

Water

A Key for Sustainable Development in Africa:

**Key Issues and constraints
International Conference on Freshwater,
Bonn, 3 - 7 December 2001**



FOREWORD

The quality of water reveals everything, right or wrong, that we do within our eco-systems. Every decision we make - whether the issue is growth, housing, transportation or economic development - is directly linked to the use of our water resources. Water is an indicator of sustainability. Its quality and availability indicate the level of social development within a community. It is an indicator of poverty. It indicates social tensions and it is also a proven indicator of the quality of the environment.

It is clear that water is becoming one of the most critical natural resource issues in Africa. The African continent is one of the two regions in the world facing serious water shortages. More than 300 million people in Africa still lack reasonable access to safe water. Even more lack adequate sanitation. In sub-Saharan Africa, only about 51 per cent of the population have access to safe water, and 45 per cent to sanitation. Currently, 14 countries in Africa are subject to water stress or water scarcity, with those in Northern Africa facing the worst prospects. A further 11 countries will join them in the next 25 years. Rising demand for increasingly scarce water resources is leading to growing concerns about future access to water, particularly where water resources are shared by two or more countries.

The main threats to water quality in Africa include eutrophication, pollution and the proliferation of invasive aquatic plants such as the water hyacinth weeds. The water hyacinth has seriously affected most water bodies in the region, including Lake Victoria, the Nile River and Lake Chivero. As no effective means of controlling this weed has yet been found, the water hyacinth will continue to disrupt water transport, water supplies to urban areas, the fishing industry, power generation and the livelihoods of many local communities. Industrial wastes are still discharged without treatment into rivers and lakes in most African countries, causing a major and persistent health problem. With recurring droughts and chronic water shortages in many areas, most countries and people already pay an increasingly high price for water and for the lack of water. They expend more in calories carrying water from distant sources, suffer more in impaired health from contaminated or insufficient water, and also lose more in diminished livelihoods and even lost lives.

Agriculture is the largest user of water in Africa, accounting for 88 per cent of total water use. However, with only 6 per cent of cropland under irrigation, there is considerable potential to increase food production through irrigation. We must remember that land is the critical resource and the basis for survival for most people in Africa. Agriculture contributes about 40 per cent of regional GDP and employs more than 60 per cent of the labour force. Although a net food exporter before 1960, Africa has become more dependent on food imports and food aid over the past three decades. Unless urgent and effective land conservation and watershed management measures are taken, food insecurity will continue to be a critical local, national and regional problem.

There is a compelling case for integrating freshwater management into national economic frameworks as key elements in policies for sustainable development and poverty alleviation. The adoption of an integrated approach to the environmentally sustainable management of water resources is fundamental for protecting freshwater ecosystems, water quality and human health. It will also enhance socio-economic productivity and conserve environmental integrity. A major constraint on efficient water management during the past has been the weaknesses of the institutions concerned not being capable of dealing with emerging water management problems brought about by new agricultural practices, large-scale water management projects and changes in social and cultural environments. To manage water in its totality in a rational fashion, inter-institutional collaboration has to be substantially improved.

Currently, water-related policies have been developed in a fragmented fashion by a host of institutions in nearly all countries. Lack of coordination and often intense rivalries, have meant that water policies have generally been sub-optimal. Without institutional rationalization and strengthening, water management simply cannot become optimal in the future. Some of the obstacles to effective, holistic, participatory water management include the promotion of short-term rather than long-term perspectives in decision making, values and attitudes that underestimate community skills and intelligence and lack of necessary funding to implement and monitor policies and decisions. Education, training and the strengthening of local organizations and decision-making authority can help to overcome some of these obstacles.

In order to be effectively implemented, integrated water resources management should also include institutional and legal capacity-building, human resources development and participatory approaches. The basis for a strategic approach to integrated freshwater management can be founded on a set of key elements that bring together all the relevant parties and their particular socio-economic and environmental concerns that are bound by freshwater. It is also important that domestic policies and actions should not be seen to be separate from international policies and actions. However, for water quality, quantity and ecosystem concerns, changes are often needed in each country's domestic policies and activities including sub-national levels of government.

Unfortunately, traditional approaches to water management do not involve the members of the civil society as stakeholders. Since the management of freshwater resources sometimes involves more than one country or states or local governments, no single entity - public, private or nongovernmental - can manage the process alone. All stakeholders must be involved. Education, training and the strengthening of local organizations and decision-making authority can help to overcome some of these obstacles.

