



UN-WATER/AFRICA

Africa Water Vision 2025



Economic Commission
for Africa



African Union



African Development
Bank



UN WATER/AFRICA

The Africa Water Vision for 2025: Equitable and Sustainable Use of Water for Socioeconomic Development



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Contents

Acknowledgements.....	v
1. Vision Summary	1
2. Introduction	3
3. The African Crisis.....	4
4. Responding to the Crisis: The Role of Water.....	6
5. Salient Features of Water Resources in Africa	7
6. Key Water Resources Issues	8
7. The Key Challenges	16
8. The Africa Water Vision for 2025	16
9. Critical Factors for Achieving The Vision.....	17
10. Framework for Action	18
11. Milestones and Targets.....	19
12. Investment for the Desired Water Future	22
13. A Glimpse at 2025 Africa.....	22
14. The Way Forward	25
15. Conclusions	28

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1. Vision Summary

At the dawn of the new millennium Africa faces a number of serious socio-economic problems that call for urgent remedial action if current trends towards endemic poverty and pervasive underdevelopment are to be turned around. The crucial role of water in accomplishing the needed socio-economic development goals is widely recognized. On the face of it, water should not pose a constraint to such development for Africa appears to have abundant water resources. It has large rivers, big lakes; vast water lands and limited, but widespread ground water resources. Moreover, it has a high potential for the development of hydroelectric power.

Unfortunately, however, the sustainability of these water resources cannot be taken for granted for it is threatened by certain natural phenomena and human factors. Among the natural threats are:

- The multiplicity of trans-boundary water basins;
- Extreme spatial and temporal variability of climate and rainfall, coupled with climate change;
- Growing water scarcity, shrinking of some water bodies, and desertification.

The human threats include:

- Inappropriate governance and institutional arrangements in managing national and transactional water basins;
- Depletion of water resources through pollution, environmental degradation, and deforestation;
- Failure to invest adequately in resource assessment, protection and development;
- Unsustainable financing of investments in water supply and sanitation.

These threats pose challenges to the management of water resources on the continent and to the satisfaction of competing demands for basic water supply and sanitation, food security, economic development, and the environment.

It is widely recognized that the threats cannot be successfully addressed by adherence to business as usual in water resources management at national and regional levels. Such an approach would lead to disastrous consequences. It would lead to a future where available water resources would become inadequate to support competing demands for sustaining life, economic development and the environment. Addressing the threats calls for a new vision for water together with a framework for action designed to ensure that we are able to achieve the vision

The Africa Water Vision for 2025 is thus designed to avoid the disastrous consequences of these threats and lead to a future where the full potential of Africa's water resources can be readily unleashed to stimulate and sustain growth in the region's economic development and social well-being.

The shared vision is for:

AN AFRICA WHERE THERE IS AN EQUITABLE AND SUSTAINABLE USE AND MANAGEMENT OF WATER RESOURCES FOR POVERTY ALLEVIATION, SOCIO-ECONOMIC DEVELOPMENT, REGIONAL COOPERATION, AND THE ENVIRONMENT

1. There is sustainable access to safe and adequate water supply and sanitation to meet the basic needs of all;
2. There is sufficient water for food and energy security;
3. Water for sustaining ecosystems and biodiversity is adequate in quantity and quality;
4. Institutions that deal with water resources have been reformed to create an enabling environment for effective and integrated management of water in national and transboundary water basins, including management at the lowest appropriate level;
5. Water basins serve as a basis for regional cooperation and development, and are treated as natural assets for all within such basins;
6. There is an adequate number of motivated and highly skilled water professionals;
7. There is an effective and financially sustainable system for data collection, assessment and dissemination for national and trans-boundary water basins;
8. There are effective and sustainable strategies for addressing natural and man-made water-resources problems, including climate variability and change;
9. Water is financed and priced to promote equity, efficiency, and sustainability;
10. There is political will, public awareness and commitment among all for sustainable water-resources management, including the mainstreaming of gender issues and youth concerns and the use of participatory approaches.

The framework for achieving this vision calls for:

- Strengthening governance of water resources;
- Improving water wisdom;
- Meeting urgent water needs;
- Strengthening the financial base for the desired water future.

The Vision calls for a new way of thinking about water and a new form of regional cooperation. At the regional level, it calls for partnership and solidarity between countries that share common water basins. At the national level, it will require fundamental changes in policies, strategies and legal frameworks, as well as changes in institutional arrangements and management practices. It will necessitate the adoption of participatory approaches, management at the lowest appropriate level, and the mainstreaming of gender issues and the concerns of the youth. At the global level, it will call for assistance from Africa's development partners in mobilising seed funding for priming the urgent developments needed to underpin sustainable management of the region's water resources. Above all, it will require adherence to the following critical success factors:

- Openness, transparency and accountability in decision-making processes;
- Ability to generate and receive knowledge and information;
- Cooperation and team work by all countries in the region to achieve common, mutually beneficial objectives;

- Readiness to take tough decisions on the future direction and course of action consistent with the aspirations in the shared Water Vision;
- Proper appreciation of “where we are”, “where we want to be” and “how to get there”;
- The adoption of financing and cost-recovery methods that are equitable and sustainable, while reflecting the concerns of the poor;
- Political commitment and grassroots support.

2. Introduction

Water is a precious natural resource, vital for life, development and the environment. It can be a matter of life and death, depending on how it occurs and how it is managed. When too much or too little, it can bring destruction, misery or death. Irrespective of how it occurs, if properly managed, it can be an instrument for economic survival and growth. It can be an instrument for poverty alleviation, lifting people out of the degradation of having to live without access to safe water and sanitation, while at the same time bringing prosperity to all on the continent. However, when inadequate in quantity and quality, it can rather serve as a limiting factor in poverty alleviation and economic recovery, resulting in poor health and low productivity, food insecurity, and constrained economic development. Thus what we get out of water depends largely upon what we put into it in terms of management and use. Hence all in Africa should be concerned and be involved in the conservation and protection of water as a valuable but vulnerable natural asset. All should be involved in thinking about new ways of managing Africa’s water to improve its efficient, equitable and sustainable use, to the benefit of all. It is for this reason that an Africa Water Vision is most opportune at this time.

The development of this Vision stems primarily from recognition of the essential role of water in sustaining life, development, and life-supporting environmental resources. The Vision has been developed to serve two functions: firstly, as an instrument for socio-economic development in Africa and, secondly, as an integral part of a worldwide initiative to develop a World Water Vision. This global initiative is a response to the concern of water professionals that the way water resources have been managed in the past has led to a water crisis in many countries, and that without a change in approach a global water crisis would be inevitable. This would have disastrous consequences for mankind and for life as we know it. Accordingly, the First Water Forum held in Marrakech in March 1997 asked the World Water Council to develop a World Water Vision for the year 2025. Two of the products of this exercise are a Vision and a Framework for Action.

The Vision defines a widely shared view of the type of water-resources management needed for the future. It is a vision intended to move us from where we are today to where we need to be in order to ensure that water available in the future is sustainable and adequate in quantity and quality to meet competing demands in the long term. The Framework for Action (FFA) is the road map that defines how to attain the Vision. It defines key milestones and potential packages of actions, such as investments and specific tools needed to achieve the desired vision, and it complements them with a set of mechanisms for translating inherent commitments in the Vision into actions.

A bottom-up participatory approach has been followed in the vision exercise. The approach has included research, stakeholder consultations, workshops, print and electronic publications, and many other means for absorbing, synthesizing and disseminating knowledge. The approach was designed to generate massive public awareness of the risks of inaction, and to encourage innovative and lateral thinking on water-resources problems. The ultimate goal has been to generate the political commitment needed to turn this increased public awareness into effective action for the benefit of all in the present and future generations.

