordination among donors. Notwithstanding the difficulties, improved coordination is crucial if more successful river basin development is to be implemented. In the absence of coordination, each donor is all too apt to go its own way on a project by project basis. Haphazard and financially costly development is the result. Though riparian states may have political concerns about improved coordination, economically they cannot afford the long-term results of a haphazard and too narrow approach to the development of their few river systems. The fact that no one donor can go it alone in financing large-scale river basin infrastructure gives donors the opportunity to exercise leverage where necessary. Should multidonor coordination improve, as a last resort, donors should be willing to use their financial clout where riparian states are following unwise courses.

Other deficiencies concern: a project versus a regional orientation; excessive and inadequate studies and unrealistic planning expectations; delayed decision making and inadequate supervision; inadequate training and lack of

continuity of effort in regard to training and institution building; insufficient attention paid to riverine habitats and production systems (a theme that recurs throughout this monograph); and inadvertent suffocation of local initiative and participation. Only UNDP has taken a consistent regional approach to river basin development both in regard to research and institution building. As for studies, problems are too many studies, the wrong kind of studies, and an inability of host country agencies to utilize available studies.

While riparian states tend to underemphasize the importance of planning studies (the decision to proceed with a particular project often being a political one), it is ironic that donors require of African countries, with relatively weak planning skills, more planning than they require at home. Few riparian states can cope with the demand, being unable to access all the studies and reports let alone use them for planning purposes. Solutions to excessive studies and unrealistic planning expectations need involve better coordination and strategy formulation on the part of donors (with studies reflecting that coordination and those strategies, and with donors disseminating and standing by study results) and better planning capabilities on the part of riparian states. In the latter case there is no substitute for the institutionalization of effective data storage, analysis, planning, monitoring, and evaluation units within river basin authorities and planning ministries.

Looking to the future, training deserves much more donor attention not just for staffing institutions with river basin development responsibilities but also to reduce the heavy financial burden of high expatriate salaries. To date, the training component of both bilateral and multilateral programs time and again has been inadequate. The situation is especially deficient when donor funds are used to employ international experts and firms, since generally

speaking these place relatively low priority on training. Three major problems are involved. The first concerns the poor phasing of training in relationship to the expatriate expert component (trainees are apt to be studying overseas while expatriate staff members are in the field so that on-the-job training is rare). The second problem concerns the time constraints placed on expatriate researchers and advisers. Understandably eager to further their own careers by doing a good job, they tend to accord low priority to training. Finally, expatriates, and the organizations that they represent, are seldom eager to train their replacements, so again training and institution building receive low priority.

In illustrating various donor deficiencies, most SARSA examples have involved AID and the World Bank. Like other donors, neither AID nor the Bank have a strategy or set of guidelines for their involvement in river basin development. In the AID case lack of a strategy has weakened the agency's impact -- an unfortunate situation granted AID's concern with environmentally sustainable downstream development. Furthermore, because of the lack of an agreed-upon strategy: good projects have been inexcusably delayed in implementation; poor projects have been implemented; conceptually important projects have been poorly designed and mired in controversy; and AID has been unable to defend itself against both informed and uninformed criticisms of its efforts. In the case of the World Bank, river basin development has remained primarily the prerogative of divisions of energy and irrigation. As a result, the bank continues to contribute to the momentum favoring major dams for hydropower and irrigation as opposed to a genuinely integrated program of river basin development which may or may not involve major dam construction.

d. The Private Sector and Research Institutions

It should be continually kept in mind by both national planners and donors that the main private sector entity in Africa's river basins, in terms of numbers and importance, is the local household. Not only are household members the principal risk-takers in regard to development programs and projects, but it is their rising disposable income, more than any other factor, that spurs development during the early stages of industrialization. More attention should also be paid to the involvement of local firms than has been the case to date; indeed their involvement should be a requirement, with technical assistance and credit provided to improve their capabilities. Heads of state and national policy makers are insufficiently aware of the importance of household production systems; they also do not appear to realize the extent to which the construction of large-scale infrastructure favors international firms over local firms.

It is necessary to stress the importance of local households and firms because of the tendency for the major bilateral and multilateral donors to define private sector involvement primarily in terms of international firms and to advocate the involvement of those firms, as opposed to local firms and households, as "a privileged solution." This emphasis on local firms and households is not intended to denigrate the importance of involving international firms in river basin development. On the contrary, case studies show that international firms can play a key role in catalyzing regional development. Unfortunately, this potential has only seldom been realized, the more common outcome being the operation of international firms at the expense of local farm households. The logical corrective is to relate policy more closely

to research on what works to the benefit of international firms, on the one hand, and national, regional, and local development goals, on the other hand.