There is much to be done, even though so much has been said and written about tackling the water crises in Africa. We have facts and figures. As stated in the recently launched UNEP GEO-2000 report an integrated approach is the way forward since it offers a means of reconciling competing demands with dwindling supplies. It also offers a framework in which hard choices can be made and effective operational actions can be taken. It is valuable for all countries and at all stages of development.

The lessons from the past are clear. Without appropriate

policies and institutional capacities for making the transition to more comprehensive, ecosystem-based water resources management, no technical or engineering fix will succeed. Water is life, and sound management of water resources is an integral component of the new paradigm for sustainable development - one that allows the steady improvement in living standards without destroying the fragile natural capital of river, marine, and groundwater systems. It is time to act. The International Conference on Freshwater (Bonn, Germany, 3 – 7 December 2001), which is a major component of the preparatory process for the 2002 World Summit on Sustainable Development, provides a unique opportunity for agreeing on options for action.

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Part 1

Water for Sustainable Development in Africa

"It's no accident that the two longest chapters in Agenda 21 deal with rivers and seas. The Earth Summit might well have been called a 'Water Summit' as our planet is 70% water and it is water, or the lack of it, which will cause many problems in the 21st Century. In dry areas like the Middle East, nations threaten to go to war about it." Rescue Mission Planet Earth by Children of the World, p.

Introduction

1. As elsewhere on our planet, water is *the* key natural resource throughout Africa. An adequate supply of clean water is the most important precondition for sustaining human life, for maintaining ecological systems that support all life and for achieving sustainable development.

2. Water is abundant in Africa on a regional scale but is unevenly distributed by nature. Although a few African countries have high annual averages of water per person, many already or soon will face water-stress (2,000 m³ or less per person annually) or scarcity conditions (1,000 m³ or less per person annually) where the population cannot be sustained with available water resources (see Table 1). Given current population projections, over 400 million people are expected to be living in at least 17 water-scarce African countries by the year 2010. Their lack of water will severely constrain food production, ecosystem protection and economic development (WWI, 1993, pp. 24-25).

3. Throughout Africa water is also unfairly allocated by man. With recurring droughts and

chronic water shortages in many areas the majority of African countries and people pay an increasingly high price for water or the lack of it. The highest price is often paid by the poor majority of people in terms of money to buy small quantities of water, calories expended to fetch water from distant sources, impaired health, diminished livelihoods and even lost lives. Today over 300 million people in Africa still do not have reasonable access to safe water. Even more lack adequate sanitation (see Table 2).

4. Aquatic species, habitats and ecosystems are also at risk. With increasing water demand throughout Africa to support greater agricultural productivity, industrial expansion and urban growth, more water to meet human needs means less for maintaining aquatic ecosystems and the many other species and environmental services they support.

5. Water in Africa is crucial for sustainable national development but is rarely confined to the boundaries of a single country. With over 50 major international water basins in Africa, most water is shared by two or more countries. Most international basins are without any agree-

ments on equitable use or environmental protection. Few have effective institutional arrangements for consultation or cooperation. Procedures for avoiding or resolving international disputes over water are largely lacking.

6. The key water supply and demand issues and challenges to meet human and environmental needs within and among African countries are reflected in Agenda 21. Chapter 18, the main Agenda 21 chapter on water resources, has more text (over 40 pages) and recommendations for national and international action (over 275) than most of the other 37 substantive chapters. Over 20 additional recommendations on water are made in nine other chapters. All of the Agenda 21 recommendations on water are identified and summarized in a separate document for the Experts Group Meeting.

Agenda 21: Water for Sustainable Development

7. Part 1 of the following report focuses on the main objectives, targets and priority activities for Africa of the many Agenda 21 recommendations on water resources. It starts with a summary of the overall objective for integrated water management and then briefly presents and examines the seven main programme areas in Chapter 18 of Agenda 21. Cross references are made in each section to relevant recommendations in other Agenda 21 chapters. Each section concludes with a list of key issues and questions for discussion at the Experts Group Meeting.

Overall Objective for Integrated Water Management

8. The overall objective stated in Agenda 21 is "to make certain that adequate supplies of water of good quality are maintained for the entire population of this planet while preserving the hydrological, biological and chemical functions of ecosystems, adapting human

activities within the capacity limits of nature and combating vectors of water-related diseases."