In addition to the global vision process, a number of sectoral, regional, and sub-regional visions have been prepared. The present document describes the vision for water prepared for Africa. It is based primarily on findings at the Africa Water Vision consultations held in Gaborone (Botswana) in November 1999, and in Abidjan in February 2000. At the same time, it draws on outcomes of vision processes conducted at sub regional level in Southern Africa and in West Africa under the leadership of the Southern Africa Technical Advisory Committee (SATAC) and the West African Technical Advisory Committee (WATAC), respectively. Both committees belong to the Global Water Partnership. The Southern African Development Commission (SADC) was closely involved in the SATAC Vision, as was the Economic Community of West African States (ECOWAS) in the development of the WATAC Vision. There have also been inputs from findings of visions developed by African river-basin organizations, such as the Nile Basin Initiative, the Niger Basin Authority, and the Lake Chad Basin Commission.

The results of Africa-level sectoral visions developed for water supply and environmental sanitation, water for food, and water for nature and conservation were also used. The Africa Water Vision also draws on the outcome of the Africa Water Resources Policy Conference held in Nairobi in May 1999. In addition, it reflects findings from water-resources initiatives and documents of regional and international organizations based in Africa. These include the African Development Bank (AfDB), the United Nations Environment Programme (UNEP), the United Nations Economic Commission for Africa (UNECA), the United Nations Development Programme (UNDP), the World Bank, and the United Nations Food and Agricultural Organisation (FAO). In preparing the framework for action, the global level FFA was taken into account to ensure consistency with milestones and targets.

While this Vision is important as part of the Global Water Vision, it is even more important because of the recognition that water has a critical role to play in addressing the socio-economic crisis facing Africa today.

3. The African Crisis

From the socio-economic point of view, Africa faces a crisis of endemic poverty and pervasive underdevelopment. For many African countries, economic performance in the immediate postcolonial era was good. However, for most of Africa, particularly for sub-Saharan Africa, economic performance has been poor and worsening, since the oil crisis of the mid-1970s¹. During the past 20 years, African economic growth rates have been low. Performance was particularly dismal in the 1980s. From 1980 to 1994, average GDP growth rates were lower than population growth rates as shown in Table 1. More recent data show, however, that

between 1996 and 1998 there was some economic recovery, and average GDP growth rates exceeded population growth rates for the first time in two decades. However, this recovery is deemed to be still fragile, and there is a long way to go to achieve a sustainable turnaround.

Table 1: Economic Performance in Africa -1965-94

INDICATOR	PERFORMANCE (%)					
	1965-73	1974-79	1980-85	1986-93	1990-94	1995-98*
Population growth rate	2.7	2.9	3.0	3.0	3.0	2.7
Growth rate of GDP (avg.)	5.7	3.5	1.8	2.5	1.9	3.75
Growth rate of per capita GDP (avg.)	3.0	0.7	-11	-0.5	-1.1	1.05
Growth rate of agricultural output (avg.)	2.7	3.0	1.5	2.7	2.1	3.4
Growth rate of manufacturing output (avg.)	7.3	6.7	5.2	2.5	1.3	2.9
Growth rate of investment (avg.)	9.6	6.9	-4.8	1.2	0.8	-
Savings-GDP (avg.)	16.2	20.9	16.3	15.6	15.3	-
Growth rate of exports (avg.)	8.2	2.6	0.4	3.0	0.6	5.25
Growth rate of imports (avg.)	7.4	6.2	-2.4	0.7	0.4	5.8

Source ADB, 1994.

* Source: Africa Summary Briefings, Live database, World Bank

One of the worse performing sectors has been agriculture. According to Mkandawire and Soludo (1999), long-term growth prospects in Africa will depend on how well agriculture performs. It is argued that in most countries in Africa, agriculture will be the main source of foreign exchange and savings. It will also be an important source of inputs for industry and a major contributor to the market for some of Africa's infant industries. Yet Africa is the only continent where the growth in food production has been lower than population growth.

Many factors account for the African crisis. Apart from purely economic factors, poor governance, political instability and civil strife, as well as conflict between countries are believed to have contributed to prolonged poor economic performance.

The poor economic performance has resulted in growing fiscal constraints and fierce competition for ever-dwindling public resources. As a result, there have been decreasing budgetary allocations for such social services as health, education, safe water supply and sanitation. In the circumstances, the human condition in Africa is now daunting. The UN list of Low Development Indicators, which has 45 countries, includes 35 of the 53 countries in Africa (UNDP, 1997). These developments have plunged Africa into a major social and economic crisis, and almost 40 percent of people in sub-Saharan Africa live below the poverty line. According to current UNDP estimates (1998), Africa is the only continent where poverty is expected to rise during this new century.

4. Responding to the Crisis: The Role of Water

Water has a vital role to play in responding to the socio-economic crisis facing Africa. Although several economic instruments are being deployed to address this crisis, the success of these efforts will depend heavily on the availability of sustainable water resources. On the other hand, success in economic development efforts is needed to ensure a sustainable flow of funds for the development of water resources.

This interdependence between water availability and development is exemplified by the link between water and poverty. Due to poverty, access to adequate water and sanitation is low in Africa. Yet due to the inadequate access to safe water and sanitation, there is a high incidence of communicable diseases that reduce vitality and economic productivity on the continent. In effect, “half the work of a sick peasantry goes to feed the worms that make them sick”. Inadequate access to water and sanitation is thus both a cause and a consequence of poverty. Similarly, inadequate water resources can become a constraint to improved agricultural development and food security. The net result would be reduced resource availability for water resources development, resulting in further reduction in the availability of water. It is noteworthy that, even with its current poor performance, agriculture is the largest user of water in Africa, accounting for about 85-88 percent of total water use (UNEP, UNDP, W13, 1998). Yet only 185 million ha or 6 percent of the total area of the region is under cultivation. Of this, some 12 million or 6% of the total cultivated area is under irrigation. This is believed to be due, in part, to the very low levels of technology and efficiency in agricultural production. Thus there is considerable scope for improved agricultural production and food security through irrigation and rain-fed agriculture, which may or may not lead to increased demand for water.

It is apparent that water and socio-economic development are mutually dependent on each other. They can be nodes in a vicious cycle that puts societies in a downward spiral of poor economic development and poor access to safe and adequate water supply and sanitation. Alternatively, they can be nodes in a virtuous cycle, reinforcing each other in an autocatalytic way, and leading to an upward spiral in which improved socio-economic development produces resources needed for improved development of water resources that, in turn, buttress and stimulate further socio-economic development.

Where, then, does Africa begin? The vision and the FFA are intended to provide a way of thinking about this problem so that priorities for action can be defined. In this regard, the Dublin-Rio principles and the salient features of water resources in Africa provide good points of departure.

The Dublin Principles. Developed in 1992, these principles state that:

1. Fresh water is a finite and vulnerable resource, essential to sustain life, development, and the environment;
2. Water development and management should be based on a participatory approach, involving users, planners and policy makers at all levels;
3. Women play a central role in providing, managing and safeguarding water;
4. Water has an economic value in all its competing uses and should be recognized as an economic good.

The Rio principles expand the fourth of the Dublin principles to underscore the need to regard water not only as an economic good, but also as a social good. In a way, this modification merely clarifies the fourth principle to reflect the notion inherent in the first principle that one of the essential uses of water is to sustain life. In this Africa Water Vision, the first and fourth Dublin-Rio principles are interpreted to mean that, generally speaking, water has an economic value in all its uses. This means that it should always be treated as an economic good, especially in its competing uses for development. However, in its use for sustaining life and the environment, water should be treated not only as an economic good, but also as a social good. This distinction is important in the pricing of services for water supply and sanitation and in the formulation of policies on water allocation for sustaining life and the environment.

5. Salient Features of Water Resources in Africa

At first glance, Africa appears to be endowed with abundant water resources. It has big rivers, large lakes, vast wetlands, and limited but widespread groundwater. Much of this is located in the Central African sub-region and in the island countries. Africa has 17 rivers with catchments areas greater than 100 000 km²; and it has more than 160 lakes larger than 27 km², most of which are located around the equatorial region and the sub-humid East African Highlands within the Rift Valley. The continent has a huge potential for energy production through hydropower (1.4 million GWh per year). To exploit this, efforts are already under way to create regional power pools in Southern Africa (the Southern Africa Power Pool) and in Western Africa. Disregarding temporal and spatial climate variability, Africa has abundant rainfall and relatively low levels of withdrawals of water for the three major uses of water - agriculture, community water supply and industry - which are estimated to be about 3.8% of total annual renewable water resources.