As an instrument for river basin development, to date international firms appear to have been most successful in the production and marketing of certain crops. In terms of production these are coffee, tea, rubber, tobacco, and sugar, with the greatest benefits accruing when the private sector (either alone or through a joint venture with government agencies) links a small holders' outgrowers program to a nucleus estate and processing facility. In terms of marketing, high value flowers, vegetables, and fruit for European winter consumption dominate.

For ideological reasons there is a tendency for donors to play down the role of government in successful private sector ventures, pushing instead for the removal of government involvement. Yet, that same government involvement has played a crucial role in some of the more successful private sector cases including Gezira Dam and the Zambia Sugar Company. Even where the private sector has gone it alone, in the sense that no legally constituted joint venture with government is involved, government involvement is still very much a factor whether in terms of favorable policies for leasing of land, for protection of new enterprises (including subsidized prices and import controls), and for credit, as in the Delmonte case, or for provision of feeder roads and electrification which benefit, for example, the Kenya Tea Growers Association.

Where tripartite joint ventures are involved (private sector, government, and small holder), the weakest partner is clearly the small holder. Donors should keep this in mind. While it is understandable that international firms, local subsidiaries, and local firms should place priority on their own interests, not infrequently those interests (as in the Delmonte and Gwembe Valley

Development Company cases) have been defined in ways that are contrary to the interests of local populations, especially in regard to involvement in agricultural production projects, and quite possibly even in terms of the longer-term interests of the firms involved. As in the recent Zambian emphasis on joint ventures, in their rush to implement a new policy, national governments may also act in ways that put local producers at a disadvantage. In giving assistance, donors must continue to bear the main responsibility for ensuring that adequate social and environmental impact assessments are completed, and that they are incorporated within plans for implementation.

Once the relationship between private sector, government, and small holder collaboration is better understood, donors should encourage private sector firms to participate more frequently in African agricultural development and in river basin development. There is much room for imaginative experiments involving research relating to the crops grown, joint production ventures, banking (along the line of experiments by Hatton's Bank in Sri Lanka in connection with the Accelerated Mahaweli River Basin Development Program, and other banks elsewhere in South Asia), management of former state farms (as in the case of Somalia's Juba River Basin sugar production project), and facilitation of outgrower production around petroleum and natural gas, mining, lumbering, and nucleus estates.

As for private voluntary organizations (PVOs), they are an important actor on the development stage, especially in situations where unfavorable rural-urban terms of trade and other constraints are associated with inadequate government services and funds. The PVOs can be especially effective in introducing alternate technologies and in building up local community or organizational capability to the point where local people can handle their own affairs

and compete for scarce local, regional, and national resources. On the negative side, weaknesses are several. First, overzealous personnel can delay or suffocate local initiative, hence delaying the institutionalization of selfhelp activities. Second, activities are apt to be restricted to a small number of communities. Third, monitoring and evaluation capabilities are weak. Given the range of PVO activities, and the creativity of many PVO personnel, this is a major inadequacy, since it not only leads to perpetuation of mistakes but to inadequate information about successes and the extent to which they are replicable. Fourth, generally speaking, there is very little coordination between PVOs, with each working in its own area and relatively uninformed about other activities which may be of relevance.

For PVOs to become more effective in the future, these weaknesses need be addressed by themselves and by donors like AID and the World Bank who are paying more attention to the involvement of PVOs in development activities. As with private sector firms, there is the risk of donors taking a "privileged solution" perspective in regard to PVOs. Clearly, they have an important role to play but as partners with local people, their institutions, governmental agencies, and other private organizations.

In advocating greater involvement of PVOs, once again, donors must not favor international organizations at the expense of local ones. So that local PVOs can emerge and be effective, donors should also consider carefully the legal and political environment in which they operate. With its multifaceted democracy, India, for example, is a more favorable environment for PVOs than exists in most African states. Just as donors diplomatically are pressing for structural reforms to facilitate economic development, reforms relating to

freedom of expression and to a reasonably independent legal system are needed if the potential of PVOs, and especially local PVOs, is to be released.

African universities and research institutions have played a more important role in river basin development than donors, and international researchers and consultants, realize. This conclusion is an important one, suggesting that an increasing proportion of donor funding for feasibility, monitoring, and evaluation studies, and for conferences and workshops, should be used to utilize and build the research capacity of African universities and research institutions.