Main Programme Areas on Water

9. Chapter 18 in Agenda 21 includes the following seven main programme areas:
- A. Integrated water resources development and management
 - B. Water resources assessment
 - C. Protection of water resources
 - D. Drinking water supply and sanitation
 - E. Water and sustainable urban development
 - F. Water for sustainable food production and rural development
 - G. Impacts of climate change on water resources

A. Integrated Water Resources Development and Management

10. This programme area contains 39 recommendations for national and international action on strengthening management, science and technology, education and training and capacity building for the integrated development and management of water resources. The estimated cost in Agenda 21 of implementing these recommendations during 1993-2000 is \$115 million annually in external grants or concessional financing.

11. Other relevant recommendations are included in the Agenda 21 programme areas on "Desertification and Drought" (para. 12.18.a (iii), 12.23.b and 12.48.d); "Mountain Ecosystems" (para. 13.16.b, 13.18.c, 13.21.b and 13.23); "Sustainable Agriculture and Rural Development" (para. 14.41.c); "Oceans and Marine Resources" (para. 17.6a); and "Management of Solid Wastes and Sewage" (para. 21.45.c).

Characteristics of an Integrated Approach

12. Agenda 21 cites the following main characteristics of integrated water resources development and management:

- *Comprehensive:* Cover all types of interrelated freshwater bodies, including surface water and ground water, and incorporate both water quantity and quality aspects.
- *Multisectoral:* Integrate water plans and programmes in national economic and social policies.
- *Inter-Ministerial:* Coordinate responsibilities for water resources development among the key sectoral agencies.
- *Multi-use:* Ensure multi-interest utilization of water resources for water supply and sanitation, agriculture, industry, urban development, hydropower generation, inland fisheries, transportation, recreation, low and flat lands management and other priority activities such as flood prevention and sedimentation control measures.
- *Rational use:* Incorporate water conservation and wastage minimization measures.
- *International use:* Formulate and harmonize water resources strategies and action programmes, taking into account the interest of all riparian countries.

(a) Objectives and Targets

Integrated Water Management

13. In Agenda 21 the overall objective is "to satisfy the freshwater needs of all countries for their sustainable development" with priority to "the satisfaction of basic needs and the safeguarding of ecosystems". The four principal objectives cited in Agenda 21 are:

1. To promote a dynamic, interactive,

iterative and multisectoral approach to water management.

2. To plan for the sustainable and rational utilization, protection, conservation, and management of water resources based on community needs and priorities and on national economic development policy.
3. To design clearly defined strategies and implement projects and programmes that are economically efficient and socially appropriate with full public participation in policy and decision-making.
4. To strengthen institutional, legal and financial mechanisms to ensure water programmes support sustainable social progress and economic growth.

14. Agenda 21 sets the following three targets for integrated water resources development and management:

1. By the year 2000 to design and implement national action programmes with appropriate institutional and legal arrangements.
2. By the year 2000 to establish efficient water use programmes for achieving sustainable use patterns.
3. By the year 2025 to achieve subsectoral targets in all programme areas.

(b) Key Issues and Constraints

Integrated Water Management

15. Agenda 21 identifies the following key issues and constraints for integrated water resources development and management:

- Although all social and economic activities rely heavily on the supply and quality of freshwater, the contribution of water

Table 1
Population, Land and Water in Africa

Source: UNDP, Human Development Report 1995

| Countries By Main Groups | Population millions 1992 | Land area 000 km ² 1992 | Irrigated land % of arable 1992 | Water per capita 000m ³ /yr 1992 | Water use % of total 1980-89 | Water use m ³ per cap 1980-89 |
|--|--------------------------------|--|---------------------------------------|---|------------------------------------|--|
| Southern & East Africa (14) | 220.5 | 8,668 | 5.4 | 4.4 | 4 | 110 |
| Angola | 9.9 | 1,247 | ... | 16.0 | ... | 52 |
| Botswana | 1.4 | 567 | 0.2 | 0.8 | 1 | 100 |
| Ethiopia | 50.3 | 1,101 | 1.2 | 2.1 | 2 | 49 |
| Kenya | 25.4 | 570 | 2.1 | 0.6 | 7 | 50 |
| Lesotho | 1.9 | 30 | ... | 2.2 | 1 | 31 |
| Malawi | 10.2 | 94 | 1.3 | 0.9 | 2 | 20 |
| Mozambique | 14.7 | 784 | 3.8 | 3.9 | 1 | 53 |
| Namibia | 1.4 | 823 | 0.6 | 5.9 | 2 | 84 |
| South Africa | 38.8 | 1,221 | 8.7 | 1.3 | 18 | 410 |
| Swaziland | 0.8 | 17 | 33.5 | 8.8 | 4 | 408 |
| Tanzania | 27.2 | 884 | 4.4 | 2.7 | 1 | 36 |
| Uganda | 19.3 | 200 | 0.1 | 3.5 | ... | 20 |
| Zambia | 8.7 | 743 | 0.7 | 11.1 | ... | 86 |
| Zimbabwe | 10.5 | 387 | 7.9 | 2.2 | 5 | 138 |
| Indian Ocean (4) | 15.2 | 586 | 23.1 | 2.5 | 19 | 520 |
| Comoros | 0.6 | 2 | ... | ... | 1 | 14 |
| Madagascar | 13.4 | 582 | 30.3 | 3.1 | 41 | 1,642 |
| Mauritius | 1.1 | 2 | 16.0 | 2.0 | 16 | 410 |
| Seychelles | 0.1 | ... | ... | ... | ... | 15 |
| Central Africa (10) | 78.3 | 5,294 | 1.4 | 42.8 | ... | 26 |
| Burundi | 5.8 | 26 | 5.5 | 0.6 | 3 | 20 |
| Cameroun | 12.2 | 465 | 0.5 | 17.0 | ... | 37 |
| Central African Republic | 3.1 | 623 | ... | 44.4 | ... | 25 |
| Chad | 5.8 | 1,259 | 0.4 | 6.6 | ... | 34 |
| Congo | 2.4 | 342 | 2.9 | 76.4 | ... | 19 |
| Equatorial Guinea | 0.4 | 28 | ... | 81.3 | ... | 15 |
| Gabon | 1.2 | 258 | 0.0 | 132.6 | ... | 57 |
| Rwanda | 7.4 | 25 | 0.3 | 0.8 | 2 | 23 |
| Sao Tome and Principe | 0.1 | 1 | ... | ... | ... | 10 |
| Zaire | 39.9 | 2,267 | 0.2 | 25.6 | ... | 22 |
| West Africa (16) | 192.6 | 6,058 | 3.7 | 15.1 | 4 | 99 |
| Benin | 4.9 | 111 | 0.4 | 5.3 | ... | 26 |
| Burkina Faso | 9.5 | 274 | 0.7 | 2.9 | 1 | 18 |
| Cape Verde | 0.4 | 4 | 4.4 | ... | 20 | 147 |
| Cote d'Ivoire | 12.9 | 318 | 1.8 | 5.7 | 1 | 66 |
| Gambia | 1.0 | 10 | 8.3 | 3.3 | ... | 29 |
| Ghana | 16.0 | 228 | 0.3 | 3.3 | 1 | 35 |
| Guinea | 6.1 | 246 | 3.6 | 37.0 | ... | 140 |
| Guinea-Bissau | 1.0 | 28 | ... | 30.8 | ... | 11 |
| Liberia | 2.8 | 97 | 0.5 | 84.3 | ... | 56 |
| Mali | 9.8 | 1,220 | 9.5 | 6.3 | 2 | 162 |
| Mauritania | 2.1 | 1,025 | 7.2 | 0.2 | 10 | 494 |
| Niger | 8.3 | 1,267 | 1.2 | 1.7 | 1 | 41 |
| Nigeria | 102.1 | 911 | 2.7 | 2.3 | 1 | 37 |
| Senegal | 7.7 | 193 | 7.7 | 3.0 | 4 | 202 |
| Sierra Leone | 4.2 | 72 | 6.3 | 36.6 | ... | 96 |
| Togo | 3.8 | 54 | 1.0 | 3.1 | 1 | 28 |
| Arab States (8) | 159.1 | 8,765 | 23.3 | 0.7 | 75 | 515 |
| Algeria | 26.1 | 2,382 | 5.5 | 0.7 | 16 | 160 |
| Djibouti | 0.5 | 23 | ... | 0.6 | 2 | 29 |
| Eqypt | 59.0 | 996 | 101.7 | 0.1 | 97 | 1,213 |
| Libya | 4.9 | 1,760 | 11.5 | 0.1 | 374 | 692 |
| Morocco | 25.4 | 446 | 13.0 | 1.1 | 37 | 499 |
| Somalia | 8.9 | 627 | 11.6 | 1.3 | 7 | 119 |
| Sudan | 25.9 | 2,376 | 14.8 | 1.1 | 14 | 1,092 |
| Tunisia | 8.4 | 155 | 4.8 | 0.5 | 53 | 317 |
| Sub-Saharan Africa (44) | 510.0 | 20,606 | 3.4 | 7.2 | ... | 122 |
| Africa (52) | 669.1 | 29,371 | 7.9 | 14.2 | ... | 184 |
| All developing countries | 4,220.0 | 76,280 | 23.8 | 6.6 | ... | 523 |
| World | 5,420.0 | 130,100 | 17.5 | 7.6 | 8 | 638 |

resources to economic productivity and social wellbeing is not usually appreciated.

- As populations and economic activities grow, many countries are rapidly reaching conditions of water scarcity and limits to economic development.
- Water demands are increasing rapidly, with 70-80% required for irrigation, less than 20% for industry and only 6% for domestic consumption.
- The fragmentation of responsibilities for water resources development among sectoral agencies is an even greater impediment to integrated water management than anticipated. Effective implementation and coordination mechanisms are required.

(c) Implementing Agenda 21 in Africa

Integrated Water Management

16. The "Efficient and equitable use of water resources" is the second of 24 priority programmes in the 1992 African Common Position on the African Environment and Development Agenda (ECA, 1992a, p. 6). In April 1993 African governments met in Gabon to prepare new African strategies for the implementation of Agenda 21. They consolidated the original 24 priority programmes in seven priority areas with the "Efficient and equitable use of water resources" in third place (ECA, 1993b, p. 6). They also prepared a detailed programme of action which identified the following 16 priority activities for improving integrated water resources management in Africa (ECA, 1993b, pp. 24-25):

1. Formulate national action plans and investment programmes;
2. Integrate measures for the protection and conservation of potential sources of water supply;
3. Develop interactive databases and forecasting and economic planning models for water management.
4. Optimize water resources allocations;
5. Implement allocation decisions through demand management, pricing mechanisms and regulatory measures, including environmental impact assessment methods;
6. Manage floods and drought, including risk analysis and environmental and social impact assessments;
7. Promote schemes for rational water use through public awareness-raising, educational programmes and levying of water tariffs and other economic instruments;
8. Mobilize water resources, particularly in arid and semi-arid areas;
9. Promote international scientific research cooperation on water resources;
10. Develop new and alternative sources of water supply;
11. Integrate water quantity and quality management;
12. Promote water conservation;
13. Optimize local water management through support to water-user groups;
14. Develop public participation in decision-making for water resources planning and management, especially the involvement of women;
15. Develop and strengthen cooperation at all levels;
16. Disseminate information, including operational guidelines and

educational material for water-users.

17. The African Ministerial Conference on Environment gives priority to the following four activities in its 1994-95 work programme (AMCEN, 1993a, p. 9):

1. Promote the environmentally sound management of inland waters, particularly river and lake basins;
2. Assist sub-regional organizations within the intergovernmental agreements on shared water resources;
3. Prepare national environment related plans and programmes for integrated water management;
4. Mobilize international support for the implementation of basin action plans.

(d) Key Issues and Questions for Discussion

Integrated Water Management

1. Objectives, Targets and Priority Activities

- (a) How relevant and feasible are the objectives, targets and priority activities for your sub-region and country? Which ones deserve highest priority? Are there others which should be added?

2. Integrated Plans and Strategies

- (a) Since 1992 what progress has been made in preparing or strengthening and implementing integrated water management plans in your country? Was extensive use made of Agenda 21 and the proposed African strategies for implementing it?
- (b) What are the main objectives and priorities for action? Are they also included in your national economic and social development plans? What are the major problems and constraints to further

integration of plans and activities?

3. Institutional and Legal Arrangements

- (a) Since 1992 what steps have been taken to strengthen the institutional and legal arrangements in your country? Which Ministry is the lead agency? Did Agenda 21 help guide the process?
- (b) Since 1992 what water pricing policies, economic incentives or other innovations have you introduced? Did Agenda 21 inspire any of these changes?
- (c) Since 1992 what progress has been made in decentralizing water management to local authorities? Are local communities and groups involved in planning and decision-making?

4. Development Assistance

- (a) Since 1992 has the water sector in your country received new and additional development aid? In which programme areas? Which bilateral and UN agencies have been most supportive?
- (b) What other priority issues need but still lack external funding?

5. Shared Water Resources

- (a) What international water basins do you share? Are they covered by international agreements on equitable use and environmental protection? Are negotiations underway on new agreements?
- (b) What institutional arrangements are there with other countries sharing the water basins? How effective are they?
- (c) What measures are in place or needed for avoiding or resolving disputes on shared water?

B. Water Resources Assessment

18. This programme area contains 32 recommendations for national and international action on strengthening institutions, data and

information, research, science and technology, education and training and capacity building for water resources assessment. The estimated cost in Agenda 21 of implementing these recommendations during 1993-2000 is \$355 million annually. That total includes \$145 million in external grants or concessional financing plus another \$210 million from national budgets.

19. Other relevant recommendations are included in the Agenda 21 programme areas on "Desertification and Drought" (para. 12.49.b); "Mountain Ecosystems" (para. 13.18.a and 13.18.b); and "Science for Sustainable Development" (para. 35.12.g).

(a) Objectives and Targets

Water Resources Assessment

20. In Agenda 21 the overall objective is to ensure "the assessment and forecasting of the quantity and quality of water resources". The five principal objectives cited in Agenda 21 are:

1. To make water resources assessment technologies available to all countries.
2. To allocate the funds needed for collecting and assessing water resources data.
3. To utilize fully the assessment information in water management policies.
4. To establish effective institutional arrangements for the efficient collection and use of information on water quantity and quality.
5. To recruit and train qualified and capable staff in water assessment agencies.

21. Agenda 21 sets the following two main targets for water resources assessment:

1. By the year 2000 to complete feasibility studies on installing water resource assessment services.

2. As a longer term target to have fully operational services using high density hydrometric networks.

(b) Key Issues and Constraints

Water Resources Assessment

22. Agenda 21 identifies the following key issues and constraints for water resources assessment:

- At a time when more precise and reliable information is needed, hydrological services are less able than before to provide it, especially information on groundwater and water quality.
- Major impediments are the lack of funds for water resources assessment, the fragmented nature of hydrologic services and insufficient numbers of qualified staff.
- Developing countries have increasing difficulty getting access to advanced technology for data capture and management.

(c) Implementing Agenda 21 in Africa

Water Resources Assessment

23. The programme of action in the "African Strategies for the Implementation of Agenda 21" identifies the following 16 priority activities for improving water resources assessment in Africa (ECA, 1993b, pp. 25-27):

Institutional framework

1. Establish and strengthen institutional and legal capabilities for water resources assessment and flood and drought forecasting services;
2. Establish and maintain effective cooperation at the national level among the various agencies responsible for the collection,

storage and analysis of hydrologic data;

3. Cooperate in the assessment of transboundary water resources;

Data systems

4. Review existing data collection networks and assess their adequacy;
5. Improve networks for the provision of data on water quantity and quality;
6. Apply standards and other means to ensure data compatibility;
7. Upgrade facilities and procedures used to store, process, analyse and disseminate hydrologic data;
8. Establish national databases on the availability of all types of hydrologic data;
9. Implement data rescue operations (e.g. establish a national archives on water resources);
10. Implement appropriate techniques for the processing of hydrologic data;
11. Derive area-related estimates from point hydrologic data;
12. Assimilate remote sensing data and the use of geographical information systems;

Data dissemination

13. Identify the need for water data for various socio-economic and environmental planning purposes;
14. Provide public forecasts and warnings on floods and drought;

Research and development

15. Establish and strengthen water assessment research and

development programmes at the national and international levels;

16. Monitor research and development activities to ensure they make full use of local expertise and resources and are appropriate for the concerned countries.

(d) Key Issues and Questions for Discussion

Water Resources Assessment

1. Objectives, Targets and Priority Activities

- (a) How relevant and feasible are the objectives, targets and priority activities for your sub-region and country? Which ones deserve highest priority? Are there others which should be added?

2. Implementing Agenda 21 in Africa

- (a) Since 1992 what progress has been made in Africa, your sub-region and country in implementing the Agenda 21 recommendations on water resources assessment? Have you taken significant steps on other water assessment issues that are not reflected in Agenda 21?
- (c) What are the major achievements, problems and constraints in Africa, your sub-region and country?

3. Development Assistance

- (a) Since 1992 have water assessment issues received new and additional development aid in your country? Which issues? Which bilateral and UN agencies have been most supportive?
- (b) What other water assessment priorities need but still lack external funding?

C. Protection of Water Resources

24. This programme area contains 50 recommendations for national and international action on strengthening water conservation, pollution prevention and control, the use of clean technologies, the protection of ground-

water, aquatic ecosystems and freshwater living resources, the monitoring of water resources, national and inter-national water law, science and technology, education and training and capacity building. The estimated cost in Agenda 21 of implementing these recommendations during 1993-2000 is \$1 billion annually. That total includes \$340 million in external grants or concessional financing plus another \$660 million from national budgets.

25. Other relevant recommendations are included in the Agenda 21 programme areas on "Human Health" (para. 6.13.d and 6.41.c (i)); "Oceans and Marine Resources" (para. 17.27.e and 17.29); and "Management of Solid Wastes and Sewage" (para. 21.25.b).

(a) Objectives and Targets

Protection of Water Resources

26. In Agenda 21 the overall environmental health objective is "to evaluate the consequences which the various users of water have on the environment, to support measures aimed at controlling water related diseases and to protect ecosystems." The three principal objectives cited in Agenda 21 are:

1. To maintain the integrity of aquatic ecosystems, including living resources, and provide basin-wide protection from any form of degradation.
2. To protect human health, provide safe drinking water and control water borne diseases.
3. To expand training and capacity building programmes for improved water quality management.

27. Agenda 21 sets the following eight main targets for protecting water resources and aquatic ecosystems:

1. To identify surface and groundwater resources suitable for development and initiate programmes for their

protection, conservation and sustainable use.

2. To identify all potential water supply sources and prepare plans for their protection, conservation and rational use.
3. To initiate effective water pollution prevention and control programmes.
4. To participate in international water quality monitoring and management programmes such as the UNEP GEMS/Water and EMINWA programmes, the FAO regional inland fisheries bodies and the Ramsar Convention on wetlands.
5. By the year 2000 to reduce the prevalence of water related diseases, starting with the eradication of dracunculiasis (guinea worm disease) and onchocerciasis (river blindness).
6. To establish biological, health, physical and chemical quality criteria for all surface water bodies and groundwater.
7. To adopt and integrated approach to the sustainable management of water resources.
8. To prepare strategies for the environmentally sound management of freshwater and related coastal ecosystems.

(b) Key Issues and Constraints

Protection of Water Resources

28. Agenda 21 identifies the following key issues and constraints concerning the protection of water resources, water quality and aquatic ecosystems:

- Major problems affecting water quality arise from inadequately treated domestic sewage, inadequate controls on the

discharges of industrial waste waters, loss and destruction of catchment areas, ill-considered siting of industrial plants, deforestation, uncontrolled shifting cultivation and poor agricultural practices.

- Aquatic ecosystems are affected by the leaching of nutrients and pesticides and by agricultural water projects such as dams, river diversions, water installations and irrigation schemes.
- The extent and severity of contamination of unsaturated zones and aquifers have long been underestimated due to their relative inaccessibility and lack of reliable information on aquifer systems.
- Many problems arise from a development model that is environmentally destructive and from a lack of public awareness and education about water resource protection.
- The means to monitor the ecological and health effects of water pollution and degradation are inadequate or lacking in many countries.
- Linkages between the development, management, use and treatment of water resources and aquatic ecosystems are not widely understood.
- A preventive approach is crucial to avoid costly measures later to rehabilitate, treat and develop new water supplies.

(c) Implementing Agenda 21 in Africa

Protection of Water Resources

29. The following three objectives for the protection of water resources in Africa are set in the "African Strategies for the Implementation of Agenda 21": (1) To maintain the integrity of aquatic ecosystems and protect them from any form of degradation in the water basin; (2) To protect public health; and (3) To develop human resources (ECA, 1993b, p. 27).

30. The programme of action identifies the following 8 priority activities for improving water resources assessment in Africa (ECA, 1993b, pp. 27-28):

1. Identify surface, underground and other water-dependent resources that could be developed on a sustainable basis and initiate programmes for their protection, conservation and rational use;
2. Identify potential water supply sources & make plans for their protection, conservation & rational use;
3. Initiate effective water pollution prevention and control programmes;
4. Participate in international water quality monitoring and management programmes;
5. Reduce the prevalence of water-related diseases, starting with the eradication of dracunculiasis (guinea worm disease) and onchocerciasis (river blindness).
6. Establish biological, health, physical and chemical quality criteria for all water bodies;
7. Adopt an integrated approach for the sustainable management of water resources;
8. