AN INTEGRATED APPROACH TO WATER RESOURCES MANAGEMENT: STRATEGY FOR SUB-SAHARAN AFRICA

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TO
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CONTENTS

I Introduction ..................................................................................... 1

II. Background .................................................................................. 3
Topography and Climate ........................................................................ 3
Drainage Basins ............................................................................... 3
Sub-Regional Characteristics ................................................................. 4

III. Justification, Scope, and Objectives ................................................. 9

IV. Key Problems and Issues ................................................................ 11
Highly Variable Water Supply and Drought .......................................... 11
Health and Environment Problems ...................................................... 12
Health ................................................................................................. 12
Environment ..................................................................................... 14
Management Institutions, Mechanisms, and Capacity ...................... 15
Fragmented Water Resources Management ....................................... 15
Limited Water Resource Management Capacity .................................. 16
Underpricing, Inefficiency, and Allocation Problems ......................... 18
Lack of Stakeholder Participation ...................................................... 19
Data, Information, and Knowledge ...................................................... 21
Problems Associated with International Water Resources .................. 22

V. Methodology, Expected Output, and Intended Audience ............. 25
Methodology .................................................................................... 25
Collaborative approach ..................................................................... 26
Background Studies and Position Papers .......................................... 26
Technical Workshops ......................................................................... 27
Expected Output ............................................................................... 27
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This paper incorporates comments received from Bank staff and external agencies.
I. INTRODUCTION

1. Through an ongoing political and economic transformation, Sub-Saharan Africa (SSA) can exploit the region's potential for economic and social change. The challenge for sustained economic growth and poverty alleviation in the region is heightened by the present growth trend in the region's population, which is projected to reach one billion within the next two decades. Among other things, the region's long-term economic development is closely associated with sustainable use of natural resources, including water, land, and forests, and better management of the environment. In this context, the implementation of a long-term national program based on a multisectoral approach to water resources management by countries in SSA will improve human welfare, ensure more efficient use of scarce water resources, maintain water quality, and provide options for future use.

2. The availability of water in the region is highly variable because of pronounced differences in average annual rainfall, evapotranspiration, and hydrogeology. Some areas of the region, such as the Sahelian countries, have a limited supply of freshwater, while other areas, particularly the humid tropical zone in Central and West Africa, have abundant water. Even within countries, e.g., in Eastern and Southern Africa, the availability of water varies considerably, influenced by physical characteristics and seasonal patterns of precipitation. Many areas within the region, most recently West and Southern Africa, have experienced recurrent droughts, interspersed with destructive flooding. Water stress is now becoming more widespread in many localized areas throughout the region.

3. Water is becoming an increasingly scarce commodity in many areas of SSA because of increased population, rapid urbanization, and expanded economic activities. The cost of exploiting new water supplies is also rising sharply, particularly costs associated with recovering groundwater and transferring water from rivers and lakes to distant places. Inefficient pricing and cost recovery measures contribute to over-exploitation of water resources, excessive consumption for low value uses, and financial weaknesses of water utilities and public agencies dealing with water resources.

4. In addition, the competition among various activities—domestic consumption, agriculture, industry, power supply, livestock, wildlife resources, and recreation—for use of water has now become more intense, requiring better management of this resource, and mechanisms for conflict resolution. Human health concerns are widespread because of a lack of access to safe drinking water and inadequate sanitation/sewage collection systems, and pollution of large bodies of water. As the region is served by several major drainage basins, management of water resources requires better coordination at the country level, as well as cooperation at the regional level.

5. New modes of thinking about improving water resources management endorse an integrated, multisectoral approach in a political economy framework, including (a) treating water as an economic, social, and environmental good; (b) relying on markets and pricing to determine water allocation among various sectors and user groups; (c) involving local people and the private sector in managing water at the lower appropriate levels; and (d) recognizing that water is a finite resource that contributes to economic development (including human health) and supports natural
systems. Such new approaches, adjusted to reflect country conditions and capacity, have been given momentum by the international initiatives at Copenhagen, Dublin, and Rio de Janeiro and are included in the new World Bank's Policy Paper on Water Resource Management.

6. The proposed strategy for the water sector will be developed in close cooperation with the Africans and other multilateral and bilateral agencies involved in the sector. The strategy will support key development objectives for sustained economic growth, poverty alleviation, food security, and environmental protection. It will be consistent with the Bank's recent Water Resources Management Policy which underscores the urgency to implement policy and institutional changes, build country capacity, involve people and the private sector, and support quality investments for sustainable use of water resources.

7. The subsequent sections of this paper will provide a background on water resources in SSA, followed by a brief statement on the scope and objectives of the strategy paper. Against this backdrop, the paper will focus on the principal problems and issues relating to water use, conservation, and management. In addition, the paper will outline the methodology that will be used to (a) determine policy and investment options, and trade-off for strategic interventions by African countries, individually and collectively; and (b) articulate the role of the World Bank, drawing from lessons from past and ongoing operations, in assisting African countries. Finally, the paper will identify the expected output of this exercise, and intended audience.
II. BACKGROUND

Topography and Climate

8. The SSA is characterized by a series of undulating plateau slopes, surrounded by narrow coastal belts bounded by the Atlas Mountains in the northwest and the Cape ranges in the southeast. The northwestern portion of the region lies mostly below 500 meters in altitude, while the southeastern portion averages 1000 meters above sea level. High mountains are found in the east (in Sudan, Ethiopia, Kenya, Uganda, and Tanzania) as are the large lakes of the East African Rift system.

9. Most of the African continent lies within the tropics, making rainfall the most important differentiating climate element. The region has high interannual variability of rainfall, with 30 percent deviation from normal levels of precipitation accruing frequently. The arid and semiarid regions show the greatest variability; consequently, average or normal precipitations in these regions are insufficient to determine water availability. Southeast Africa appears to have a cycle of 10 wet years followed by 10 dry years, and the Sahel has seen a significant decline in rainfall over the past 30 years, which may be part of a longer cycle. Droughts, mainly in arid and semiarid areas, are a common phenomenon in the region.

Drainage Basins

10. All of the countries in continental SSA share one or more international river basins, and there are at least 50 rivers or water bodies that cross or form international boundaries. The table below shows the main river basins, including data on catchment area and population. The six largest combine to affect 27 SSA countries and Egypt. The challenges associated with international water resources are discussed in sections 88 through 95.

11. The availability of water in the region is highly variable because of significant differences in average rainfall, evaporation, and hydrogeology. The mean annual renewable water resources in SSA totals about 3,800 billion m$^3$ per year (or 3,800 km$^3$/year), of which about 15 percent is groundwater.
12. The table below shows the main river basins by sub-regions, including data on catchment area and population.

<table>
<thead>
<tr>
<th>Name of basin</th>
<th>Catchment (000 km²)</th>
<th>Water resources (km³/yr)</th>
<th>Population (% of total)</th>
<th>Predominant sub-region</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAKE CHAD</td>
<td>1,900</td>
<td>74</td>
<td>2</td>
<td>I The Sahelian Belt</td>
</tr>
<tr>
<td>SENEGAL</td>
<td>340</td>
<td>34</td>
<td>1</td>
<td>I</td>
</tr>
<tr>
<td>NIGER-BENUE</td>
<td>2,230</td>
<td>216</td>
<td>18</td>
<td>I&amp;II Shared</td>
</tr>
<tr>
<td>VOLTA</td>
<td>390</td>
<td>396</td>
<td>3</td>
<td>II West &amp; Central Africa</td>
</tr>
<tr>
<td>OGOOUE</td>
<td>220</td>
<td>209</td>
<td>1</td>
<td>II</td>
</tr>
<tr>
<td>ZAIRE (CONGO)</td>
<td>3,690</td>
<td>1,520</td>
<td>9</td>
<td>III The Congolese Basin</td>
</tr>
<tr>
<td>AWASH</td>
<td>120</td>
<td>8</td>
<td>1</td>
<td>III</td>
</tr>
<tr>
<td>NILE</td>
<td>2,850</td>
<td>118</td>
<td>14</td>
<td>IV East Africa</td>
</tr>
<tr>
<td>LAKE TURKANA</td>
<td>500</td>
<td>2</td>
<td>0</td>
<td>IV</td>
</tr>
<tr>
<td>JUBA-SHEBELLi</td>
<td>450</td>
<td>24</td>
<td>2</td>
<td>IV</td>
</tr>
<tr>
<td>ZAMBEZI</td>
<td>1,290</td>
<td>274</td>
<td>5</td>
<td>V Southern Africa</td>
</tr>
<tr>
<td>LIMPOPO</td>
<td>400</td>
<td>7</td>
<td>4</td>
<td>V</td>
</tr>
<tr>
<td>OKAVANGO</td>
<td>320</td>
<td>13</td>
<td>0</td>
<td>V</td>
</tr>
<tr>
<td>ORANGE SENQU</td>
<td>800</td>
<td>20</td>
<td>2</td>
<td>V</td>
</tr>
<tr>
<td>RUVUMA</td>
<td>150</td>
<td>15</td>
<td>5</td>
<td>V</td>
</tr>
<tr>
<td>CUNENE</td>
<td>110</td>
<td>17</td>
<td>4</td>
<td>V</td>
</tr>
<tr>
<td>SAVE (SABIE)</td>
<td>103</td>
<td>7</td>
<td>0</td>
<td>V</td>
</tr>
<tr>
<td>OTHER BASINS</td>
<td>760</td>
<td>24</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sub-Regional Characteristics

13. The countries in the region differ greatly in terms of water availability, climate, and ecology. In terms of spatial and temporal dimensions, the five sub-regions shown in the map on page nine exhibit four characteristics: too much water, too little water, water in the wrong place, and water at the wrong time. A fifth characteristic has been introduced as a result of human intervention—contamination. A common concern facing these sub-regions is water availability, accessibility, and quality on a sustainable basis. The discussion below provide a brief description of the main features of each sub-region. The sub-regional division is based on an eco-political

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1 Subregion I: The Sahelian Belt (Burkina Faso, Cape Verde, Chad, The Gambia, Mali, Mauritania, Niger, Senegal)
Subregion II: The humid and subhumid zones of West and Central Africa (Benin, Cameroon, Cote d'Ivoire, Equatorial Guinea, Gabon, Ghana, Guinea, Guinea Bissau, Liberia, Nigeria, Sierra Leone, Togo).
Subregion III: The Congolese Basin (Central African Republic, Congo, Zaire)
Subregion IV: Subhumid East African Highlands (Burundi, Djibouti, Ethiopia, Kenya, Madagascar, Rwanda, Somalia, Sudan, Uganda)
Subregion V: Southern Africa (Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, Republic of South Africa, Swaziland, Tanzania, Zambia, Zimbabwe)
grouping of countries, combining natural resource and political boundary considerations. The country aggregation could be subject to adjustments during the preparation of the strategy document to develop the most appropriate grouping of countries in terms of water resource management typologies. The strategic implications of the variability of water resources are more thoroughly addressed in sections 30 through 35.