B. RECOMMENDATIONS

1. Introduction

The recommendations in this section are not targeted at any one type of organization whether river basin authorities, donors (including AID), or local organizations. Although some relate to organizational matters, they are based, on the one hand, on SARSA's assessment of the record with African river basin development to date and, on the other hand, on the potential for sustainable growth with equity. More specifically, by building on achievements and attempting to offset failings, their intention is to facilitate sustainable development of Africa's river basins for the benefit of both the riparian habitat and its resident population and for the riparian states.

Many of the recommendations in this section are not new. During the 1960s and the first half of the 1970s, for example, the need for considering a wider range of alternatives, and for flexibility in planning, was emphasized in both national and international publications, while a wider range of topics were researched through the various reservoir research projects funded by UNDP and executed by FAO and various riparian states. Nonetheless, the recommendations that follow go beyond previous recommendations in a number of ways. First, they have the benefit of a more detailed assessment of the record to date and, more specifically, of the performance of a wider range of institutions with river basin development responsibilities than has been considered in the past. Second, the emphasis has shifted from water resource management to the sustainable development of human, land, and water resources. Third, for the first time, impacts on downstream users are considered and strategies suggested for downstream development which could combine hydro power generation and irrigation with regularized reservoir drawdown and a controlled downstream flood.

The major source for the recommendations that follow are the SARSA studies, including the issues papers presented at the AID-sponsored April 1985 Washington, D.C. conference and the fieldwork and analysis carried out thereafter. The next most important source was the proceedings of the AID-sponsored May, 1988 Easton conference and especially the recommendations drafted by the four workshops.

2. Policy Recommendations And Recommendations Relating To Analytical Approaches To River Basin Development

a. Donors should clarify their guidelines, policies, and/or strategies for river basin development. Because river basin development is a dynamic process about which knowledge is increasing, such guidelines, policies and strategies need be periodically updated.

Discussion: While donors have biases regarding different approaches to river basin development, no policy or strategy papers, or even guidelines, were found by the SARSA teams. This is a serious deficiency. On the one hand, it perpetuates an out-dated water resource management emphasis as opposed to the integrated development of human, land, and water resources. On the other hand, it makes it difficult for donors to stand by the results of studies that reach unpopular conclusions (as with the University of Michigan studies of Gambia River development) and to follow through systematically on programs for river basin development that require not years but decades of careful policy formulation, conversion of policies into plans, and implementation, evaluation, and modification of those plans.

b. Donors should establish a forum to discuss river basin development strategies and to improve coordination of effort.

Discussion: While it will be very difficult for multilateral and bilateral donors and riparian states to agree on a common approach to river basin

development, let alone to articulate a common set of guidelines or policies, the stakes are too high not to make the attempt. Africa is a continent in crisis. Most African countries have access to only one or two river basins, or portions of river basins, which are apt to be national heartlands or potential heartlands. Further, river basin development projects involving large dams tend to be the largest single investment in national development plans.

In the 1985 HYDROSULT report by FAO on the multidonor/multidisciplinary approach to African river and lake basin development has already suggested high level discussions among UN agencies, noting "the obvious advantages of a UN system with a unanimous standpoint concerning river basin development planning" (page 48). At the very least, FAO, the UN, UNDP, and the World Bank should be involved. In addition to executing numerous feasibility studies and projects within river basins, FAO has also executed important research projects on the impacts of reservoir impoundment.

The UN has consistently advocated an integrated approach to river basin development through periodic updates by a panel of experts convened through the Department of Economic and Social Affairs. The UN's Department of Technical Co-operation for Development has also been actively involved in river basin issues as an organizer of international meetings, the next of which is to focus on Africa (organized in cooperation with the Economic Commission for Africa, it will be held in Addis Ababa in October, 1988).

The UNDP has also sponsored international meetings, as well as providing funds for river basin research and documentation, feasibility studies, institutional development, and convening of round tables to bring together donors and riparian states. As for the World Bank, it is the major international agency appraising and funding large-scale river basin development projects.

It is not enough, however, for such strategy sessions to be restricted to multilateral agencies. Though the World Bank may be the major multilateral funder of river basin development projects, the bulk of the finance continues to come from bilateral donors and banks. While it is to expected that such bilateral sources will have their own agendas, the need for pooling the resources of a variety of donors provides the opportunity to ensure that those agendas are not at the expense of longer-term African development. This opportunity has yet to be realized and will not be realized unless the relevant UN agencies, with strong backing from key bilateral donors, are willing to push for joint action.

How riparian states should be articulated to an international forum requires further discussion. At the very least a major function of the forum should be to discuss with heads of state outcomes which can be expected from different approaches to river basin development. That function is discussed in the next recommendation. As for improved coordination between donors, though difficult to achieve, it is crucial. In the absence of coordination, each donor is apt to go its own way on a project by project basis. Haphazard and financially costly development is the result.

c. <u>The international forum discussed under the second recommendation should also be used to discuss river basin development objectives with heads of state and concerned officials within riparian states.</u>

Discussion: Where they stand alone, recommendations to consider a wider range of development strategies rarely receive serious consideration. This is because of a number of political, institutional, and technical constraints. All too often, for example, decisions to proceed with dam projects are based on political considerations which either ignore or precede the necessary

feasibility studies. Hence, Nkrumah paid insufficient attention to the 1956 findings of the Preparatory Commission in advocating development goals for the Volta Dam, while the President of Somalia has decided in favor of the Baardeere Dam prior to the completion of the necessary feasibility studies. While heads of state in such cases have laudable national and river basin development goals in mind, the record to date shows that such goals have not been realized. A mechanism such as an international forum is badly needed for discussing how best to achieve the type of multiplier effects desired by heads of state. Heads of state and other policy makers then need to decide upon priorities which are subsequently passed on to planners.

In assessing the feasibility of such a forum, donors and riparian states need be aware of various precedents. Though restricted in scope to specific river basins and projects, and generally chaired by officials representing international river basin authorities or riparian states, examples include consultative committees (as for Senegal River basin development) and various other multidonor meetings convened, in particular, by UNDP and the World Bank. SARSA's recommendations go considerably beyond these precedents, however, since they advocate the formation of a permanent forum dealing with policy issues, development outcomes, and priorities relating to river basin development throughout tropical Africa.

Such a forum could play a major role in providing heads of state and other senior politicians with better information on what can be expected from different approaches to river basin development. In particular, they need to be better informed about the need for development programs to raise the disposable incomes of large numbers of river basin residents rather than to impoverish them by transferring basin resources elsewhere.

d. Multidonor funding for river basin development projects should be linked to execution by riparian states of minimal structural reforms.

Discussion: During the early stages of industrialization, development is primarily driven by the rising production and disposable incomes of large numbers of rural residents. Production provides foodstuffs and other primary products to sustain urban populations and industries. Rising disposable incomes catalyze a process of enterprise creation and employment generation through increased demand for goods and services which can be produced within the riparian states. For such benefits to be achieved, however, national policies and terms of trade must provide sufficient incentive to rural producers, including those living within river basins.

Increasingly, both bilateral and multilateral donors are insisting on structural reforms. In Toward Sustained Development in Sub-Saharan Africa: A Joint Program of Action, the World Bank (1984) noted that "Consultative groups, United Nations Development Programme (UNDP) roundtables, and similar meetings should aim for more explicit and monitorable commitments by recipient governments and donors to implement their respective responsibilities under an agreed program of action."

While the World Bank statement is directed at programs for national development, it is equally applicable to river basin development programs and projects which are apt to be major components within national development plans. Because of the funding levels involved and the inability of any one riparian state or donor to proceed alone, large-scale river basin development projects provide an exceptional opportunity for linking investment to structural reforms.

To be effective, however, "policy based lending" and "lending conditionality" must be consistently applied by donors. In a recent critique of bilateral

donors, the World Bank emphasized that they "must recognize that, if they allow commercial or strategic considerations to outweigh considerations of priority, efficiency and relevance in their assistance decisions, they weaken the ability and willingness of governments to implement reforms" (1984b:4).

e. Donors should continue to bear the main responsibility for ensuring that adequate social and environmental impact assessments are completed, and that they are incorporated into plans for implementation.

Discussion: Continued donor responsibility is needed because of the scant attention paid by African governments to environmental and social equity issues. In comparison to South Asia, for example, the situation is worsened due to the scarcity of local private voluntary organizations that champion environmental and social causes and the relative lack of political clout of the rural majority. Just as donors diplomatically are pressing for structural reforms to speed economic development, so too, reforms relating to freedom of expression and a more independent legal system are needed if the potential of local populations and of local private voluntary organizations is to be released.

f. Current donor emphases on privatization need be carefully adapted to African conditions, where the rural household continues to be the main unit of production and where building up the capability of indigenous private sector firms should also receive priority.