Rainfall in Africa. Table 2 shows that on a continental basis, rainfall in Africa is about 670 mm per year with greater variation in time and place. Temporal variability of rainfall is typically 40% around the mean -much higher than in temperate zones. At sub regional level, the spatial distribution of rainfall is varied. The highest rainfall occurs in the Island countries (1,700 mm per year), the Central African countries (1,430 mm), and the Gulf of Guinea (1,407 mm). The lowest precipitation occurs in the northern countries where average annual rainfall is only 71.4 mm.

Internal Renewable Resources. A further significant feature of water resources in Africa is the extremely low runoff in relation to precipitation. Table 2 shows that the amounts of surface and ground water flows that are generated from rainfall within the subregions are low for all the subregions in Africa. At continental level, renewable water resources constitute only about 20 percent of total rainfall. In the Sudano-Sahelian and Southern African subregions, the figures are 5.9% and 9.25 respectively. This may reflect high losses of rainwater. These losses may occur, in part, through evaporation of surface waters or through plants. The low values of the internal renewable resources also show that there is room for improvement in conservation of rainwater. More importantly, they account, in part, for the endemic drought in parts of the continent.

NOTE: The subregions are:

Northern: Algeria, Egypt, Libya, Morocco and Tunisia
Sudano-Sahelian: Burkina Faso, Cape Verde, Chad, Djibouti, Eritrea, Mali, Mauritania, Niger, Senegal, Somalia, and Sudan
Gulf of Guinea: Benin, Cote d'Ivoire, Ghana, Guinea, Guinea Bissau, Liberia, Nigeria, Sierra-Leone, Togo
Central: Angola, Cameroon, Central African Republic, Congo, Equatorial Guinea, Gabon, Sao Tome and Principe, Democratic Republic of Congo
Eastern: Burundi, Ethiopia, Kenya, Rwanda, Tanzania, and Uganda
Islands: Comoros, Madagascar, Mauritius, and Seychelles
Southern Africa: Botswana, Lesotho, Malawi, Namibia, South Africa, Swaziland, Zambia, and Zimbabwe

Withdrawals. Of the total amount of water withdrawn, 85% is for use in agriculture, 9% is for community water supply and 6% is for industry. The figures in Table 2 show that at both the continental and sub-regional levels, the withdrawals are rather low in relation to both rainfall and internal renewable resources. The only exception is in the northern countries where the withdrawals are 18.6% and 152.6% of rainfall and internal renewal resources respectively. It is noteworthy that for Africa, as a whole, the amount of water withdrawn for the three major uses of water amounts to only 3.8% of internal renewable resources. This may reflect a low level of development and use of water resources on the continent.

Groundwater in Africa. Groundwater is extremely important in Africa. It is estimated that more than 75 percent of the African population uses groundwater as its main source of drinking water. This is particularly so in North African countries such as Libya and Tunisia, as well as parts of Algeria and Morocco, and in Southern African countries such as Botswana, Namibia and Zimbabwe.

However, groundwater accounts only for about 15 percent of the continent's total renewable water resources. In South Africa, for example, groundwater accounts for just 9 percent. As a rule, significant groundwater resources tend to occur in small sedimentary aquifers along the major rivers and in the coastal deltas and plains. Limited groundwater resources, generally sufficient for local water supply, can also be found in the widely occurring crystalline (basement) rocks.

6. Key Water Resources Issues

In the midst of an apparently substantial supply of water at continental level, there are subregions and countries in Africa that are experiencing growing water scarcity. This situation is the result of a number of issues that face the continent in the area of water resources. These issues fall into two broad categories: resource-side and demand-side issues. The resource-side issues are concerned with the occurrence, distribution, protection and management of available water resources. They also relate to the sustainability of the available resource. The demand-side issues regard the management of competing demands for available water

resources. They are concerned with the extent to which such demands are satisfied in an equitable and sustainable way.

Resource Side Issues

There are many resource-side issues facing Africa. Among these are:

1. Multiplicity of trans-boundary water basins;
2. High spatial and temporal variability of rainfall;
3. Growing water scarcity;
4. Inadequate institutional and financing arrangements;
5. Inadequate data and human capacity;
6. Inadequate development of water resources;
7. Depletion of water resources through human actions.

Multiplicity of trans-boundary water basins. A key water-resources issue in Africa is the multiplicity of international water basins in a climate of weak international water laws and weak regional cooperation on water-quality and water-quantity issues. Africa has about one-third of the world's major international water basins (basins >100,000km²). Virtually all the continental sub-Saharan African countries and Egypt share at least one international water basin². There are about 80 international river and lake basins in Africa³. The Nile basin, for instance, has 10 riparian countries; the Congo has 9, the Niger 9, the Zambezi 8, the Volta 6, and Lake Chad 5. Then there are countries through which several international rivers pass. One extreme case is Guinea, which has 12 such rivers.

Table 2 : Regional Distribution of Rainfall and Water Withdrawals in Africa

Sub-Region	Area Rainfall			Internal Resources (IRR)		Renewable %of rainfall	Withdrawals for Agriculture, Community Water Supply and Industry			
	1000X kn12	km3/yr	mm/yr	km ³ /yr	Mm/yr		km ³ /yr. rainfall	mm/yr.	% of	%of IRR
Northern	5753	411	71.4	50	8.7	12.2	76.3	13.3	18.6	152.6
Sudano-Sahelian	8591	2878	335.0	170	19.8	5.9	24.1	2.8	0.8	14.1
Gulf of Guinea	2106	2965	1407.9	952	452.0	32.1	6.1	2.9	0.2	0.6
Central	5329	7621	1430.1	1946	365.2	25.5	1.4	0.3	0.02	0.1
Eastern	2916	2364	810.7	259	88.8	11.0	6.5	2.2	0.3	2.5
Islands	591	1005	1700.5	340	575.8	33.8	16.6	28.1	1.7	4.9
Southern	4739	2967	626.1	274	57.8	9.7	18.9	4.0	0.6	6.9
Total	30027	20211	673.1	3991	132.9	19.7	149.9	4.0	0.7	3.8

Source: ECA and FAO, 1995

Water interdependency is accentuated by the fact that high percentages of total flows in downstream countries originate from outside their borders. For example, almost all of the total flow in Egypt originates outside its borders. In Mauritania and Botswana, the corresponding figures are 95 and 94 percent respectively; in the Gambia it is 86 percent; and in the Sudan it is 77 percent. Despite this, very few shared waters are jointly managed and in many respects, the issues of water rights and ownership of international waters remain unresolved, and national interests tend to prevail over shared interests.

Since so many of Africa's water basins are international, their use as a unit for water resources management is impossible without partnership and cooperation between countries sharing them. In the absence of such cooperation, the potential for conflicts among riparian countries has increased in recent years and is likely to intensify in the future as water scarcity increases. While national and customary laws exist to deal with conflicts at the local and national levels, existing international laws are not adequate for fully addressing conflicts between countries and among riparian states.

In the field of international cooperation, the SADC Protocol on Shared Watercourse Systems represents a model for what can be achieved if countries cooperate over their shared water resources. Other models include the Nile Basin Initiative and a number of river basin authorities such as those of the Niger and Lake Chad. Joint water projects between countries are encouraging examples of positive regional cooperation. They include the Lesotho Highlands Water Project (between Lesotho and South Africa) and the Kornati Basin Project (South Africa and Swaziland). The challenge is for immediate action to create an enabling environment for joint management of international water basins to become the norm rather than the exception.

It would appear that partnership should not be limited to countries with shared water basins. It should be extended to cooperation between subregional groups as well. In the field of water and sanitation, a number of initiatives have been developed, important examples of which are the Water and Sanitation Africa Initiative (WASAI) and the WHO's Africa 2000 Initiative to expand water and sanitation services in Africa.

High spatial and temporal variability of rainfall. Extreme spatial and temporal variability of climate and rainfall on the continent is one of the significant features of water resources in Africa, with far-reaching consequences for water-resources management. As shown in Table 2, Africa is a continent with great disparities in water availability between subregions. Great disparities also exist within and between countries. While there are areas with plentiful supply of water, there are others where water is scarce. For example, northern Africa and southern Africa receive 9 percent and 12 percent respectively of the region's rainfall. In contrast, the Congo River watershed in the central humid zone, with 10 percent of Africa's population, has over 35 percent of its annual runoff. Again, in the humid equatorial zone (in the Gulf of Guinea), annual rainfall is over 1,400 mm and exceeds evaporation. In contrast, in the Sahara and Kalahari deserts, annual rainfall is less than 50 mm, and it is exceeded by evaporation.

In Southern Africa, the Lake Malawi basin, Southern Tanzania, and northern Madagascar have become wetter in the last 30 years. This is in contrast to the situation in Mozambique, southeast Angola and western Zambia, which have become significantly drier over the same period,

although Mozambique is currently overwhelmed by excessive rainfall and flooding. The extremes in variability have been greater in Tunisia, Algeria, the Nile Basin, and in the extreme south of the continent. Another example of this variability is rainfall in the Sahel region during the period 1961-1990, which was 30 percent lower than it was during the period 1931-1960.

In general, although analysis on a continental scale introduces all sorts of statistical questions, it can be shown in many ways that the African continent has an exceptional disadvantage with regard to water resources. A comparison of the annual average precipitation of the world's continents shows Africa to have a level comparable to Europe and North America. However, the higher evaporation losses that occur on the African continent result in a substantially lower percentage of precipitation contributing to renewable water resources, setting it apart from other continents. Africa's total runoff, which is reflected in its useable and renewable water resources and accounts for 10% of the world's freshwater resources, is thus very low.

In addition to the limited nature of the continent's water resources, the temporal and spatial variability of precipitation, due to the strong influence of the Intertropical Convergence Zone on the climate of Africa, has implications for reliability and management strategies. This variability, which is exacerbated by unpredictability, has great significance for the development of surface water resources and for the large areas of the continent that are underlain by low-storage aquifers, which are dependent on effective levels of annual rainfall.

Growing water scarcity. These variations have resulted in abundant water resources in some areas and endemic and spreading drought and growing scarcity of water in others, especially where low annual rainfall is accompanied by low levels of internal renewable water resources. This has been the case in such dry lands as the Sahelian and some Southern African countries, where there has been a significant decline in rainfall. The frequency of drought has been increasing over the past 30 years, resulting in significant social, economic and environmental costs borne mostly by the poor. Not surprisingly, there are growing constraints to water supply in the dry lands that occupy about 60 percent of the total land area of Africa.

For example, it was reported that in 1995, Algeria, Burundi, Cape Verde, Djibouti, Egypt, Kenya, Libya, Malawi, Rwanda and Tunisia were facing water-scarce conditions (with less than 1000 m³ of renewable water resources per capita per year). Another three countries, Morocco, South Africa, and Somalia, were reported to be facing water-stress conditions (with less than 1,667 m³ /capita/year). It has been estimated that by 2025, the number of countries facing scarcity will increase to 14, and the number facing water stress will rise to 11 (UNEP, 1999). Already, about one-third of the people in the region live in drought-prone areas, and there is one country where one-sixth of the drinking water supply in one city comes from recycled sewage that has been put through very sophisticated treatment processes.

The apparent disappearance of Lake Chad in West Africa is symptomatic of the growing scarcity of water in Africa. Originally believed to have an area of about 350,000 km², the lake was reduced to 25 000 km² in the early 1960s. However, today, it is reduced to about 2,000 km².

While the cause of this apparent shrinkage of the lake is not well understood, it is occurring in the same area where the two complementary processes of desertification and deforestation are combining to push the frontiers of the desert farther south in West Africa.

Inadequate institutional and financing arrangements. A key issue is related to the adequacy of the enabling environment under which water resources are managed at local, national and intercountry levels. Current institutional arrangements are often inadequate and the financing of investments is often unsustainable. There is therefore a need for institutional reform to improve performance in the water sector. Such reform should be underpinned by the adoption of the Dublin Principles. It should also be based on cooperation and partnership between countries and between subregions, with the water basin serving as the basic unit for resource management.

Fortunately, many African countries have risen to the challenges that confront them. In the field of water policy, strategy and institutional arrangements, a number of advances have been made. These include an increased awareness of, and political commitment to, integrated water resources management (IWRM). There is also an increasing commitment to water-policy reform and a strong trend towards decentralization of water institutions. Furthermore, there is a thrust towards financial sustainability in the water sector and a realization of the importance of treating water as an economic good, while providing a safety net for the poor.

Inadequate data and human capacity. A key limitation at national, sub regional and continental level is the paucity of data on water resources. This limitation is linked to inadequate human capacity for the collection, assessment and dissemination of data on water resources for developing, planning and implementing projects.

The skills for IWRM are not widely available in Africa. A massive programme for capacity-building is therefore needed to produce a cadre of water professionals (both men and women) who are highly skilled in IWRM principles and practices. Under the Global Water Partnership, a capacity-building associated programme is being developed to provide strategic assistance for developing the necessary skills for IWRM. The challenge is how to retain staff once they are given the requisite training. It is generally recognized that even if the trained staff are retained, the skills they acquire may become atrophied from lack of use unless appropriate incentives are introduced. A second challenge is, therefore, how to devise such incentives so that they are consistent with the aspirations of the staff and with the goals of the water sector. These are pressing challenges that call for immediate remedial action.

Inadequate water-resources development. The information in Table 2 suggests that scarcity of water in Africa is not due entirely to natural phenomena. It suggests that it is due, in part, to low levels of development and exploitation of water resources even though there is a growing demand for water in response to population growth and economic development. The Table shows that at the continental level, only 3.8 percent of internal renewable resources were being withdrawn for the three major water uses of agriculture, community water supply and industries. Constrained financial resources may be the prime reason for this low level of water-resources development.

This determinant of scarcity is likely to increase in significance in the future with growth in economic activities both in the agricultural and in the industrial sectors unless a sustainable source for financing water resources development is introduced. In the SADC region, for example, water demand is projected to rise by at least 3% annually until 2020, a rate equal to the region's population growth (SARDC, IUCN, AND SADC, 1994). As a consequence

of demands like this, it has been estimated that by 2025, up to 16% of Africa's population (230 million) will be living in countries facing water scarcity, and 32% (460 million) in water-stressed countries (Johns Hopkins, 1998). Already, the rising demand for increasingly scarce water in the drier parts of Africa is leading to growing concern about future access to water, especially where water resources are shared by two or more countries. However, this is not an entirely insurmountable problem, given the likely dividends that may be derived from cooperation between countries with shared water basins and between subregions.

Depletion of water resources through human actions. Available resources are being depleted through man-made actions that reduce both their quality and their quantity. Water contamination is increasing across the continent, from industrial pollution, poor sanitation practices, discharges of untreated sewage, solid wastes thrown into storm drains, and liquid leached from refuse dumps. A major problem is pollution from food-processing waste and the decaying of invasive aquatic weeds. Poor land use and agricultural practices compound these problems. As a consequence, concentrations of waste frequently exceed the ability of rivers to assimilate them, and water-borne and water-based diseases have become widespread.

The consequent deterioration of water quality is a significant form of depletion of available water resources. At best, it increases the cost of developing water resources and at worst it increases water scarcity. The consequences of the deterioration of water quality include eutrophication and the proliferation of invasive aquatic plants. Eutrophication is a factor mainly in lakes. The water hyacinth has already seriously affected most water bodies like Lake Victoria, the Nile and Lake Chivero. Future threats may include pollution from petroleum production and refineries, from agricultural waste such as fertilisers and pesticides, and from small-scale industries dispersed in large urban areas.

Another water-quality problem is salt-water intrusion. This is an issue particularly along the Mediterranean coast and on the oceanic islands like the Comoros that are highly dependent on groundwater resources. It is due in part to over-exploitation of groundwater resources.

Demand-side Issues

On the demand side too, Africa faces a number of issues. These include:

1. Lack of access to safe and adequate water supply and sanitation services;
2. Lack of water for food and energy security;
3. Inefficiency and wastage in water use;
4. Threats to environmental sustainability

Lack of access to safe and adequate water supply and sanitation services. Access to basic water supply and sanitation services is highly inadequate in Africa. In rural Africa, about 65 percent of the population do not have access to an adequate supply of water and 73 percent are without access to adequate sanitation. In urban areas, 25 percent and 43 percent do not have access to adequate water and sanitation respectively. In fact, since the Water and Sanitation Decade, progress in coverage has stagnated, and more people are without adequate services today than in 1990.

Due to these limitations, almost half of all Africans suffer from one of six main water-related diseases. The worst statistics are for cholera and infant diarrhoea. Out of the 46 countries in which schistosomiasis (or bilharzia) is endemic, 40 are in Africa. Moreover, 16 of the 19 countries reporting Guinea worm disease are in Africa. The poor access figures are likely to be compounded by the fact that population growth, at 3 percent per annum, is the world's highest. Hence, from 1997 to 2025, the population is expected to almost double, from 778.5 million to 1.453 billion (United Nations Population Division, 1996). Africa also experiences the world's most rapid rate of urbanisation, at 5 percent per annum.

However, it would appear that the inadequate access to basic water supply and sanitation services is not rooted in the inadequacy of available water resources. The root cause appears to be financial and technological. Hence, the poor performance of economic development in Africa should be expected to pose a challenge to financing sustainable expansion of access to safe and adequate water and sanitation services for all, especially the poor, in the shortest possible time.

Lack of water for food and energy security. During the past three decades, agricultural production has increased at an average of less than 2% per annum, while population has risen at about 3%. Under current demand and supply trends, cereal imports are expected to rise from the current 10 million mt per annum. to 30 million into in 25 years. Much of this can be explained by the fact that about one-third of the people in the region live in drought-prone areas.

In much of West Africa, average food supply (2,430 kcal/day/person) is below what is regarded as the optimum level of 2,700 kcal/day/person. In East and Southern Africa, the number of people affected by food insecurity has almost doubled, rising from 22 million in the early 1980s to 39 million in the early 1990s. It has been estimated that a 33-percent increase in agricultural output per annum is needed to achieve food security for the continent. Worse still, scenarios suggest that if the area under irrigation were to grow by a factor of three to over 16 million hectares, this would only represent a 5-percent contribution to the threefold food production increase needed by 2025.

Finally, it is worth noting that despite the high levels of food insecurity in the region, most countries have substantial underutilized potential for irrigation expansion (about 45 million hectares, according to an FAO estimate). In fact, two-thirds of African countries have developed less than 20% of their potential. In the whole of Africa about 6% of the cultivated area is irrigated. The three countries with the most irrigation potential have each developed less than 10% of their potential irrigated area. The scope for expanding irrigation is, therefore, considerable. However, it is apparent that there is an even greater scope for expansion of rainfed agriculture if agriculture is to make the necessary contribution to Africa's socio-economic development.

Ninety-five percent of the total energy consumption is supplied by coal-based power plants while only 4 % is covered by hydropower (World Bank, 1996). The hydropower potential of the region is estimated to be about 1.4 million GWh, of which less than 3% is utilized. Small-scale hydropower potential for supplying rural areas with energy is hardly exploited.

It is recognized that ensuring food and energy security calls for a range of actions involving socioeconomic development policies. However, water can be a limiting factor in the success of such measures. The challenge is, therefore, how to develop Africa's water resources so that water does not become the limiting factor in the expansion and increased productivity of both rain-fed and irrigation-based agriculture to ensure food security and economic development.

Inefficiency and wastage in water use. Given its current economic situation, Africa cannot afford to spend its constrained resources on producing water that is allowed to go to waste. Yet much water is wasted. For example, the average level of unaccounted-for water is about 50 percent in urban areas, and as much as 70 percent of the water used for irrigation is lost and not used by plants.

These high levels of water wastage may be attributed to the existence of perverse incentives or to the use of inefficient technologies. In the case of water supply, a major contributory factor is the neglected maintenance of installed equipment. In fact, in many African countries, limited resources borrowed for water supply go towards rehabilitating installed facilities instead of expanding services. This is an indirect way of borrowing for maintenance because rehabilitation has become a form of delayed maintenance of facilities. Apart from being a drain on limited financial resources, this is a major constraint to the expansion of services to the unserved. Incentives and technological improvements are needed to reduce such waste and improve the efficiency of investments in water resources.

Threats to environmental sustainability. The threat to environmental sustainability is due in part to failure to recognize the life-supporting functions of ecosystems (terrestrial and aquatic). In fact, the water quantity and quality requirements of ecosystems are not normally taken into account in the overall allocation of available water resources in much of Africa. Hence the important role played by wetlands in many rural economies (for the provision of highly productive agricultural land, dry season grazing for migrant herds, fish, fuel wood, timber needs, medicines, etc.) has not been recognized and reflected in national water policies. As a result, such wetlands are increasingly being endangered by poor cultivation, deforestation and overgrazing.

As stated earlier, the Dublin Principles explicitly draw attention to the essential role of water not only for development, but also for life and the environment. It is important, therefore, to recognize the legitimate use of water for sustaining the environment, especially the life-supporting functions of ecosystems. This recognition should be reflected in the generation of broad-based support and a legal basis for ensuring that water for maintaining the sustainability of life-supporting ecosystems is adequate in quality and quantity. This may call for separating water resources into three categories, with one part catering to competing demands for economic development, a second part reserved for sustaining the environment, and the third part earmarked for meeting basic needs for sustaining life, as has been done in South Africa.

Compounding Issues

In addition to the key issues identified above, there are a number of compounding issues that also have a significant impact on water resources in Africa. The most significant ones are:

- 1 . Political instability and conflict within and between countries;

2. Weak institutional arrangements and legal frameworks for the ownership, allocation and management of water resources;
3. Inadequate public awareness and stakeholder involvement;
4. Inadequate research for water-resources development;
5. Weak socio-economic development and technology base;
6. Low public capacity to finance required investments in the development and management of water resources, including protection and restoration;
7. Inadequate private sector participation in financing.

7. The Key Challenges

While the key and compounding issues pose numerous challenges for the water sector in Africa, it is possible to identify 10 key challenges. These are:

1. Ensuring that all have sustainable access to safe and adequate water supply and sanitation services to meet basic needs;
2. Ensuring that water does not become the limiting factor in food and energy security;
3. Ensuring that water for sustaining the environment and life-supporting ecosystems is adequate in quantity and quality;
4. Reforming water-resources institutions to establish good governance and an enabling environment for sustainable management of national and trans-boundary water basins and for securing regional cooperation on water-quantity and water-quality issues;
5. Securing and retaining skilled and motivated water professionals;
6. Developing effective systems and capacity for research and development in water and for the collection, assessment, and dissemination of data and information on water resources;
7. Developing effective and reliable strategies for coping with climate variability and change, growing water scarcity, and the disappearance of water bodies;
8. Reversing growing man-made water-quantity and quality problems, such as over-exploitation of renewable and non-renewable water resources, and the pollution and degradation of watersheds and ecosystems;
9. Achieving sustainable financing for investments in water supply, sanitation, irrigation, hydropower and other uses, and for the development, protection and restoration of national and trans-boundary water resources;
10. Mobilizing political will, creating awareness and securing commitment among all with regard to water issues, including appropriate gender and youth involvement.

The Water Vision for Africa is designed to address these challenges.

8. The Africa Water Vision for 2025

From this review of the socio-economic crisis in Africa, the salient features of water resources in the region, and the key challenges facing the development of such resources, it is apparent

that business as usual will be woefully inadequate in addressing the water-resources problems in Africa. A radical change in approach is required if water is not to become a constraint to, but rather an instrument for, a socio-economic turnaround and development in Africa. Such an approach calls for a new water vision for the continent, buttressed by a flexible framework for action that can respond to progress towards the Vision and to relevant developments within and outside the water sector.

The shared Water Vision for Africa has been defined with this in view. It is a vision of:

AN AFRICA WHERE THERE IS AN EQUITABLE AND SUSTAINABLE USE AND MANAGEMENT OF WATER RESOURCES FOR POVERTY ALLEVIATION, SOCIOECONOMIC DEVELOPMENT, REGIONAL COOPERATION, AND THE ENVIRONMENT.

It is a Vision of an Africa where:

1. There is sustainable access to a safe and adequate water supply and sanitation to meet the basic needs of all;
2. Water inputs towards food and energy security are readily available;
3. Water for sustaining ecosystems and biodiversity is adequate in quantity and quality;
4. Water-resources institutions have been reformed to create an enabling environment for effective and integrated management of water in national and trans-boundary water basins, including management at the lowest appropriate level;
5. Water basins serve as a basis for regional cooperation and development, and are treated as natural assets for all within such basins;
6. There is an adequate number of motivated and highly skilled water professionals;
7. There is an effective and financially sustainable system for data collection, assessment and dissemination for national and trans-boundary water basins;
8. There are effective and sustainable strategies for addressing natural and man-made problems affecting water resources, including climate variability and change;
9. Water is financed and priced to promote equity, efficiency, and sustainability;
10. There is political will, public awareness and commitment among all for sustainable management of water resources, including the mainstreaming of gender issues and youth concerns and the use of participatory approaches.

9. Critical Factors for Achieving The Vision

Many factors will influence attainment of the vision. Among these are population and demographic trends, lifestyles and consumption patterns, structure and level of economic development, technology development and choice, governance, policies and institutions. The structuring of these factors is what will determine the attainability of the vision. For example, achieving the vision will call for slower population growth, sustainable socio-economic development, a new way of thinking about water and a new form of regional co-operation. It will call for a framework for action that is underpinned by partnership and solidarity between countries that share common water basins. In addition, it will call for co-

operation between sub regional groups on the continent. It will require fundamental changes in policies, strategies and legal frameworks, as well as changes in institutional arrangements and management practices. Above all, it will require adherence to the following critical success factors:

- Openness and transparency in decision-making processes;
- Ability to generate and receive knowledge and information;
- Cooperation and teamwork by all countries in the region to achieve common and mutually beneficial objectives;
- Readiness to take tough decisions on the future direction and course of action consistent with the aspirations in the shared Water Vision;
- Proper appreciation at all times of “where we are”, “where we want to be”, and “how to get there”.

10. Framework for Action

The framework for action defines the road map towards the Vision. Table 3 shows the milestones and corresponding targets towards the Vision. The framework for action consists of actions under the following broad categories:

1. Strengthening governance of water resources;
2. Improving water wisdom;
3. Meeting urgent water needs;
4. Strengthening the financial base for the desired water future.

Strengthening governance of water resources

- Adopting and implementing IWRM principles and policies;
- Developing and implementing institutional reform and capacity-building at local, national and trans-boundary water-basin levels;
- Promoting transparency and participation;
- Adopting the river basin as the unit for water-resources management; Strengthening river-basin and aquifer management;
- Creating an enabling environment for cooperation between countries sharing international water basins;
- Mainstreaming management at the lowest appropriate level and creating institutional arrangements for full stakeholder participation;
- Liberalizing water markets while meeting basic needs of the poor.

Improving water wisdom

- Raising awareness on water-management issues;
- Establishing a sustainable system for data collection, management, and dissemination, including standardization and harmonization of data;
- Building institutional, technological and human capacity for effective water management;
- Conducting research and development on water-resources issues;

- Facilitating access to knowledge and information centers and services such as the Internet;
- Mainstreaming gender and youth concerns in all activities.

Meeting urgent water needs

- Expanding safe water-supply and sanitation services to meet basic human needs;
- Ensuring an adequate supply of water for sustainable food security;
- Ensuring that water for the environment is adequate in quantity and quality;
- Ensuring an adequate supply of water for urban, agricultural, energy, and hydropower production, industry, tourism and transportation development;
- Managing climate variability and change, including drought, desertification, and floods;
- Conserving and restoring ecosystems;
- Protecting watersheds and controlling siltation of hydraulic structures;
- Meeting rural energy needs;
- Developing non-conventional resources such as desalination and re-use of water.

Strengthening the investment base for the desired water future

- Mainstreaming full cost recovery and service differentiation, while ensuring safety nets for the poor;
- Securing sustainable financing from national and international sources for tackling urgent water needs;
- Securing sustainable financing for institutional reform;
- Securing sustainable financing for information generation and management;
- Promoting and facilitating private sector financing in the water sector;
- Establishing mechanisms for sustainable financing of water-resources management.

11. Milestones and Targets

The framework for action defines what needs to be achieved if Africa is to move from where it is today to where it envisions being by 2025. However, these ends cannot be achieved overnight in one giant step. The milestones and targets define intermediate goals to be reached at different levels (local, national, sub regional and regional) at stated times in progressing towards the goals. Examples of milestones and targets are presented in Table 3. They need to be accompanied by indicators and criteria for monitoring their successful attainment.

Table 3: Milestones and Targets

Actions	Targets		
	2005	2015	2025
Improving Governance of Water Resources			
1. <i>Development of national policies and comprehensive institutional reform.</i>			
<ul style="list-style-type: none"> In process of development Full implementation 	100% of countries	100% of countries	100% of countries
2. <i>Enabling environment for regional cooperation on shared water.</i>			
<ul style="list-style-type: none"> Initiated in existing river-basin organizations Implemented in existing river-basin organizations Initiated in new river-basin organizations Implemented in new river-basin organization 	100% of organizations 50% of organizations	100% of organizations 100% of organizations 50% of organizations	100% of organizations
Improving Water Wisdom			
1. <i>Systems for information generation, assessment and dissemination</i>			
<ul style="list-style-type: none"> Established at national level Established for international river basins Established at Africa-wide level 	50% of countries 30% of basins	100% of countries 100% of basins	100% complete
2. <i>Sustainable financing for information generation and management</i>			
<ul style="list-style-type: none"> Review of global experience Implementation at national level Implementation at river-basin level Implementation at Africa-wide level 	100% complete 50% complete 30% complete	100% complete 100% complete 30% complete	100% complete 90% of countries Three established
3. <i>IIFRM Capacity Building</i>			
<ul style="list-style-type: none"> Create public awareness and consensus Knowledge gaps identified Partnerships for strategic assistance National research institutes established Regional research institution established Gender/youth concerns mainstreamed 	100% of countries 100% of countries 100% of countries 20% of countries One established 30% of countries	60% of countries Two established 100% countries/basins	

Actions	Targets		
	2005	2015	2025
Meeting Urgent Water Needs			
1. <i>Proportion of people without access</i> <ul style="list-style-type: none"> to safe and adequate water supply to safe and adequate sanitation 	Reduce by 25% Reduce by 25%	Reduce by 75% Reduce by 70%	Reduce by 95% Reduce by 95%
2. <i>Water for achieving food security</i> <ul style="list-style-type: none"> Water productivity of rain-fed agri. and irrigation Size of irrigated area 	Increase by 10% Increase by 25%	Increase by 30% Increase by 50%	Increase by 60% Increase by 100%
3. <i>Development of water for agriculture, hydropower, industry, tourism & transportation at national level</i>	5% of potential	10% of potential	25% of potential
4. <i>Conservation and restoration of environment, in biodiversity, and life-supporting ecosystems</i> <ul style="list-style-type: none"> Allocation of sufficient water for environmental sustainability. Conserving and restoring watershed ecosystem 	Implemented in 30% of countries Under development	Implemented in 100% of countries Implemented in 100% of countries	Implemented in 100% of river basins
5. <i>Effective management of drought, floods and desertification</i>	Under development	Operational in 50% of countries	Operational in 100% of countries
Strengthening Financial base for desired water future			
1. <i>Sustainable financing for policy and institutional reform and capacity building</i>	Operational in 60% of countries	Operational in 50% of countries	Operational in 100% of countries
2. <i>Sustainable financing for information generation and management</i>	Secured in 100% of countries	Operational in 100% of countries	Operational in 100% of countries
3. <i>Financing urgent water needs</i> <ul style="list-style-type: none"> Implementation of pricing and full cost recovery Increasing private sector participation Mobilizing finance from national and international sources 	Operational in 50% of countries Operational in 30% of countries Secured for 50% of countries	Operational in 100% of countries Operational in 100% of countries Secured for 100% of countries	Operational in 100% of countries

12. Investment for the Desired Water Future

To meet the challenges of the Vision and implement the Framework for Action for a secure and sustainable water future, substantial investment outlays will be required. The key areas needing investment are policy development, institutional reform and capacity-building, knowledge and information generation, water infrastructure and services to meet immediate needs and increase water productivity. The main obstacles to achieving the Vision and implementing the Framework for Action are obtaining the required investment and creating the enabling institutional environment and capacity to manage it. The detailed investment requirement and financing strategies will be established once national plans and frameworks for action are prepared based on the African Vision.

In order to give some idea of the investment needed for implementing the Framework for Action, the African Development Bank has come up with a figure of US\$ 20 billion as being necessary each year over the coming 25 years to attain the minimum condition of the desired water future. This is about 11% of the global estimate of US\$ 180 billion per year for implementing the global Framework for Action in developing countries. A summary of the aggregate investment level for the main development components is given in Table 4.

Table 4: Summary of Preliminary Investment Requirement

Framework for Action Cost Centre Annual Investment	Annual Investment US \$ billion
1. Water supply for basic needs	5.00
2. Sanitation and hygiene	7.00
3. Irrigation and water-productivity improvement	4.00
4. Water for industry, energy and transport	2.10
5. Flood and drought management	0.40
6. Policy and institutional reform and capacity-building	0.35
7. Knowledge and information	0.45
8. Awareness and education	0.45
9. Research-search and development	0.25
Total	20.00

13. A Glimpse at 2025 Africa

Adherence to the framework for action will result in a new way of thinking about water. It will result in fundamental changes in current policies, strategies and legislative frameworks, and also in institutional arrangements and management practices. It will result in a desirable impetus to economic and social development, water for health, and water for food. A glimpse at this water future in Africa is reflected in the following:

- New policy, strategy and legislative frameworks;
- Bottom-up institutional arrangements;

A living flood plain

Early on an April morning in the year 2025, on one of the vast floodplains of the Sahel, Ibrahim Diaw leads his herd of long-horn cattle to their dry-season pastures. The grazing routes for nomadic herders are based on the ecosystem restoration programme initiated at the turn of the millennium. Using these migration pathways no longer results in violent conflicts with farmers, as was the case 40 years ago after intensive irrigated rice schemes were constructed throughout the plain.

Now his herd prospers through access to large expanses of restored perennial grasses, including those of the new Wahta Biosphere Reserve. Throughout the wet and dry seasons, water holes provide drinking water for his animals and the floodplain “works” for the benefit of Ibrahim and the local people who can count on stable livelihoods based on recession agriculture, semi-intensive production and artisanal and small-scale commercial fishing. Ibrahim walks in the grass and thinks of the past desiccated flats, 25 years without a single wedding in the villages, his father who thought that they had been forgotten by God... He thinks that efforts to mitigate the impact of infrastructure development are about to pay off. the dikes have been put to good use, artificial flooding schemes are effective and water is not wasted anymore. Ibrahim’s floodplain is alive and its water resources are used wisely.

Source: Water and Nature Vision (October draft)

- Adherence to demand-responsive approaches while meeting the basic needs of the poor;
- Food self-sufficiency.

New policy, strategy and legislative frameworks. It is envisaged that under the Africa Water Vision water policy will be framed within a comprehensive and integrated approach to the development and management of water resources. National water policies shall be adopted at the highest political level, and followed by water resources management strategies to implement them. Governments would retain control through regulation and an enabling environment, with decentralization and empowerment providing a shift from centralised and top-down administration and implementation.

Regional and national strategies would be designed and developed to implement water policies based on integrated water resources management principles. Such strategies would be aligned and integrated with other government strategies, in such areas as economic development, environmental protection, land use management and energy production.

Water laws and regulations would be modified to reflect market principles, enabling a breakthrough from an administrative system of water allocation to a demand-responsive one. This would not be done at the expense of abandoning the regulatory roles of government or the social value of water, however. The rights of people to water to meet their basic needs would be entrenched in policy, strategy and legislative frameworks across the continent.

Moreover, water laws and regulations would be revised to give more attention to issues of water quality management. In this environment, pollution of water resources would be minimized, the principles of polluter pays would be widely used, and water re-use and waste recycling

would be practiced. Furthermore the location of “dirty” industries from industrialized countries to developing ones would be abolished by national and international consensus.

National legislation and regulations would be harmonized between countries; facilitating consistent basin-based management of international waters and fostering a win-win regionally integrated economy. Water-resources management would become influential upon a wide spectrum of legislation not immediately directed at water (e.g. environmental law, bio-safety).

Bottom-up institutional arrangements. As a result of the Vision, there is a geographical hierarchy of institutions, characterized by close vertical integration, and also by very close horizontal integration with other sector interests. Key principles underlying such institutional arrangements include transparency, accountability, demand-responsive approaches, and market orientation. Given their role in irrigated agriculture, in food production and in maintaining the health of families and societies, women take on key positions and functions in decision-making under the new institutional structures.

In these new structures, responsibility for key aspects of overall management is passed to the community through decentralization. There is simultaneously a shift away from provincial and district water administration to basin and sub-basin management. Governments become enablers and regulators rather than direct service providers, and this leads to an accelerated achievement of government policy. At the regional level, river-basin commissions and river-basin authorities are established to manage water across international borders. There is a “levelling of the playing field” whereby all participating countries are able to negotiate on an equal footing for their shared and mutual benefit.

Adherence to demand-responsive approaches while meeting the basic needs of the poor. Liberalization of African economies that results from the new Vision is matched by a more market oriented approach to water-resources management. Water pricing and taxation within countries becomes sensitive to the relative availability of water within catchments boundaries and to demand. Moreover, public enterprise reform in water utilities is aimed at improved efficiency, cost recovery, and financial viability. Increased water efficiency results in lower levels of unaccounted-for water, higher levels of user revenues, and lower costs of infrastructure development. It thus becomes possible to move public funds towards capital expenditure for water infrastructure, and away from recurrent spending. As part of the economic reforms, increased private sector participation in financing water infrastructure and delivering water services is evident.

Market reforms are accompanied by the development of sound regulatory frameworks, and social criteria are built into the pricing principle to ensure that the basic water needs of the poor are addressed. Development and expansion of water-supply systems is driven by what users want and are willing to pay for. There is no insistence that all must be served with the same level of service whether they can afford it or not. Instead of this, the principle of service differentiation is also firmly established so that different socio-economic groups in different parts of an urban area or of a country are able to obtain the types and levels of services that they want and are willing to pay for. The agency responsible for providing water services is autonomous from government but manages the system under technical, financial and

administrative guidelines set by national governments in order to safeguard the interests of both consumer and supplier of the service. Links between water supply and environmental sanitation are made in the planning of new programs. Hygiene education becomes crucial to planning in the sector.

Food Security. Food security is the result of a number of critical interventions. As a consequence of the Vision, countries have optimized the use of available land and water resources by considering riparian and environmental issues. They have improved watershed management practices, implemented necessary institutional reforms, established enforceable protocols for shared water basins in the region, improved databases and information sharing on land and water, and enhanced trade in food crops and products.

Second, agriculture is operated as a business with more specialized farms, optimizing the use of organic and inorganic inputs and taking into account state-of-the-art soil and water conservation techniques.

Third, surface and groundwater is managed more efficiently through improvements in technology, equipment and water storage and distribution facilities for irrigation (increasing productivity per unit of available water), aquaculture, domestic and industrial use, livestock, wildlife and nature. Fourth, rainfed agriculture is expanded through appropriate strategic planning.

Finally, African countries achieve improved water availability and management by developing appropriate drought-and flood-mitigation strategies, improving water storage, and reducing water losses. This is complemented by cost-effective technologies for desalination, recycling of water, prevention of resource degradation and reductions in energy costs.

These are examples of conditions prevailing in 2025 as a result of the Vision; but how do we move from where we are to these desirable goals? The framework for action provides an answer.

14. The Way Forward

The attainment of these and other desirable outcomes of the Vision requires action at various levels, such as the grassroots, national and subregional water-basin levels. Action should also be taken at the level of subregional economic commissions (such as ECOWAS and SADC) and of Africa-wide organizations (such as the AfDB, ECA, and the OAU). The priority actions that need to be taken include awareness-and consensus-building, creation of enabling environments for international cooperation, responding to immediate water problems, creating frameworks for integrated water resources management, and capacity-building.

Building awareness and consensus. There is an immediate need to create awareness and consensus about the Vision at all levels, using messages that may be revised from time to time and from place to place to reflect local and changing circumstances. An initial set of such messages is presented in the following box:

Africa Water Vision Messages:

1. Provide safe and adequate water and sanitation for all, urgently.
2. Make equitable and sustainable use of Africa's water resources.
3. Ensure sustainable development and management of water resources for all.
4. Use water resources wisely to promote agricultural development and food security.
5. Develop water resources to stimulate socio-economic development.
6. Treat water as natural asset for all in Africa.
7. Share management of international water basins to stimulate efficient mutual regional economic development.
8. Ensure adequate water for life-supporting ecosystems.
9. Manage watersheds and flood plains to safeguard lives, land and water resources.
10. Price water to promote equity, efficiency and sustainability

Creating an enabling environment for international cooperation. Management of international waters has been identified as a priority in Africa due to the multiplicity of international waters. To respond to this, early action should be taken to develop a framework and an enabling environment for cooperation in the development and management of international water basins. Action would be required at an all-Africa level, at the sub regional level, and at the national level. Good models that have been cited above include the Nile Basin Initiative (NBI) and the Protocol on Shared Watercourse Systems of the Southern Africa Development Commission (SADC), the Lake Chad Basin Commission (LCBC), and the Niger Basin Authority (NBA).

Responding to immediate water problems Reference has been made to the inter-dependency between water and economic development. It has been suggested that water-resources issues (such as climate variability and shared river basins) and inadequate access to water and sanitation services can contribute to poverty. Similarly, on the positive side, well-managed and adequate water resources can be a result of and contribute to cause sustainable economic development. The challenge is how to prime the pump to launch the upward spiral in which water-resources development and economic development become mutually supportive. To this end, Africa would like to appeal to its development partners for initial financial assistance to facilitate action in three priority areas: (a) institutional reform; (b) information generation and management; and (c) meeting urgent water needs. Addressing these three fundamental needs would contribute to improved vitality, longevity, and human productivity that can serve as the springboard for socio-economic development.

Creating frameworks for integrated water-resources management. A prerequisite for successfully addressing the pressing water problems is to change from the fragmented approach to an integrated approach to water-resources management (IWRM). A first step in this regard is the establishment of an enabling environment at national level that will include policies and institutional arrangements for water-resources management and allocation between competing demands. This calls for an understanding of the Dublin-Rio principles. It also calls for a programme of gap analysis to determine the types of strategic assistance needed at the country level for implementing IWRM.

Moreover, it will call for an interpretation of the concept of water as an economic and social good. In this regard, it has been stressed that it might be helpful to separate the competing

demands for water for economic development from the competing demands for water for supporting life and the environment. This would make it easier to treat water strictly as an economic good for competing demands for economic development. However, for its use to support life, such as water supply and sanitation for the poor or for food security, a case may be made for treating water as both an economic and a social good. The aim here is to set prices for these services that can promote equity, efficiency, and sustainability. A lot of debate and public education may be necessary to arrive at a consensus on these issues.

Building capacity. One of the major constraints in the development of water resources in Africa has been identified as inadequate human and institutional capacity for IWRM. Unfortunately, Africa does not have an adequate number of highly motivated and highly skilled water professionals who can deal effectively with the complex issues of water scarcity, climate variability and joint management of international waters. It is fortunate that, under the Global Water Partnership, a program of capacity-building has been launched, starting in Southern Africa. Other regions in Africa need to take the initiative to call for the use of the services of this new program for capacity-building at national and international levels.

Identifying vision drivers. Vision drivers (or vision driving forces) are long-term factors that influence the course of future water developments. They represent the conditions of the social and ecological system and the engines that move forward the development of water resources towards the desired vision. By knowing the most important drivers, it is possible to gain an insight into the direction and speed of water-resources development in the future. In view of their importance, a number of driving forces that might be relevant for the water vision for Africa have been identified. In order of priority, they are socio-economic, demographic, environmental, governance, and technological factors. There needs to be early consensus on how these drivers are to be defined.

- **Socio-economic factors.** The main socio-economic factor likely to constrain attainment of the Vision is the widespread poverty resulting mainly from slow economic growth and high levels of indebtedness on the continent. It is feared that this will inhibit investments in water resources development. There is a need to address this as a matter of urgency, especially through the expansion of access to safe and adequate water supply and sanitation services.
- **Demographic factors.** A key demographic constraint is rapid population growth and urbanization resulting in increasing demand on scarce resources under conditions of limited managerial capacity. A related factor is the high prevalence of communicable diseases and premature death due to inadequate, unsafe and inequitable access to water supply and sanitation. Countries need to review the trade-offs between different population policies in order to ensure that demographic factors do not limit socio-economic development or lead to increased water scarcity.
- **Environmental factors.** The major environmental factor is climate variability (spatial and temporal) leading to drought, desertification, floods and other natural disasters. A second factor is environmental degradation from domestic, industrial and agricultural waste. A third factor is failure to allocate adequate water resources to sustain life-supporting ecosystems, both terrestrial and aquatic. Addressing these factors at the national and international level is absolutely critical for Africa's

sustainable social and economic development. If they are not addressed, the prognosis is dire.

- **Governance factors.** There are numerous governance factors in Africa. They include: lack of accountability, transparency and good governance, resulting in ineffective management of water resources; inadequate cooperation and coordination in the management of national and international water basins; and inappropriate institutional arrangements resulting in poor management and low capacity in human resources. The governance factors also include: inadequate regulatory and legal frameworks at local, national, and regional levels; inadequate stakeholder involvement in water-resources management, particularly women and the youth; and civil strife and inter-country wars. A lot of work remains to be done on this constraint.
- **Technology factors.** The key technological factor is the existence of critical gaps in data (ground and surface water information and knowledge in the water sector). Inadequate technological know-how is another factor. The Internet is a major instrument for overcoming some of the technological constraints; yet in many parts of Africa, high telephone charges constitute a major constraint to access to the Internet. There is an urgent need for appropriate policies on Internet access in African countries.
- **International factors.** Water does not recognize borders. One factor is Africa's abundance of shared international river basins, which will create interdependencies that can be threats or opportunities. A second factor is climate variability, which creates untenable risks in the absence of inter-country and inter-regional cooperation, allowing diversified sources of water, food, power, etc. Regional institutions and governments need to promote cross-border economic cooperation and integration, replacing threats with opportunities and mutual benefits.

15. Conclusions

Water is clearly a major factor in socio-economic recovery and development in Africa. The continent appears to be blessed with substantial rainfall and water resources. Yet, it has severe and complex natural and man-made problems that constrain the exploitation and proper development of its water resources potential. It is now recognized that these problems are surmountable. However, business as usual in water-resources management is not the way to overcome them. It is an approach that is bound to have disastrous consequences. A new Africa Water Vision for 2025 has been developed accordingly to address these problems and to stimulate a shift in approach toward a more equitable and sustainable use and management of Africa's water resources for poverty alleviation, socio-economic development, regional cooperation and the environment.

A framework for action towards the attainment of the Vision has been defined along with milestones and targets towards the Vision. What remains is mobilizing the political will, grassroots support and sustainable financial resources to make the Vision a reality.