Sub-region I: The Sahelian Belt

14. This region is dominated by the resource-constrained countries of the Sahel with limited supply of renewable water resources. The region has experienced below normal precipitation for two decades, which has led to dramatic changes in the environmental conditions, for example, the Lake Chad Basin. The drying up of Lake Chad, the intrusion of the desert, and the decline of aquaculture, livestock, and fisheries, threaten the social and economic well-being of the people living in the basin countries of Cameroon, Chad, Niger, and Nigeria.

15. Sahel wetlands are characterized by a high primary production and a diversity of habitats and natural resources. The inner deltas of Niger and Benue of the Sahel Wetlands are very important ecosystems with an extremely high nature of wildlife values, including millions of migratory birds. These areas also play an important role in the rural economy of the region.

Sub-region II: The Humid and Sub-humid Zones of West and Central Africa

16. In the humid countries of West Africa, the main international river basins are Niger-Benue, Volta and Ogooue. The Niger and its principal tributary flow through the territory of nine riparian states, all of them members of the Niger Basin Authority. The resources of Niger and its tributaries have been substantially developed, and there are new schemes under way. The projects cover the whole range of water uses, such as flood control, hydropower generation, irrigation, water supply and navigation. The lower Niger and the Benue are navigable, however, commercial navigation on the Benue is restricted by the very low dry season flows.

Sub-region III: The Congolese Basin

17. The Zaire River basin covers an area of 4,000,000 km$^2$ across the equator. The Zaire River is the fifth longest in the world at 4,373 km, but second in terms of mean annual runoff (41,000 m$^3$/s) and catchment size. The river has a high discharge regularity; on an annual basis the maximum and minimum discharges vary by a factor of only 2. Recently, several proposals have been made to divert water from the Zaire to the Lake Chad Basin.

Sub-region IV: The Sub-humid East African Highlands

18. Most of the countries in this sub-region are members of the Intergovernmental Authority on Drought and Development (IGADD). These countries form a complex interlinked hydrological situation, dominated by the highlands of Ethiopia, Kenya, and Uganda from which a number of rivers originate. Although the major river system is the Nile, with two sources around the East African Lakes and Western part of Ethiopia, a number of important rivers, the Shebelli, Juba, Tana and Gelena, flow southeast toward the Indian Ocean. The average rainfall in the region is largely related to latitude and elevation, so that areas of high rainfall are concentrated in the
Ethiopian highlands and the equatorial regions of Kenya and Uganda. Potential evaporation is high, and annual runoff is extremely sensitive to variations in rainfall from site to site and from year to year. The sub-region is highly dependent on groundwater resources, which are vulnerable to periodical long lasting rainfall deficiencies, as in the desert regions, or to seasonal deficits which are intensified during drought periods.

Sub-region V: Southern Africa

19. The Southern Africa sub-region, mainly the SADC-countries, has a predominantly arid and semi-arid climate. This zone is crossed by one major perennial river, the Zambezi, and several smaller river basins, including Orange Senqu, Ruvuma, Cuene and Save. The Okavango River rises in Angola and enters the unique wetlands of the Okavango Swamps. In Southern Africa there is also the Kalahari desert covering parts of Namibia and Botswana. In Eastern and Southern Africa, the availability of water varies considerably, influenced by seasonal and periodical variations of precipitation.

20. The Okavango River Basin provides natural resources which are of significant economic and environmental importance to the people of Angola, Botswana and Namibia, but conflicts between development and conservation interests are likely to remain and intensify as populations increase. The ecological and aesthetic value of the Okavango wetlands is immense, and will become even more unique as the wildlife of Africa's wetlands diminishes. The Southern Africa region was recently stricken by drought, which especially affected Zimbabwe, Zambia, Malawi, and Mozambique.
Subregion I
The Sahelian Belt

Subregion II
The humid and subhumid West and Central Africa

Subregion III
The Congolese Basin

Subregion IV
East African Highlands

Subregion V
South Africa
21. The average figures, as shown below, provide a broad sub-regional view. However, there are significant variations in terms of space and time at both local and regional levels within a country. An assessment of scarcity proposed by Falerunark suggests that, under African conditions, scarcity begins to exist when the population as a proportion of renewable water resources exceeds 500 persons per million m³ per annum.

### Population Distribution and Renewable Water Resources by Region

<table>
<thead>
<tr>
<th>Sub-region</th>
<th>Year</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>V</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>1990</td>
<td>34</td>
<td>175</td>
<td>48</td>
<td>116</td>
<td>112</td>
<td>485</td>
</tr>
<tr>
<td>(million)</td>
<td>2025</td>
<td>74</td>
<td>378</td>
<td>105</td>
<td>252</td>
<td>242</td>
<td>1050</td>
</tr>
<tr>
<td>Water resources</td>
<td>1990</td>
<td>165</td>
<td>1309</td>
<td>1581</td>
<td>211</td>
<td>495</td>
<td>3761</td>
</tr>
<tr>
<td>(km³/year)</td>
<td>2025</td>
<td>445</td>
<td>288</td>
<td>66</td>
<td>1194</td>
<td>489</td>
<td></td>
</tr>
<tr>
<td>Ratio (People per million m³/yr</td>
<td>1990</td>
<td>206</td>
<td>134</td>
<td>30</td>
<td>549</td>
<td>226</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2025</td>
<td>445</td>
<td>288</td>
<td>66</td>
<td>1194</td>
<td>489</td>
<td></td>
</tr>
</tbody>
</table>

22. It is important to note that only a small portion of the per capita renewable water resources is used for consumptive purposes. This is illustrated in the table below which shows the demand by economic sector. Even with intensive development of the irrigation potential, only a small proportion of the total renewable water resources is likely to be used. This is the myth of abundant water supply in the region: in reality many areas within the region suffer from water scarcity as water is unevenly distributed throughout the region, and the costs to transfer water is likely to be prohibitive. As a result, several proposals have recently been made to divert water from the Congo River to the Lake Chad Basin and to take water from the Zambezi River and divert it southwards into the Southern Africa Region.

### Current and Projected Water Demands (km³ per year)

<table>
<thead>
<tr>
<th>Sector</th>
<th>Current</th>
<th>Scenario 1</th>
<th>2025</th>
<th>Scenario 2</th>
<th>2025</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>200</td>
<td>200</td>
<td>400</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban water supply</td>
<td>6</td>
<td>17</td>
<td>17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial water supply</td>
<td>3</td>
<td>6</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industrial water supply</td>
<td>4</td>
<td>9</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total consumption</td>
<td>213</td>
<td>232</td>
<td>432</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total renewable resources</td>
<td>3761</td>
<td>3761</td>
<td>3761</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent of sources used</td>
<td>5.7%</td>
<td>6.2%</td>
<td>11.5%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

23. Presently, thirteen countries² in the region are facing water stress (more than 500 persons per mill m³ per year or less than 2,000m³/person/year), and it is projected that with current trends in population, consumption, and economic activities, at least three-fourths of SSA will be facing some form of water scarcity within 30 years. Water stress also occurs often in localized areas, especially in arid and semi-arid areas, as well as in other countries in the region.

III. JUSTIFICATION, SCOPE, AND OBJECTIVES

24. As in other regions of the world, freshwater resources have significant economic, social, and environmental values in SSA. They contribute to economic development and provide valuable environmental services. The need for more efficient management of water resources, in terms of availability, accessibility, and quality, calls for countries in the region to tackle water-related issues (including policy, technical, institutional, and legal aspects) in the broader context of natural resource management and sustainable development. It also calls for the countries to act collectively in order to address issues that have transboundary implications given the importance of international rivers in the region (over 40 countries of SSA share at least one river or lake).

25. It is desirable for the countries in SSA to work together and develop mechanisms for regional cooperation in dealing with water scarcity problems and in promoting better management of river and lake basins for mutual long-term benefits. Regional cooperation is needed for addressing critical areas, such as collection and monitoring of hydrological data, strengthening river basin organizations, and promotion of multi-country investments, research, and training. A regional strategy will provide the framework for examining these overarching issues and resolving water-related conflicts, as well as give guidelines for countries to develop effective long-term strategies and programs for improved management of water resources for rural and urban areas. As a result of this examination of regional experiences and opportunities, linkages will be made to regional development programs in SSA.

26. An important objective of the proposed water strategy for SSA will be to guide the Bank's operational staff and provide a framework and guiding principles for countries in the region to develop gradually a more comprehensive approach to water resources development and management. The Bank has been involved in assisting countries in SSA to develop their water resources since 1960s, but it needs to place more emphasis on cross-sectoral issues, capacity building, involvement of local people and the private sector, and correction of distortions resulting from market and policy failures. The strategy will also serve as a vehicle for developing a dialogue and consensus among the countries in SSA, donor agencies, and NGOs to develop a common approach to conservation and development of water resources. The proposed strategy will focus on appropriate approaches at the country and regional levels to achieve more efficient management of water resources and identify priorities for Bank attention.

27. The strategy paper will give an overview of water resources in the region, emphasizing the sub-regional differences in the availability of water. The paper will examine the key issues, problems, and constraints facing countries in the region. Often, the approach to water resource utilization and management in the countries is highly fragmented and narrowly focused by sector. Countries generally lack the capacity to manage water resources effectively, with clearly defined roles for the public and private sectors, as well as for local communities.

28. Moreover, in many countries, water is often under-priced, delivery of water-related services is poor, policies are weak, regulatory frameworks are inadequate, investment costs are high, and the data base and information systems are outdated or lacking completely. Traditional management institutions have not been able to respond to (a) the need for improved water resource management; (b) competing and shifting water uses; (c) increasing water scarcity; (d) declining
water quality; (e) operation and maintenance requirements; or (f) water allocation conflicts and transboundary issues. These institutions frequently rely on centralized interventions, command-and-control, and inconsistent water allocation schemes. Lack of enforcement of existing rules and regulation is also a common problem in many countries. In addition to analyzing these issues, the paper will identify major externalities, examine underlying socioeconomic and political factors that contribute to these problems and propose solutions. The paper will also focus on resettlement issues resulting from water development programs.

29. The strategy paper will discuss how countries can approach management of water resources supporting development and conservation aims in keeping with their needs (both rural and urban) and priorities. In this context, the paper will examine the policy options and investment possibilities for countries for sustainable development of water resources. The paper will also focus on the difficult tradeoffs between economic growth and conservation considerations relating to water use and management. Finally, the paper will address how the Bank can assist countries in SSA through lending operations, policy dialogue, and technical assistance to develop and manage water resources in a way that promotes economic growth and conservation. It will identify the Bank's comparative advantages by drawing on lessons learned from past and ongoing projects in water resources sector and define priority areas in which it should be involved in assisting SSA countries. Finally, to ensure that the strategy paper internalizes African concerns and priorities, an African Advisory Group has been formed to be actively involved in the preparation of the final product.
IV. Key Problems and Issues

Highly Variable Water Supply and Drought

30. Sub-Saharan Africa spans latitudes that include both desert and tropical weather conditions. Precipitation over the continent varies from near zero over the Horn of Africa and the Namibian desert, to over 1600 mm/yr in the western equatorial region. A large portion of the continent consists of semi-arid zones with 200-800 mm/yr generally concentrated in a single rainy season. Average annual rainfall in this semi-arid zone exhibits a large variability as measured by the average departures of about 20-30 percent from the long-term annual mean.

31. The variable rainfall pattern in many SSA countries affects the entire hydrological cycle, e.g., water level in lakes, aquifers, and rivers. This implies complicated management problems, such as optimal water storage capacity, allocation of water among competing uses, and long-term water planning and conservation.

32. In addition to the naturally highly variable water supply, many countries also face long periods of severe drought conditions. Droughts might be the result of long periods with low or no precipitation, or, human induced droughts can result from, among other things, increased demand for water or poor management of water and land resources. Some parts of SSA are prone to severe droughts, especially the Sahel, Southern and Eastern Africa. The Sahel region has continued to experience a decline in rainfall for about 25 years. Further, 28 countries in the region experienced more than two consecutive years of drought during 1974-1985 period (UN, 1986). During the same period, several countries, including Cape Verde, Mauritania, Senegal, The Gambia, Guinea-Bissau, Sudan, and Ethiopia have experienced two drought periods—each period lasting two or more years.

33. Drought-related impacts have serious economic, social and environmental consequences (e.g., relocations, famine, diseases, land degradation, loss of vegetation, loss of wildlife resources and loss of human lives). Countries also experience serious reduction in agricultural production. In 1983, 22 countries in the region experienced a significant decline in food production because of droughts. In 1986, about 185 million people living in the African dryland were at risk, with 30 million immediately threatened. In addition, over the past half-century, 65 million ha of productive land have become desert on the southern edge of the Sahara region alone (UN, 1986). Estimates of the impact of the 1973 drought in Africa include 100,000 deaths in Ethiopia (UN, 1975); a drop in the water table levels of aquifers from 2 to 15 meters, depending on location; and decreased flow rates in all rivers in the Sahel (UN, 1975).

34. Although variable water supplies and droughts are both hard to predict and to prevent, the adaptation of water resource management to these extreme conditions might ease their impact. It is obvious that in addition to general drought contingency plans, a comprehensive approach to water

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3 Countries stricken by desertification and drought. General Assembly, Economic and Social Council, June 9, 1986.

resource management may help mitigate the negative effects. A coordinated plan should involve all stakeholders, include all affected sectors, and encompass all different water supply sources.

35. Important considerations in assessing water variability and drought-related issues are:

- how to incorporate highly variable water supply and droughts in the design of water projects;
- how to determine the most appropriate planning level to incorporate water variability/drought considerations in water resource management programs and in the allocation of water for different uses;
- how to identify locations prone to desertification and to evaluate measures for preventing and reducing the impact of drought conditions;
- how to design water pricing policies under drought conditions;
- how to integrate land and water resource management so as to minimize loss and contamination of water resources due to inappropriate land use practices;
- how to identify a strategy for using surface and groundwater to deal with water scarcity problems during short- and long-term variable supply cycles, including droughts;
- how to include environmental considerations in short- and long-term drought planning;
- how to tie efforts of the drought-affected countries into a comprehensive plan for joint water resources use in drought-affected regions;
- how to promote agricultural development strategies that are more suitable for variable water supply and drought conditions.

Health and Environment Problems

Health

36. The World Health Organization estimated in 1990, that SSA had more people without access to safe water than any other demographic region (52 percent versus 40 percent for the next highest region). Approximately 62 percent of the population did not have access to sanitation services, a statistic second only to India (where 84 percent lack adequate sanitation).

37. Health hazards arise from contamination of water used for bathing, washing, and drinking; lack of facilities for excreta disposal; and, where present, poorly designed or maintained sewerage systems. Inadequate sanitation is not only a major cause of morbidity and mortality through water-related diseases, but it is one of the most important factors in degradation of surface and groundwater supplies. Preventing other water-related diseases such as Malaria, schistosomiasis, as well as river blindness also present challenges to water managers.
38. A report by the Environment Division of the Africa Region assessed the major environmental problems in most countries comprising SSA. Of these countries, 35 (80 percent) reported at least one major environmental problem pertaining to either safe water, scarce water, sanitation, pollution, and/or water environmental issues. However, regions in SSA where health problems related to water are most critical have not been evaluated in a comprehensive way so that this information can be used in project planning and design.

39. Water quality degradation is a growing issue in SSA as more monitoring reveals the extent of the problem, population continues to grow, and both new and reopened industrial facilities continue to pollute. Water quality is especially poor in urban areas (at least 60 cities in SSA have over 250,000 inhabitants) where industry is concentrated and human sewage is inadequately collected and treated. Water is simply unsuitable for most uses in many cities, and it constitutes a health hazard for drinking, bathing and food preparation. While there is a need to focus on simple but effective sanitation facilities and educating people on the relationship between sanitation and health, there is also an urgent need to provide sewage collection and proper treatment in cities for health and pollution concerns. Industrial pollution continues unabated in many nations with virtually no effective treatment and little attention to pollution prevention.

40. In addition, poor land use practices in agriculture, forestry and mining and runoff of agricultural chemicals result in "non-point source" water pollution that is more difficult to control than discrete "point" sources from industries or sewage, where identifying polluters and determining liability is generally easier. In Nigeria, for example, pollutants from irrigated agriculture result in degradation of fishery communities that they depend on to feed their families. In Mozambique, salinization of soil caused by irrigation projects in Gaza and Mapato provinces causes on-site productivity losses as well as off-site pollutant loads. Erosion from poor agricultural practices causes environmental degradation from sedimentation as well as filling important hydroelectric impoundments like those on the Tana River in Kenya.

41. Many SSA countries do not have enforceable legislation, water quality standards, or water pollution control programs for effectively achieving abatement of point and non point sources of pollution. Water quality sampling units and laboratories are under-funded and limited by poor equipment and lack of training. Some countries (such as Liberia, Sierra Leone and Sudan) have inadequate or nonexistent environmental policies mandating water pollution prevention, pollution control, and environmental assessment requirements for new industries. How to design, fund, and foster these needed policy reforms and institutions will be a focus of this strategy.

42. Because the costs of implementing water pollution prevention and control can be substantial, another issue is how to balance the high potential costs of reducing health hazards with what is realistically achievable for SSA. Other priority issues to be considered as part of the strategy include: how to focus Bank and country attention on proper sanitation/sewage treatment in informal settlements of large cities; how to use health information to target sanitation projects;

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how to incorporate erosion control and agricultural pollution control into the Bank's agricultural sector work and target it where needed for water resources management reasons; and how to apportion more support and technical assistance for addressing these concerns.

Environment

43. Much of the development that has occurred over the last 30-40 years in SSA has been accomplished without adequately addressing environmental concerns. This has resulted in significant environmental damage which in turn has adversely affected the poor. In fact, water-related environmental issues have been identified as an important priority, along with sanitation/pollution, in a recent SSA survey.

44. The highly variable water discharges necessitate the construction of dams and storage reservoirs to regulate the seasonal and periodical discharge variations. SSA presently has the smallest number of dams and the lowest storage capacity. Still, while many of the large water projects responsible for the adverse impacts have been essential to provide water and power for development, the environmental and social impacts have yet to be mitigated. Some of the projects have increased diseases, degraded wetlands, impaired riverine fisheries, impoverished resettlement neologism and pastoralists, and disrupted coastal zone fisheries important for providing income and protein to the poor. It should be noted, however, that storage reservoirs are necessary not only for hydropower production, but also for reliable water supply for domestic uses and irrigation schemes. An important consideration is how to balance the negative environmental impacts against development needs.

45. During the wet season, rivers such as the Zambezi and Niger used to flood riverine wetlands providing for traditional recession, agriculture, favorable conditions for fish breeding, and recharge of groundwater. With dam construction in the midst of tangible benefits, there are a number of environmental consequences: for instance, to some extent wildlife have been impacted; fishing has been reduced; water wells have dried up; and diseases have increased substantially. Even the coastal zone has become impaired with salt water intrusion up the river because of reduced flows. Floodplain agriculture is no longer profitable, and poor fishermen have lost income and protein from reduced fisheries. Wetland and coastal zone ecosystems are some of the most valuable natural aspects of SSA and their value in support of sustaining the poor should be recognized. Controlled "artificial" floods can be created at dams to mitigate such environmental concerns. This has occurred in the Senegal River Valley and is seen as a huge benefit by officials and the public.

46. In addition to the proper amount, quality, and timing of water, aquatic life require suitable habitat for survival and management measures to prevent over-harvesting. Accelerated soil erosion results in sedimentation that kills fish food organisms and reduces fish habitat. Coastal zones and their estuaries provide essential habitat in need of proper planning processes to achieve sustainable use. But proper management of coastal zones in SSA is often inadequate. Institutions to prevent over-harvesting of fish are often inadequate (where they exist) in SSA. How to facilitate coastal zone management planning and establishment of fish harvesting limitation represent key water resources issues.
47. Water scarcity has become a key impediment to development in SSA. The challenge in meeting future demands then involves avoiding the creation of new adverse impacts from future and currently planned projects as well as correcting, rehabilitating, and retrofitting old projects which are impairing the environment and the lives of the poor. How to ensure that these existing environmental and social impacts receive priority attention in Bank policy dialogue with countries will be addressed.

48. Rehabilitation, retrofitting of water projects, and changes in operation may yield vast environmental, agricultural and social benefits. How to conduct needed capacity building for coastal zone management and establishment of institutions for preventing overfishing and destructive harvesting techniques will also receive attention. How to raise awareness to build capacity to analyze these problems, and to devote priority for funding will be included in this strategy development process. Also to be considered is how environmental issues affect or are affected by implementing a policy where water is treated as an economic/social good, where decentralized demand management is used, where stakeholder participation is encouraged, and where a comprehensive approach is required for water resources management.

Management Institutions, Mechanisms, and Capacity

Fragmented Water Resources Management

49. Water resources problems in SSA are not usually addressed in a coherent, comprehensive manner. Within any one country, (e.g., Tanzania, Zimbabwe, Côte d'Ivoire, Ghana, Malawi) water uses by different sectors, such as agriculture, industry, and municipal, are managed by separate agencies. Functionally related issues are often handled by parallel, overlapping administrative structures. Moreover, issues of water quality and quantity are considered separately as are groundwater and surface water. As a result, decision-making is most often fragmented, uncoordinated, and short-sighted. Often, environmental quality considerations are ignored as sectoral agencies plan for their single purpose use of water resources. The sectoral and department/divisional structure of the Bank further compounds this problem.

50. Fragmentation also occurs as a result of the actions of different administrative units of government within a country. Domestic, industrial, and commercial supplies often are provided by local government units, which are not coordinated with provincial or national water departments. This detachment may lead to situations in which different agencies are developing the same water source for different uses. These problems are also compounded by external support agencies that have in the past by-passed relevant ministry officials to deal with political officials in a certain region of a country for which they have interest. The lack of involvement of ministry officials and users in planning has resulted in inappropriate projects, imported materials and equipment which are not locally serviceable, and water conflicts.

51. While river basins are the natural unit for water management, the importance of such a holistic or comprehensive approach is only now being widely recognized as the conflicts over resource allocation increase. These conflicts concern not only the quality of resources but also the timing of their availability and their quality as different sectors attempt to meet growing needs. Insufficient attention is being paid to managing water resources for multiple uses (including environmental protection) within river basin frameworks in SSA. With its many large international
river basins, regional organizations have been created but many have either too narrow or too broad mandates. The success of these organizations in promoting regional cooperation has been mixed and environmental/social considerations have frequently been neglected.

52. Through the utilization of a comprehensive multi-sectoral approach, processes can be conducted to integrate disparate interests, sectoral uses, and other demands in focusing on improved management of water resources.

53. There are a number of institutional issues that need further consideration:

- how to integrate disparate private and public interests, sectoral uses, ministries, and levels of government to improve water resources management;
- how to develop rational and coherent legislative, regulatory, and enforcement institutions that can balance command/control and economic incentives for both demand and supply management as well as environmental protection;
- how to provide a range of support mechanisms to facilitate and assist preparation of country water resources assessments and water resources management strategies that adopt a comprehensive, ecosystem-based approach;
- how to design processes for determining roles and functions of different levels of the public sector and the private sector in basin water management;
- how to establish, develop, and strengthen (semi-) autonomous bodies to carry out decentralized functions delegated to them by government; and
- how to incorporate cross-sectoral water resources management elements into the Bank's policy dialogue with borrowers;
- how the Bank should facilitate cross-ministerial, cross-sectoral, and donor coordination.

Limited Water Resource Management Capacity

54. While there have been improvements in recent years, countries in SSA generally lack the institutional capacity necessary for long-term, comprehensive, and sustainable water resources management. This holds for the public and private sector at all levels: ministerial departments, local governments, basin-wide, district, and community organizations, as well as for educational and research systems. For example, many countries lack the people, funds, equipment, facilities, and monitoring and information systems necessary for resource management. At the policy level, few countries have adequate national water policy statements, national water plans which are integrated with national economic policies, water legislation and coordination mechanisms, and cost recovery measures.

55. The capacity-building implications are considerable. The capacity of both existing organizations and the institutional setting—the enabling environment that defines the responsibilities of organizations and their interrelationships—must be addressed.
56. With respect to organizations, while countries in SSA have different organizational arrangements in place for water resources management, they nevertheless share common capacity-building challenges. On one hand, a widespread challenge arises largely because of the generally weak and overextended managerial capacity of central governments, namely, how to decentralize management structures so that water is managed at the lowest appropriate levels, especially for the delivery of water services. An integrated and holistic WRM approach could, on the other hand, encourage a strengthened central regulatory capacity. The strategy paper will address the potential conflict between the need for a centralized bureaucracy and the principles of management at the lowest appropriate level through decentralization and involvement of major stakeholders.

57. Related issues include how to define the "appropriate" lowest level for different water resources management problems; how to define the roles and responsibilities of national, regional, district, and community organizations, as well as the public and private sectors; how to build the capacity of each level for the tasks it is being asked to assume; and how to balance decentralization with the need for integrated, cross-sectoral management approaches. Other common challenges include how to allocate scarce management resources among different managerial units, and how to best utilize the many existing organizations without creating new ones.

58. Despite progress in SSA in recent years, the institutional setting—in terms of statutory, legal, regulatory, enforcement, financial management and administrative frameworks—remains largely inadequate. Key issues concern how to design, evaluate, and implement these frameworks. Related issues include how to: develop incentives that are consistent with treating water as an economic, social, and environmental good; develop effective systems of accountability; and resolve conflicts over resource allocations. Of particular importance for SSA are the institutional barriers that undermine the vibrant informal sector. The informal sector, which lacks official recognition and support, is actively involved in and relied upon for the provision of water supply and waste disposal services.

59. Strengthening the capacity of institutions is, in large part, enhancing the capacity of the people who run them. Education and skills development—especially in the areas of science and technology, policy formulation and analysis, and other disciplines necessary for managing complex water systems—are generally weak in the region. The number of technical specialists also remains small because of unattractive salaries and poor career prospects. The development of technical expertise has been further compromised by SSA's over-reliance on external technical assistance, which has not given sufficient attention to either developing indigenous capabilities or adapting to the constraints imposed by local circumstances.

60. Although high quality research is carried out at some centers in the region, national research systems have not been too effective. Issues relate to the extent to which R&D should emphasize application, relevance, and priority areas; how to reduce the isolation of researchers; and how to foster cooperation.

61. Of crucial significance for building managerial capacity in SSA is the availability of hydrogeologic and hydrometeorologic information. Adequate and reliable information is essential for making sound water resources management decisions. Some countries do have advanced data management systems, and there are some notable regional (donor-sponsored) hydrometric programs. But in general, there is an immediate need to improve virtually all aspects of water resources assessment in SSA.
62. For example, data collection networks are widely deficient and/or deteriorating; there is a
general lack of equipment and laboratories; and data are often either inadequate or nonexistent.
Inadequate funding, organizational and administrative problems, and political instabilities are
common constraints that seriously undermine the ability of hydrometric agencies to function (IBRD
et. al, 1992). Issues relate to identifying and mobilizing the human, financial, and technical
resources necessary to create information systems that are sustainable and adequate for addressing
decision-making priorities. Discrepancies in the level of sophistication among different SSA
countries has many ramifications, including for international water resources management.

_Underpricing, Inefficiency, and Allocation Problems_

63. For optimum allocation, the price of water should reflect its scarcity value. This implies
that the price should be set to reflect the opportunity cost of providing it. Appropriate pricing
schemes may reduce the need to administer detailed allocation of water to different users. However,
pricing to induce efficient use requires the ability to monitor use on a volumetric basis.

64. The use of proper prices induces an allocation of water to its best use, as well as provide
incentives for efficient use within the user sub-sector. Often, opportunity cost pricing is politically
unachievable in the short term, or difficult to calculate and enforce. In this case, a second best
approach is a price scheme that will recover the operation and maintenance costs as well as a
significant portion of the investment cost of the project over its life span.

65. Agriculture consumes on the average about 90 percent of the available water in SSA
countries. Therefore, appropriate pricing schemes for agricultural water projects may result in
substantial water savings and improved allocation efficiencies. However, physical and institutional
setups of the agricultural producers make it difficult to collect the water fees from individual users.
A possible implication of underpricing of agricultural water may be the misallocation of water
between relatively low value agricultural uses compared to relatively higher value of urban and
industrial uses.

66. Not much information is provided about pricing and cost recovery of agricultural water
projects in SSA. The situation in SSA countries is probably similar to other developing countries.
Cost recovery was examined in 106 projects of the 208 evaluated projects by OED, and was found
unsatisfactory in 68 percent of these projects.

67. Review of cost recovery in urban and sanitation projects funded by the World Bank does
not provide specific statistics for SSA countries. Of the 129 urban supply and sanitation projects
evaluated in countries around the world (World Bank, 1992), only 12 countries were in full
compliance with the cost recovery criteria. For example, Botswana used water pricing to control
demand, promote efficiency in the use of water, and enhance conservation.

68. If the price of water does not reflect its true value, it may result in over-use and
misallocation of the water resource. However, when poverty alleviation considerations are taken
into account, pricing issues become more complex because the demand for water to meet human
needs is quite inelastic at low levels. This can imply a heavy burden on the poor. A solution
adopted by many countries, for domestic and industrial users of water, is a progressive, tiered
pricing scheme with increased prices for increasing water consumption.
69. However, in many SSA countries, often one joint water meter is used per apartment building that is occupied by many poor families. This may increase the average per family spending on water to the highest price step. Therefore, poor households may spend a substantial portion of their income on water. For example, the tiered price structure in the Botswana Water Utility Corporation (a project funded by the World Bank) may lead an average poor family to pay more than 8 percent of its income for water.

70. An implication of water underpricing in SSA urban water utility projects is the chronic financial deficit that leads to management problems and frequent cuts in services penalizing mainly the poor. As a result, poor households in urban areas may be forced to use polluted sources of water, or are obliged to acquire water from expensive vendors. This causes increased health problems, and expenditure of an even higher ratio of the income for water.

71. Water supply to the rural areas in SSA is a worse situation. Fewer residents of rural areas benefit from public water and sanitation utilities. Because water sources are often far, the time cost required to fetch water is high. In addition, water supply in rural areas is often provided from open streams. The sanitation level of such supply sources is very poor. The rural population thus may face substantially higher health risks compared to the urban population.

72. Underpricing and cost recovery issues which merit further consideration include:

- how governments should apply more efficient water pricing;
- how locations and aggregations of water supply utilities, via economies of scale and lower conveyance cost, may affect costs and tariffs and allow a lower per unit price for water;
- how pricing of water may improve environmental sustainability of water resources (e.g., the introduction of the "polluter pays" principle);
- how different pricing schemes may signal the opportunity cost of water, provide for cost recovery, promote conservation, and allow affordable water supplies to the poorest segments of society.

Lack of Stakeholder Participation

73. The participation of all stakeholders—of all parties who affect or are affected by water use—is an essential ingredient for successful water resources management in SSA. Through participation, parties have the opportunity to influence, and develop a sense of involvement in, the policies, projects, and operations that affect their daily lives. For example, participation allows users to reveal their needs and demands, thus improving the chances for system responsiveness. It is a vehicle for mobilizing "community savings" (i.e., through fees and labor), which helps to ensure the financial viability of enterprises and empower users to demand improved services. It also fosters responsibility, self-reliance, and commitment by making users accountable for efficient, cost-effective, and equitable management practices.

74. A highly participatory approach to water resources management would be consistent with SSA's rich social and cultural traditions of community and group welfare, sharing among people, grassroots initiatives, and group actions. But there have been few government efforts to elicit
community participation in the water sector. Without effective participation, project results tend to be disappointing: water supply services operate inefficiently; water supply facilities fall into disrepair; and projects cannot muster financial support. The lack of participation is cited as one important reason why the objectives of the International Water Decade have not been met in SSA, especially in rural areas.

75. By contrast, the positive benefits of involving local populations in the design, construction, operation, and maintenance of water supply projects (notably, rural water supplies in most SSA countries) are already evident. When communities have actively participated in project implementation and management, projects have been financially sustainable—all the more striking given that revenue collection in SSA is "notoriously poor". For example, the provision of reliable, safe, and accessible drinking water to one million people under the Malawi Rural Piped Water Program is largely attributed to the program's strong community-participation component.

76. The need for increasing user participation in the delivery of services is now widely accepted. But stakeholder participation also is important for overall water resource management. Ensuring that all stakeholder interests are well-represented in water resource management decisions is likely to encounter special difficulties in SSA because of the preponderance of large numbers of very small-scale and informal stakeholders, the wide variety of "stakes," and the often competing traditional resource management systems of stakeholders. Key issues include: identifying the different stakeholder groups, defining the appropriate roles for different stakeholders in the management process, evaluating the effectiveness with which stakeholders can perform their functions, assessing the impacts of alternative water policies on different stakeholder groups, and promoting a conservation approach to water utilization among various stakeholders.

77. In general, participation will be enhanced to the extent that decision-making is decentralized to the lowest appropriate level, namely, to the level of stakeholder interests. Of course, some governmental responsibilities (e.g., utility regulation, arrange financing/planning for large investments environmental protection, and pollution control) would require government intervention. Key issues involve how to define the role of the government and balance responsibilities among the public and private sectors and communities. Related issues include how to develop consensus and devolve responsibilities from powerful government institutions to the private sector and community; how to coordinate governmental, private, and local efforts; and how to build capacity at all levels (e.g., in village and ward associations at the grassroots level, local NGOs and cooperative unions at the intermediate level, and chambers of commerce, industry and trade associations, umbrella NGOs, and professional associations at the country-wide level).

78. Special attention needs to be given to the role of women. The involvement of women in local management decisions in SSA has been minimal although women—who are the main collectors of water and producers of food—are the ones most affected by poor access to water. While some donors do require the participation of women in water supply projects, women's participation is not similarly required in resource management.

79. The success of participatory approaches depends, in large part, on an informed and aware population. Stakeholders must understand their stake and that their interests are best served by participation. In general, water will be better managed to the extent stakeholders understand the interactions between local activities and basin-wide impacts and how improvements in water management will benefit related areas of concern including health and nutrition.
The resolution of water resource-related conflicts, which are becoming more prevalent in SSA, will also be facilitated by stakeholder participation. Such conflicts involve not only competing water claims but also conflicts arising from the interactions between water and land. Issues involve the identification and characterization of stakeholder conflicts as well as mechanisms for conflict resolution (e.g., economic, legal, negotiations).

As stakeholders in SSA countries become increasingly involved in many areas of their lives, water resources will compete against other areas (e.g., education, food) for their attention and priority. Pragmatically, mechanisms for participation must recognize the constraints facing stakeholders and the difficult tradeoffs they may have to make.

Data, Information, and Knowledge

Data and information (physical, technical, socioeconomic, etc.) relating to water resources in terms of quantity, quality, accessibility, and use are generally inadequate throughout the region. Countries have established data and information systems relating to climate, rainfall, hydrology, and soil, but in most cases these systems need further improvements through better technology, trained human resources, and strengthened capacity. Through the SSA Hydrological Assessment (SSAHA) Program, supported by UNDP, more than 30 countries have completed hydrological assessments. This assessment shows that hydrological services are weak in the region. Reliable hydrological, water quality, soil characteristics, and socioeconomic data are necessary to the development of comprehensive water resources management plans for the country as a whole, as well as for river basins. Local capacity needs to be developed for continuous updating of pertinent data for planning and monitoring.

Even though pollution from urban sewage, industry and farming is less compared to many other parts of the world, there are numerous water quality problems associated with African waters, which limit their use for drinking and other uses. These water quality problems are further compounded by a lack of public awareness of water quality, even at the most basic level of faecal contamination, and the fact that government concern over water quality tends to be restricted to water quality laws which are usually not enforced.

Surface and ground water quality networks are not well developed in SSA due to budgetary constraints, lack of analytical equipment, logistical limitations, as well as a lack of appreciation of the importance of water monitoring. Some ad hoc investigations of raw water quality is being carried out in connection with planning of new water supply and irrigation projects, and some monitoring of treated water is undertaken by water utilities. Some of this material has been revealed during the ongoing CESP/NEAP activities. Another source of water quality data is the GEMS/WATER Program.

Monitoring of water quality for inland water resources should be closely linked to hydrological services, and recorded with reference to a river flow or water level in an aquifer. Furthermore, there is a need to monitor water quality and quantity at the pollution sources.
from major polluters—not only the piped discharges, but also from the diffuse sources, such as agriculture and forestry. The challenge for the future is to reconsider how water quality data are to be collected and used, and take advantage of new developments within monitoring and information technology.

86. The strategy paper will emphasize the need for a comprehensive data base relating to (a) water availability, hydrology, and water quality; and (b) river basins, watersheds, and drainage areas. The water resource management strategy process will benefit from the Bank’s involvement in the Hydrological Assessment Program, concerning the hydrological aspects of the strategy. In addition, the strategy paper will consider the relationship of comprehensive data bases to other existing programs, such as the Program on Environment Information Systems in Sub-Saharan Africa (EIS), and the Global Environment Monitoring System on Water, GEMS-WATER, and the National Environmental Action Plans (NEAPs).

87. African countries will need to improve existing knowledge relating to management of water resources including protection of water ecosystems, the interaction of humans with water systems, the inter-relationships among water, land, and forest variables in a natural resource management framework, multisectoral considerations in water utilization, and international characteristics of river basins and implications for management. The strategy paper will explore the potential for regional cooperation in improving data, information, and knowledge relating to water availability, utilization, and management.

Problems Associated with International Water Resources

88. In SSA, international river basins constitute the principal source of water resources. About one-third (17) of the world's international river basins is found in SSA. Thirty-five countries in the region share the 17 major river basins. Furthermore, international rivers also include 11 river basins between 30,000 and 100,000 sq km and 40 below 30,000 sq km.

89. There are a number of important considerations associated with these international rivers that have implications for long-term management of water resources. First, the concentration of recharge is restricted to limited mountainous areas (such as the Ethiopian Highlands, the Cameroon mountains in West Africa, etc.) which experience seasonal and annual variation in rainfall. This implies that countries located upstream could influence the availability of water to downstream countries which often have a dry climate. Second, because of variable rainfall and climatic conditions, the seasonal and annual flows in the river systems are subject to wide variations, thus requiring efficient planning and management of water resources. Third, the main rivers and tributaries that have regular annual flows are widely spaced over a large area. This situation constrains the use of water resources for domestic, agricultural and industrial activities because of long distances in transferring water.

90. Presently, there is mounting evidence that uncoordinated exploitation of international waters has caused significant detrimental environmental, agricultural, and social consequences for the entire basin. For example, until recent years development has focused largely on hydroelectric

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6. International River refers to a river system that is shared by 2 or more countries. Typically, however, the major river basins in SSA are shared by five or more countries.
power and irrigation. The larger hydropower and irrigation projects have degraded environmental quality and caused adverse impacts, such as fisheries impairment downstream of dams. As noted in Section B, flood plain irrigation is a key element for fisheries production and sufficient flows are needed to keep delta and estuary areas functioning properly.

91. The development of international waters nevertheless offers valuable opportunities for meeting the region's water needs. There are many areas of mutual interest where the collaboration between countries in water basin management can yield benefits that are not attainable through individual country efforts. For example, regional organizations can provide the economies of scale needed for development of large-scale projects (such as multiuse reservoirs), conducting priority research and development, collecting and disseminating data, conducting specialized training, and facilitating professional and multidisciplinary networking.

92. As demand for water increases in SSA, pressure on international basins and their aquatic ecosystems will escalate and greater conflicts will develop among countries. How to share decision-making in these basins will be a priority issue to be addressed. In addition, if economic development is to proceed in Africa, the joint use of international waters offers valuable opportunities for meeting the region's water needs. There are many areas of mutual interest where the collaboration between countries in water basin management can yield benefits that are not attainable through individual country efforts. Managing water in multiple jurisdictions presents many challenges. While there has been some development of integrated drainage basin organizations in SSA, recent reviews have identified numerous weaknesses in their operation and a wide variation in their performance. For example, the least effective groups cited in a recent review of SSA river basin organizations were the ones that had very broad objectives encompassing several sectors.

93. Fulfilling broad, complex mandates is often beyond the competence of any organization to perform, even with adequate financial support. River basin organizations that concentrated on specific construction showed more progress. How to incorporate public and stakeholder participation in management of international river basins and how to rationalize, consolidate, and reform existing regional organizations for improving water resources management to sustain multiple uses are key issues to be addressed in this strategy.

94. Because the watersheds do not follow political boundaries, these issues spill over into North Africa as evidenced by the Nile's contribution to Egypt. In this case, the issues transcend SSA boundaries and will be addressed in this strategy development process. Of paramount concern is focusing basin organizations and nations on improving collection of hydrologic and environmental information. With declining funding sources, monitoring strategies should focus on key parameters and on harmonizing monitoring protocols across administrative borders.

95. Other priority issues to be addressed include: treatment of environmental conditions in international basins with measures for mitigating existing adverse environmental and social impacts on the poor; definition of the roles and functions of different management levels (e.g., local, basin-wide, national) in specific internationally-shared waters; adequacy of useful data for
international waters; guidance and framework for negotiating, implementing, and enforcing international agreements on water resource allocation, water rights; and performance of river basin organizations and joint institutions in addressing the various cross-boundary water use and management considerations.
V. METHODOLOGY, EXPECTED OUTPUT, AND INTENDED AUDIENCE

Methodology

96. Economic rationale (market as allocative mechanism, efficiency, incentives) will provide the underpinning for assessing how water resources can be allocated efficiently to maximize net social benefits. This approach will, however, be broadened to take into account other important ecological, ethical, and sociopolitical considerations. This framework will treat water not only as an economic good but also as a social and environmental good. Within the context of this framework, the key policy, institutional, and technical issues relating to water resource management will be evaluated. In addition, this framework will provide the basis for examining inter-generational, and transboundary issues.

97. The Bank's new Water Resources Management Policy will provide the guiding principles to develop and assess solutions to address important water-related issues. The key guiding principles include the following elements:

- A comprehensive, more ecosystem-based approach recognizing multisectoral needs should be adopted for improving water management, incorporating the interdependencies between water and land use;

- Methods for managing water should be integrated and multisectoral, recognizing that there are roles for the market as well as for the public sector;

- Water resources should be treated as a scarce national resource, as well as an economic and social good, with participatory and demand-driven management;

- Responsibilities for water management should be decentralized to the lowest level, ensuring that the interests of all stakeholders are recognized;

- Management of international waterways require national actions and regional cooperation.

Collaborative approach

98. The intended audience will be diverse, including Bank operational staff, governments, key agencies dealing with water resources, NEAP, and development planning and programming, donor agencies, special interest groups from the private sector, local communities, and academia. The proposed water strategy paper will be a product of collaborative efforts involving the Africa region and the Center and external expertise. ESD is providing support from its three departments—agriculture, infrastructure, and environment.

99. Inputs from the Country Department staff will be critical to addressing specific issues at the country level, including collaborative arrangements for dealing with multinational river basins.
The Africa Region's Water Thematic Team, the Steering Committee, and the Technical Advisory Group will provide valuable input and guidance to the preparation of the strategy paper (see Annex I). Important contacts have already been made with key agencies—such as UNEP, FAO, UNDP, AfDB, UNESCO, WMO, ODA, NORAD, SIDA, CIRAD, USAID, to develop a partnership in this strategy exercise. A number of these agencies have agreed to prepare position papers as inputs to the strategy document.

Fact Finding Mission

100. To promote collaboration, a fact finding mission was undertaken in June 1994. The objectives of the mission was to initiate dialogue with key agencies (African and external) engaged in the water sector and to become more familiar with other institutions' work and activities in the sector. The mission also established a common ground for further cooperation in this field. The institutions visited were FAO in Rome, AfDB in Abidjan, UNEP in Nairobi, and several other national and international organizations.

Background Studies and Position Papers

101. Numerous studies have been conducted on water-related topics in SSA by both Bank and external agencies and some initiatives are still in progress. These studies will be used as reference documents for the strategy paper. There are lessons to be learned from the past experiences of external agencies that have addressed water resources problems in SSA (in terms of approaches to water resource management, capacity building, best practices, implementation results, and sustainability of development programs). To this end, a brief analysis of past and ongoing Bank-financed water-related projects dealing with SSA will be undertaken to derive key lessons learned, including results in the field. The strategy paper will also rely on three studies completed under the direction of the Regional Water Thematic Team: (a) International River Organizations in SSA; (b) Review of Water Resources Issues in SSA; and (c) Hydrological Assessments.

102. In addition to the directions that will be given by the African Advisory Group, the draft strategy document will be based on additional position papers from external institutions and from Bank staff (Annex 2). The positions papers, which are due by the end of December 1994, will give various perspectives on water resources management, highlight critical concerns, such as capacity building, stakeholder involvement, gender issues, health and environment, and policy issues.

Technical Workshops

103. Before the strategy document is finalized, there will be two technical workshops in Africa to discuss the draft strategy document, including the background papers. The workshops will provide a forum for developing consensus by engaging the Africans, donor agencies, and NGOs in constructive dialogue. The workshops, supported by the donor agencies, will attract participants representing diverse agencies and groups involved in water-related activities to develop a common approach, and agreed actions to promote more efficient management of water resources. The final draft strategy paper will incorporate the consensus developed at the workshops. Proceedings will be prepared for each of the workshops and disseminated to the participants and concerned agencies.
Expected Output

104. The final output will be a strategy document: "An Integrated Approach to Water resources Management: A Strategy for Sub-Saharan Africa". This paper will outline appropriate actions in terms of policy and institutional reforms, investments, and regional programs, needed by the countries in SSA to address important issues relating to water resource management, plus the World Bank’s role in providing assistance to the member countries to accelerate the transition to more efficient use of water resources. The strength of this paper will come from involving the Africans, other donor agencies, and NGOs in a constructive dialogue focusing on key issues and finding solutions at the local, national, and regional levels.

105. Within the Bank, the strategy will: (a) help Bank staff to acquire a better knowledge of the water situation in SSA; (b) improve the operations supporting long-term national programs based on an integrated, multisectoral approach; (c) improve policy dialogue with African countries; (d) adopt best practices; (e) promote regional cooperation and development of a good data and information base; and (f) build consensus among donors.

106. Within SSA the strategy will assist countries in the: (a) establishment of comprehensive water policies, strategies, action plans and consistent water rights procedures; (b) formulation of guidelines and measures for water allocation, water pricing, cost recovery, and incentives; (c) adoption of water pollution standards and regulatory mechanisms within the context of national environmental management objectives; (d) creation of better and more comprehensive legal framework; (e) formulation of alternative plans for public investments to address priority needs and problems; (f) improvement of local capacity; and (g) involvement of all major stakeholders (private sector, local people, local agencies, NGOs, etc.). The follow-up dialogue needed to implement the underlying tenets of the strategy paper would be carried out through some regional or sub-regional entities identified at the technical workshops.
VI. PROPOSED TIMETABLE AND MANPOWER REQUIREMENTS

Timetable

107. The schedule for the strategy process is shown below. The exercise of identifying and selecting the members of the African Advisory Group has been completed. The first meeting of the advisory group will be from December 15 to 17, 1994 in Washington DC. The next Advisory Group meeting is planned for August 1995, after the initial draft strategy document has been prepared.

108. The first draft, based on the input from the African Advisory Group and the position papers will be prepared for internal discussion by May 1995. A revised draft will be circulated for discussion at the proposed workshops in October 1995. The final draft strategy paper will be issued by the end of 1995, and the proceedings of the two workshops will be circulated by March 1996.

Manpower

109. The total manpower used in FY94 was 37 staffweeks (AFTES provided 20 sw; and ESD, 17 sw). In FY95, a total of 43 staffweeks have been allocated for the exercise (African Region 23, including AFTES; ESD, 20 sw). There is a need for additional resources from the Center to complete the exercise. This demand for additional resources will be 15 sws, which will be discussed during the mid-term review.
Financial Support

110. The Water Resources Management project is supported by The Norwegian Trust Fund in the Bank with an amount of US$300,000. This funding will cover external expenditures related to advisory group activities, workshop, and specially requested services and inputs.
Annex 1: Core Team.

<table>
<thead>
<tr>
<th>Task Manager/Principal Author:</th>
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<tr>
<td>Narendra Sharma</td>
<td>AFTES</td>
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<tr>
<th>Core Team members:</th>
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<tr>
<td>Ariel Dinar</td>
<td>AGRAP</td>
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<tr>
<td>Ali Duda</td>
<td>ENVPE</td>
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<tr>
<td>Don Parsons</td>
<td>ENVPE</td>
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<tr>
<td>Rafik Hirji</td>
<td>ENVPE</td>
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<tr>
<td>Paula Donolly-Roark</td>
<td>AFTES</td>
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<tr>
<td>Paula Stone</td>
<td>AFTES</td>
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<tr>
<td>Torbjorn Damhaug</td>
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<td>Edeltraut Gilgan-Hunt</td>
<td>AFTES</td>
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<td>Jean Delion</td>
<td>AFTES</td>
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<tr>
<td>Cyprian Fisiy</td>
<td>AFTES</td>
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<tr>
<td>Francois-Marie Patorni</td>
<td>EDINU</td>
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<tr>
<td>Akhtar Elahi</td>
<td>AF2AE</td>
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<tr>
<td>Geoffrey Matthews</td>
<td>AGRNR</td>
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<tr>
<td>Daniel Rothberg</td>
<td>Duke University</td>
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<tr>
<td>David Grey</td>
<td>NHI, UK</td>
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<tr>
<td>John M. Kalbermatten</td>
<td>Consultant</td>
</tr>
<tr>
<td>Bill Johnes</td>
<td>OED</td>
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</table>
Annex 1.1 : Africa Region's Water Thematic Team

Chairman:
Bocar Thiam

Members:
Randolph A. Andersen,
Loso Boya,
Walker Ochs,
Torbjorn Damhaug,
Colin Lyle,
Salah Darghouth,
Narendra Sharma,
Cynthia Cook,
Akhtar Elahi,
Randolph Harris,
John Elder,
Assefa Telahun,
Ebenezer Aikins-Afful,
Geoffrey Matthews,
Max Wilton,
Robert Tillman,
Letitia Obeng,
Elizabeth Adu,
Francois-Marie Patorni,
Julia Clones

Annex 1.2 : Steering Committee

Chairperson:
Kevin Cleaver,

Members:
Jean Doyen,
John Briscoe,
Gerson Feder,
Guy Le Moigne,
Mohan Munashinge,
François Falloux,
Bocar Thiam

Chaim Helman
### Annex 1.3: African Advisory Group

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
<th>Institution/Institute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr. Ahmed Adams</td>
<td>First Undersecretary</td>
<td>Ministry of Irrigation and Water Resources, Khartoum, Sudan</td>
</tr>
<tr>
<td>Mr. Ni Boi Ayibotele</td>
<td>Director</td>
<td>Water Resources Research Institute (CSIR) Accra, Ghana</td>
</tr>
<tr>
<td>Mr. Peter Heyns</td>
<td>Director</td>
<td>Investigations &amp; Research, Department of Water Affairs, Windhoek, Namibia</td>
</tr>
<tr>
<td>Professor Mark Mujwahuzi</td>
<td>Institute of Resource Assessment</td>
<td>University of Dar-es-Salaam, Tanzania</td>
</tr>
<tr>
<td>General Olusegun Obasanjo</td>
<td>Africa Leadership Forum</td>
<td>Nigeria</td>
</tr>
<tr>
<td>Mr. Mamadou Sylla</td>
<td>Coordinator</td>
<td>Celule Apres-Barrage, Water Ministry Senegal</td>
</tr>
<tr>
<td>Mr. Imeru Tamrat</td>
<td>Legal Advisor</td>
<td>Ethiopian Study Valley Development Authority, Addis Ababa, Ethiopia</td>
</tr>
</tbody>
</table>
Annex 1.4: Technical Advisory Group

Chairperson:
Jean Doyen, AFTES

Members:
Dr. Norman Borlaug, President, Sasakawa Africa Association
Dr. Randy Kramer, Professor, Duke University
Dr. Haakon Thaulow, Director General, Norwegian Institute for Water Research
Dr. Ulrich Kuffner, EMTWU

External Agency Liaison
Jean Doyen
Narendra Sharma
Annex 2: Position Papers

<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
<th>Subject</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mr. B.G. Appelgren</td>
<td>FAO</td>
<td>Water policy reform</td>
</tr>
<tr>
<td>Ms. V. Vanderweerd</td>
<td>GEMS/UNEP</td>
<td>Monitoring and assessment requirements for sound watershed management</td>
</tr>
<tr>
<td>Dr. P. Sanchez</td>
<td>ICRA</td>
<td>Agroforestry in the context of watershed management</td>
</tr>
<tr>
<td>Dr. H. N. El-Habr</td>
<td>UNEP</td>
<td>International water management, health and environment</td>
</tr>
<tr>
<td>Mr. A. Mathys</td>
<td>RWSG W.</td>
<td>Africa local WRM in Mali</td>
</tr>
<tr>
<td>Dr. A. Szollosi-Nagy</td>
<td>UNESCO</td>
<td>Education/training</td>
</tr>
<tr>
<td>John Morton</td>
<td>ODA/NRI (UK)</td>
<td>Small scale irrigation</td>
</tr>
<tr>
<td>Daniel Rothberg</td>
<td>Duke Univ.</td>
<td>Capacity building for cooperation</td>
</tr>
<tr>
<td>Paula Stone</td>
<td>WB</td>
<td>Institutional capacity building</td>
</tr>
<tr>
<td>Ariel Dinar</td>
<td>WB</td>
<td>Water supply variability and drought in SSA</td>
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<tr>
<td>Ariel Dinar</td>
<td>WB</td>
<td>Water pricing and cost recovery</td>
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<tr>
<td>Rafik Hirji</td>
<td>WB</td>
<td>River basin issues and ground water</td>
</tr>
<tr>
<td>Torbjorn Damhaug</td>
<td>WB</td>
<td>Hydrological information service (coop. w/ G. Matthews)</td>
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<tr>
<td>Edeltraut Gilgan-Hunt</td>
<td>WB</td>
<td>Overview of past and ongoing projects</td>
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<tr>
<td>Torbjorn Damhaug</td>
<td>WB</td>
<td>Urban WS &amp; S (coop. w/ L. Obeng and J. Kalbermatten)</td>
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<tr>
<td>Don Parsons/Al Duda</td>
<td>WB</td>
<td>Health and environment</td>
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<td>David Grey</td>
<td>NHI (UK)</td>
<td>Management of rural water supply and sanitation services</td>
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<tr>
<td>David Grey</td>
<td>NHI (UK)</td>
<td>An overview of the intersectoral issues affecting WRM</td>
</tr>
<tr>
<td>Ms. H. G-Ouedraogo, Akhtar Elahi</td>
<td>AfDB/WB</td>
<td>Local participation in WRM</td>
</tr>
<tr>
<td>Julia Clones</td>
<td>WB</td>
<td>Irrigation - SSA (in coop. with E. Gilgan-Hunt)</td>
</tr>
<tr>
<td>Cyprian Fisiy</td>
<td>WB</td>
<td>Gender issues</td>
</tr>
<tr>
<td>Jean Delion</td>
<td>WB</td>
<td>Resettlement issues</td>
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<tr>
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Annex 3 Draft Annotated Outline
AN INTEGRATED APPROACH TO WATER RESOURCE MANAGEMENT:  
A STRATEGY FOR SUB-SAHARAN AFRICA

Executive Summary

I. Introduction

II. Water Resources in Sub-Saharan Africa

- Water resources and regional variations
- Supply and demand trends
- Major challenges and opportunities

III. Major Water Resources Problems

A. Highly variable water supply and drought
B. Health and environmental problems
C. Management institutions, mechanisms, and capacity
   - Fragmented water resources management.
   - Limited water management capacity.
   - Underpricing, inefficiency, and allocation problems
   - Lack of stakeholder participation
D. International water resources management problems
IV. Improving Water Resources Management

A. Comprehensive cross-sectoral approach
B. Health, pollution, and ecological aspects of water resources
C. Cooperation in international water resources management
D. Capacity building
E. Legislative and regulatory reform
F. Incentives, participation, and decentralization

V. The Role of the Bank

A. The World Bank’s experience in Africa
B. Implications for future operations
C. Priority areas for Bank involvement
D. Donor coordination
AN INTEGRATED APPROACH TO WATER RESOURCE MANAGEMENT:

A STRATEGY FOR SUB-SAHARAN AFRICA

(Draft Annotated Outline)

I. Introduction

This section will provide the overall context for the paper, outlining the objectives and linking them to the strategic agenda included in the Long Term Perspective Study of Sub-Saharan Africa ("Sub-Saharan Africa: From Crisis to Sustainable Growth", 1989, A World Bank Report). Among other things, the objectives will reflect the region’s priorities concerning poverty alleviation, food security, sustainable agriculture, better management of the environment and natural resources, and capacity building. The objectives will also take into consideration the Bank’s new Water Policy, approved in May, 1993.

II. Water Resources in Sub-Saharan Africa

Water Resources and Regional Variations

This section will provide an overview of fresh water resources (both surface and groundwater) in the region. Also, in this section information would be provided that distinguishes SSA from other regions of the world. For example, the incidence of droughts and the international nature of their rivers and the lack of large flood plains such as those found in Asia. This section would also bring out subregional differences within SSA in terms of ecological characteristics, surface water, hydrology, and rainfall patterns.

Supply and Demand Trends

Supply and demand trends - at the sub-regional and country level as appropriate - will be included to show how water conditions vary over time and space. This will highlight some of the sharp differences among the countries and subregions, as well as take into account population growth, agricultural requirements, urbanization, and expansion of economic activities in assessing demand.

Major Challenges and Opportunities

This section would include a discussion of the challenges and capacity of countries to manage their water resources, focusing on both quantity and quality aspects. How does the highly variable nature of rainfall impact the region (impact of flooding/drought)? How to price and allocate water to promote more efficient, equitable and sustainable use of this resource? What should be the role of the market and the private sector in water resource management? How to get different stakeholders involved in better management of international waters? Of particular concern are issues of rural water supply, conservation of water use, health and environmental concerns, stakeholder participation with a special concern for women, and food security in times of drought.

III. Major Water Resources Problems

There are a number of policy, institutional, financial, technical, and transboundary issues. This section will emphasize the main issues, recognizing
country differences within the region. To the extent possible, the discussion of each issue will highlight relevance to each subregion or groups of countries.

Highly Variable Water Supply and Drought

Not only is SSA frequently plagued by droughts, it is also the region which has the lowest water withdrawal rates per capita of any region in the world. Thus when droughts occur the people have very little flexibility in cutting back on consumption. The droughts also create serious food security and land degradation problems that have particularly severe impacts on the poor. Furthermore, it makes the provision of reliable rural water supplies very difficult.

Health and Environmental Problems

The use of contaminated water for human consumption is the principal cause of many health problems such as diarrhea, typhoid, yellow fever, cholera and other waterborne diseases which kill many people each year in SSA. Other water related diseases such as malaria, bilharzia, filariasis and onchocerciasis also cause serious health problems and losses in productivity in Sub-Saharan Africa. Furthermore, industrial and municipal wastes are causing increasingly serious health and ecological problems in many countries in the region. Major environmental problems relate to pollution, degradation of aquatic, estuaries and coastal ecosystems and biodiversity, and flooding problems. Restoration of damaged aquatic ecosystems needed by the poor for survival and use of best practices in cases of resettlement will also receive priority attention.

Management Institutions, Mechanisms, and Capacity

Fragmented Water Resources Management. In general governments do not address water resources problems in a comprehensive manner. Their activities are organized so that each different water use is managed by a separate agency. This structure often results in overlapping responsibilities among various agencies and ineffective enforcement of water laws and regulations. Water quantity and quality issues are also considered separately as are ground and surface water. Problems of coordination and fragmented decision making abound as each sector goes off in its own direction.

Limited Water Management Capacity. Lack of institutional capacity to manage water resources properly and inadequate data and information system for effective planning and monitoring undermine sustainable use of this resource. Many governments have only limited ability to collect the information and data needed for comprehensive and long term water management. In addition they have few skilled people, funds, equipment, and facilities available to do the planning and policy analysis necessary to guide water resource management and investment decisions. Most countries must rely on foreign consultants for technical work related to water resources. This section will examine these problems and analyze why water management capacity is weak.

Underpricing, Inefficiency, and Allocation Problems. Throughout the region, significant underpricing of water leads to inefficient use and misallocation of water resources. In many instances, cost recovery remains low, thus increasing the financial burden on scarce government resources. An important question is how to finance cost of water taking into account efficiency and equity considerations? To what extent can water pricing reflect the scarcity cost of the resource? How should allocation of water be determine among various competing uses? How should the private sector be involved in order to increase efficiency and to attract financing for sector development and management.

Lack of Stakeholder Participation. There are many users of water for domestic, agricultural, commercial, recreational, and industrial purposes. Since
there are competing claims and special interest groups for water use, stakeholders' participation is an important element in wise use of water resources. In many countries in the region, the major stakeholders often do not participate effectively in the planning, designing of programs, and implementation of water projects. Besides their limited planning capability most governments do not have the incentives or the trained people to successfully implement large water projects. This leads to poor project implementation, lack of user participation and the resulting unwillingness of consumers to pay for poor service. Even though the women are the major users of water in Africa they are often not asked to participate in water resource management decisions. A notable exception is the water supply project fund by UNDP on the southern coast of Kenya where all the village water committees have women as the treasurer.

Problems Associated with International Water Resources

International water resources are classic cases where national and regional management strategies can be quite different because of externalities. In many cases, upstream countries see few benefits from increasing or maintaining the flow and quality of water downstream. Over 200 rivers are shared by two or more countries and shared rivers are the usual case for SSA. This section of the paper will examine the poor performance of river basin organizations in dealing with international waters.

IV. Improving Water Resources Management

Comprehensive Multisectoral Approach

Investments, policies, and regulations related to water resources need to be formulated in the context of a broad water resources strategy, which takes the long term view and gives full consideration to the ecosystem and socio-economic structure that exist in river basins. The key element is the need to develop a comprehensive framework based on a multisectoral approach that reflects the nation's social, economic and environmental objectives.

Health, Pollution, and Ecological Aspects of Water Resources

A balanced, more comprehensive set of policies and institutions are needed that will take advantage of the efficiency provided by market forces and strengthen government policies, regulations, and institutions targeted at protecting public health and the environment. Greater incentives must be given to polluters to clear up their effluent by using the polluter pays principle. Furthermore, increased investment and private sector participation are needed in the delivery of water services particularly in rural areas. Those delivering water must be accountable to users to ensure improved services and management of water resources.

Cooperation in International Water Resources Management

Outside help is sometimes needed to facilitate cooperation among countries in the management of international waters. Agreements for management of international waters are needed on river basins for coordinating water resource management and sharing information. International agencies can play an important role in providing technical assistance regarding international rivers and in helping establish effective international river basin entities. How can existing river basins in the region be more effective and successful?
Capacity Building

Countries need to build up their technical, institutional and organizational capacities to effectively manage water resources. In many cases the institution and organizational capacities will need to be developed at the international river basin level as well as at the local level. More support is needed from international agencies in capacity building (including training and research) since many countries fail to make these necessary long term investments and may resist establishing effective river basin commissions.

Legislative and Regulatory Reforms

In many countries legislation is needed to facilitate the decentralization of water management including legislation that encourages the formation of water users association and that establishes water rights. Regulatory reform will also be necessary to control water pollution and prevent monopoly pricing of water. This reform will involve changes both in legislation and enforcement.

Incentives, Participation and Decentralization

It is critical that the incentives for water use be changed so that consumers are encouraged to use water more efficiently. Pricing and other water conserving mechanisms need to be adopted particularly in agriculture and industry. User participation will be important in creating a sense of ownership among water users and as a means of improving operations and cost recovery. Users must be able to benefit from water conservation practices if they are expected to make the necessary changes and investments.

V. The Role of the Bank

The World Bank's Experience in Africa

This will be a short section spelling out the performance of water projects in Africa over the past twenty years. There should also be some discussions of the problems that cause the low level of performance in Africa relative to other regions.

Priority Areas for Bank Involvement

Because of the large share of the population still in rural areas and the high levels of poverty, Africa requires a water strategy that is targeted on rural areas and the poor. This does not mean that other areas will be ignored but that programs must be designed to reach the rural poor. To reach the poor will require participation by the poor, especially women in low income rural households, in the design and management of water projects. Priorities for investment will have to vary by region in response to differences in resource endowments and in levels of economic development.

Implications for Future Operations

Although countries differ in their water endowments, institutional capacities, and levels of economic development, each should have a strategy for managing its water resources. This strategy will spell out how the Bank can assist countries in SSA to deal with the following issues related to water: (a) incentive framework and pricing (b) service delivery to the poor particularly in
rural areas (c) public investment priorities, (d) environmental protection and ecosystem restoration, (e) water resource assessment and data collection, (f) comprehensive framework for decision making (g) legislative and institutional arrangements, (h) the role government and the private sector, and (i) resettlement.

Donor Coordination

Due to the large number of donor countries and international agencies involved in assisting Africa, more must be done to coordinate these efforts. Because of its high standing among donors the Bank has an excellent opportunity to facilitate such coordination. The Bank should use its influence to encourage coordination and if necessary withhold funding in cases where the lack of coordination is causing serious resource misallocation.