Discussion: It is necessary to reiterate this point for two reasons: (1) First, to emphasize again that during the early stages of industrialization it is the rising productivity and disposable income of millions of small-scale producers that is the engine that drives development; (2) to correct the bias of many donors toward their own firms, or in cases requiring international competitive bidding, toward large-scale expatriate firms. Situations, such as

the construction of the Diama and Manantali dams in the Senegal Basin, where virtually all contracts go to expatriate firms, point up a contradiction between donor words and actions. Even where local firms may be less efficient and less cost effective than international ones, a major goal of development assistance should be to strengthen the capacity of the private sector of riparian states.

g. As a matter of policy, riparian states should actively encourage and facilitate the involvement of local organizations in the planning, execution, and evaluation of river basin development. The involvement of various private voluntary organizations should also be encouraged.

Discussion: River basin development is too important a process to be left to government agencies, donors, and international contractors and consultants. Local organizations include farmers' associations, rural councils, and district development committees. Such organizations should be involved in all stages of the project cycle from project and program identification through ex-post evaluation. Since few local organizations have the staff, training, or the financing to participate in the planning process, let alone to play an important implementation and management role, external assistance is needed.

A solution to this constraint requires government sanction and finance, as well as selective financial and technical assistance from donors, and appropriate technical and institution building assistance from private voluntary organizations, foundations, and other non-governmental organizations. Use of the words "selective" and "appropriate" is intended to remind donors and NGOs of the risks involved in providing too much assistance too fast, hence creating dependency and factionalism, and undermining local initiative.

h. Donors should help research institutions in riparian states develop capabilities to undertake a gradually increasing proportion of feasibility, appraisal, and evaluatory studies relating to river basin development.

Discussion: Such institutions should include both national and international (but African-based) institutions within and without universities. The African Academy of Sciences should be encouraged to play the major coordinating role, especially in regard to basic research and dissemination of research results through meetings and publications.

3. Planning And Implementation Recommendations

a. In planning river basin development projects in Africa, a much wider range of alternatives must be considered, prioritized, and sequenced.

Discussion: In a number of respects this recommendation reiterates the recommendations of the Committee on Water of the United States National Academy of Sciences/National Research Council over twenty years ago. At least three different categories of alternatives need be emphasized. The first category compares river basin development alternatives with development approaches which relate to the riparian nations as a whole or to other regions within those nations. Hence, in considering alternatives to development of the Colorado River Basin, the above mentioned Committee on Water considered such wider alternatives as investment in education. In the African context, investment in rainfed crop agriculture and livestock management both within and without the basin might be an example of such a broader alternative since SARSA believes that enhancement of rainfed production systems should be a major priority throughout tropical Africa.

Consideration of alternatives must be carried out within a dynamic context. Where prioritization and sequencing are emphasized, alternatives which may appear incompatible at a particular point in time become more feasible when

prioritized and sequenced through time. A case in point relates to the recommendation by Stryker et al. (1978) that Sahelian development could benefit from emphasis on rainfed agriculture during the first decade and irrigation and other river basin development options during the second decade.

The second category of alternatives relates more specifically to river basins. While it includes "with major dam" and "without major dam" options, again, sequencing may show such options to be complementary rather than incompatible through time. For example, the West African onchocerciasis control program has opened up sizeable areas for river basin settlement in the Sudanic Zone where precipitation is sufficient for rainfed agriculture. After a ten-year delay, settlement planning is receiving for the first time the importance it deserves through several UNDP-funded World Bank-executed studies. It this case, an initial emphasis on rainfed agriculture might or might not be followed by dam construction and irrigation.

The third category of options broadens the alternatives associated with dam construction. In particular, the ecological and developmental trade-offs associated with reservoir drawdown regularization and a controlled downriver flood need much more careful assessment. The need for further research relating to this alternative is emphasized below as another recommendation.

b. <u>International, donor nation, and riparian state research institutions should collaborate in standardizing appropriate techniques for assessing a wider range of river basin development options, and for prioritizing options through time.</u>

Discussion: As currently utilized, methodologies for assessing African river basin development options are seriously deficient since they: overemphasize national accounting (as opposed to national, regional, sociocultural, and environmental accounting), engineering and macroeconomics (as opposed to a

more multidisciplinary approach including agricultural sciences, natural resource management, and the other social sciences); underestimate costs (especially as they apply to affected habitats and societies); and deemphasize the importance of positive and negative multiplier effects. Within research institutions like the World Bank, the United States Department of Energy, and the Institute for International Applied Systems Analysis there is ongoing debate as to whether the problem is primarily the non-utilization or misapplication of known methodologies or the inadequacies of existing techniques. Resolution of this issue should be linked to the careful evaluation of a small number of river basins or portions of basins where dams and other major infrastructure were built at least a generation ago.

c. Appropriate local institutions should be involved early in the planning process as standard procedure.

Though large-scale river basin development programs must serve the national interests of the riparian states, when dam, irrigation, and other types of projects are implemented, the main risktakers are those who live within Africa's river basins, and especially the low income rural majority. To date, they have not only received few of the benefits associated with river basin development, but they have also had to absorb the main costs. Through appropriate local institutions, local populations should be involved in all stages of the planning process including project identification, planning, monitoring, and evaluation.

d. <u>More attention should be paid to the involvement of local private sector firms in river basin development activities than has been the case to date; indeed, their involvement should be a donor requirement, with technical assistance and credit provided to improve their capabilities.</u>

Discussion: When African leaders opt for large-scale river basin development projects, they make decisions which favor international corporations over local corporations. In the same way, international competitive bidding requirements, bilateral donor preferences for their own firms, and the preferences of expatriate consulting engineers for expatriate firms retard the development of a strong private sector in riparian states. Granted the increased emphasis given in policy statements to private sector development, donors need to re-evaluate how their programs can better contribute to increasing the number, capability and effectiveness of local firms.

e. <u>The planning of river basin development programs should be the responsibility of institutions, ministries, and/or divisions with multisectorial capabilities. Whether within the World Bank or riparian states, planning should not be the responsibility of energy divisions or ministries of power, public works, and irrigation.</u>

Discussion: A major weakness of African river basin development to date is the failure to apply the concept of multiobjective planning. Over-emphasis on hydropower generation for the urban-residential, commercial, and industrial sectors has been fostered by concentrating responsibility for planning in organizations concerned with energy development and construction of infrastructure, and by recruiting engineers for the key positions. This generalization applies to international and national river basin authorities, key ministries and parastatals, and to the World Bank. The case of the World Bank is particularly instructive. Not only is dam construction primarily the responsibility of the bank's energy divisions, but it was also stated by bank officials at the May 1988 Easton conference that the bank did not have the

institutional capability to deal with multisectorial planning. So long as this constraint remains, the World Bank will continue to be "part of the problem" in regard to the ongoing failure of development institutions to capture a greater portion of the potential of Africa's river basins for development.

f. Within riparian states, continued priority should be given to building of institutions with major river basin development responsibilities.

Discussion: While emphasis in the past has been on building up the capabilities of national and international river basin authorities, and, more recently, of planning and finance ministries, this should be extended to such local level institutions as district councils and district development committees. Special attention should be given to establishing managerial competence and financial viability.

g. Priority should also be given to the creation of strong planning units within river basin authorities, relevant parastatals, and ministries of planning and finance.

Discussion: While existing institutions have many weaknesses that need be addressed through institution building programs, a universal weakness is the inadequacy of their planning units. Inadequacies relate to staff and staff training. They also relate to the articulation of planners to decision makers (in the OMVS, for example, the outputs of The Planning Unit do not go directly to the Secretary General but must filter up through a hierarchy of offices).

The functions of planning units should encompass: acquisition, storage, and processing of information; formulation of planning options and rolling plans; dissemination of options to key decision-makers; and monitoring and evaluation. While external evaluation is essential to keep planning units from being pressured into serving self-justifying public relations functions, the

planning unit does need the capability to assess all sorts of studies, whether feasibility or evaluatory.

h. Special emphasis should be placed on staff training within all levels of institutions with river basin development responsibilities.

Discussion: Staff training deserves more support not just for staffing institutions but also to reduce the heavy financial burden of high salaries for expatriate advisers and staff members, including research scientists. In existing bilateral and multilateral programs, training components continue to be inadequate. The situation is especially deficient when donor funds are used to employ international experts and firms, since both are apt to accord low priority to training.

Though staff members prefer overseas training, more emphasis upon on-the-job training is essential so that riparian state trainees can benefit from the experience and expertise of expatriate personnel. More emphasis should also be placed on training within Africa or in other areas of the tropics with special expertise relevant to African river basin development. While project visits can be a useful training exercise, their utility could be strengthened if they were carried out in conjunction with short courses within the countries visited. With the assistance of donor funding and international experts, short courses might be organized, for example, within the Volta River Authority or the Central African Power Corporation. For training to be effectively used, there should be good conditions of service and opportunities for advancement within the sending institutions. A special problem that needs be addressed in regard to research workers is the availability, on their return from training, of the necessary equipment, transport, and other support needed to apply what has been learned.

i. Planning should be more "Africa oriented." In particular, it should be more sensitive to the nature of Africa's climatic cycles (especially as they relate to drought), to the nature and variability of African river regimes and other major features of the resource base (especially soils), and to the relationship of riverine populations to annual flooding. Planning should also be more sensitive to the development implications of the uncertainty associated with African economies.

Discussion: At the national level, World Bank evaluations warn against overly optimistic appraisals of development benefits, stressing the need for more reliable forecasting and analyses of demand. At the regional and project level, time and again case studies emphasize the major costs that have been associated with inadequate soil surveys, inadequate understanding of drought, inadequate understanding of the nature of Africa's river regimes, and inadequate understanding of the dependence of millions of people on flood regimes which to date have been adversely affected by dam construction. No systematic attempts have been made by riparian states, donors, or scientists to assess systematically the development potential of riverine floodplains or production systems in tropical Africa.

Broader feasibility assessments for both dams and irrigation projects should include, from the start, social science analyses of local communities. Such analyses must pay particular attention to land tenure, the nature and potential of local production systems, marketing networks, and rural-urban linkages within the encompassing region.

There is a critical need to deal with these deficiencies in the planning process. Where knowledge is incomplete, high priority should be given to whatever research is necessary.

j. Planning should pay far more attention to the nature and potential of local riverine and lacustrine production systems both before and after dam construction.

Discussion: Such systems support millions of people and livestock. Multi-faceted, they tend to be both more stable and more dynamic than the production systems of planners. They also have considerable potential for intensification at relatively low costs per hectare and per household. This statement applies to both pre- and post-dam situations. Following reservoir impoundment, for example, local populations have been quick to crop some drawdown areas while grazing others. Planners have tended to ignore the potential of the drawdown zone and especially the combined development potential of a regularized drawdown and a controlled downriver flood.

k. In relating the two previous recommendations, ongoing and future dam feasibility studies should carefully assess costs and benefits of a regularized reservoir drawdown and a controlled downriver flood as they relate to environmental enhancement and to increased productivity of local production systems, and such multipliers as nonfarm enterprise development and employment generation stimulated by the rising disposable incomes of local producers.

Discussion: It is important to bear in mind that African river basin development has not only failed to benefit large numbers of rural households but has also made millions of river basin residents worse off. It has also adversely affected riverine habitats. Because a controlled downriver flood could provide major environmental, economic, and socio-political benefits where dams are constructed, assessment of the "controlled flood" option, combined with an assessment of the effects of a regularized reservoir drawdown, should become standard procedure in future feasibility analyses. The tradeoffs between a controlled downriver flood and reduced hydropower generation should be assessed, as a matter of course, in ongoing and future feasibility analyses.

l. Serious consideration should be given to breaking river basins down into planning zones after basinwide assessments have been made and priorities established.

Discussion: While certain aspects of planning require that the river basin be analyzed as a whole (as a hydrological system, for example), the variety of riverine habitats in Africa, the international character of many of Africa's river basins, and current trends toward regional and district decentralization within nations suggest that a zonal approach to planning might follow, or be combined with, an assessment of the development alternatives associated with the river basin as a whole.

m. Serious consideration should be given, initially, to restricting the responsibilities of both national and international river basin authorities to planning and coordination, to raising and disbursing funds, and to monitoring project implementation.

Discussion: This is a tentative recommendation. Its main merit is based on two considerations. First, the record to date shows that river basin authorities are more effective as planning agencies than as development agencies. Second, there is an increasing potential for conflicts of interest when authorities add implementation responsibilities to planning and coordination ones. This is especially the case where those implementation responsibilities require large amounts of water as with hydropower generation and large-scale irrigation. While this recommendation should not preclude river basin authorities from being implementing agencies in regard to pilot projects and dam construction, clearly, the capacity of a river basin authority to consider a wide range of alternatives, including those that do not involve the construction of major dams, is compromised if that authority is seen from the start as an agency for planning and fund raising for dam construction.

The question as to what organizations should construct or otherwise implement, manage, and evaluate specific projects (including dams) might be deferred until after alternatives have been assessed and specific options selected. At that time decisions as to what implementation roles, if any, river basin authorities should have would also have to take into consideration the capacity and motivation of other organizations to take on additional responsibilities, and the advantages and disadvantages of creating new organizations where that capacity and motivation does not exist.

4. Recommendations Relating To Monitoring And Evaluation And To Research

a. Institutional assistance should be given to build up the monitoring and evaluatory capability of river basin authorities, relevant parastatals, and ministries of planning and finance

Discussion: Inadequate monitoring and evaluation have been major deficiencies associated with programs of African river basin development. Where monitoring does occur, frequently its purpose is to record numbers as they relate to the realization of construction goals, for example, to cubic meters of concrete laid, or kilometers of canals constructed. All too often such information is more for public relations purposes or to provide information for supervisory or evaluatory missions of donors. In the future, much more emphasis should be on monitoring for development, that is, using monitoring as a mechanism to improve planning and plan implementation. In this way, monitoring can contribute to a more flexible form of planning and to "rolling planning" by serving an "early warning system" function that identifies problems before they become too serious, that points up misconceptions and erroneous assumptions, and that identifies new opportunities to be taken advantage of.

Unlike monitoring, evaluation should be carried out by "outside" agencies. Wherever possible, it should be contracted to universities and research institutions within the riparian states supplemented, where necessary, with outside expertise. While such organizations are not free from the influence of stronger government organizations, nonetheless, placing prime responsibility in their hands increases the possibility for relatively objective evaluations and for new insights into the river basin development process. At the same time, river basin authorities, relevant parastatals, and ministries of planning and finance should also have an evaluatory capability in their planning unit so that they can process external evaluations and convert them to a form that can be used by decision makers.

b. Research priority should be given to a small number of carefully selected and designed studies of the positive and negative impacts of river basin development programs that were implemented during the 1950s and the 1960s.

Discussion: In terms of improved planning, a serious deficiency is the lack of a single comprehensive analysis of the costs and benefits of African river basin development. This is a serious deficiency which should be corrected at the earliest possible time. It is taken for granted the stakes involved in such a research project deserves strong riparian state and donor support. Because of its pan-African implications, it is the kind of research effort which could benefit greatly from the involvement of the new African Academy of Sciences, other pan-African research institutions, and national universities and research organizations. Financing, on the other hand, would require donor support, while the expertise of non-African universities and research institutions is also needed. The IIASA, for example, could play an important role in modeling the impacts of river basin development programs. An

important aspect of such a research effort would be to assess the applicability of existing methodologies and to develop new tools as necessary. This aspect of the research program would have immediate applicability for improving feasibility analyses.

c. Priority should also be given to research on the nature and potential of African wetlands and other riverine habitats, and to the development potential of local production systems utilizing those habitats.

Discussion: Africa's wetlands are major national resources, the potential of which have been seriously underestimated. As pointed out by University of Zambia researchers, the biological productivity of "an area such as the Kafue Flats may in the long run prove to be vastly more important to mankind than its short term value as a modified water storage for the generation of electric power" (Williams and Howell 1977:102). As for riverine production systems, not only are they important for millions of people and their livestock, but they support more people than irrigation projects at a much lower cost per household or hectare developed. Relatively productive, they have also proved to be environmentally sound over the centuries. While some information exists on where to extend the area under cultivation, little research has been carried out on possibilities for intensification, the emphasis in feasibility studies being on how to mitigate adverse effects of dams on local production systems as opposed to how dams might enhance their productivity. Though there are a few exceptions, generally speaking, local production systems have been over-surveyed and under-researched. In the Middle Valley of the Senegal River Basin, for example, no detailed studies of local production systems have been completed and, hence, there is insufficient information on which to base

policies concerning post-Manantali river regimes, including a controlled annual flood.

A word of caution is necessary, however, so as to avoid taking too optimistic a view of local production systems. These are dynamic systems, some of which are out of balance because of such factors as population increase, environmental degradation, and previous development policies. The impact and implications of these factors must also be studied as must the willingness of urban-based labor migrants to return to agricultural and other rural occupations, and the willingness of the better educated youth of today to participate in such occupations.

d. Research is also needed on the nature of the impacts of dams on downstream populations.

Discussion: While the effects of the relocation of people from reservoir basins have been studied in considerable detail, the same is not true concerning those living below dams. Throughout tropical Africa many millions of people are involved, the majority of whom appear to be dependent in some fashion on the annual flood of free-flowing rivers. However, except in parts of Nigeria, little documentation exists on the number of people involved and the nature of the impacts of dam construction. Until more is known about these impacts, feasibility studies will continue to ignore them as will development plans and programs.

e. Donors should play a more active role in funding research for river basin development in a way that also contributes to building the research capacity of local research institutions and universities.

Discussion: SARSA documented case after case where local researchers, research institutions, and universities have played an important role in

undertaking policy-oriented research, and in organizing development-related seminars and research programs. The time has come for donors and riparian states to involve local research institutions and universities to a greater extend in the design and execution of feasibility, monitoring and evaluation studies, and in the holding of relevant seminars, training courses, and workshops.

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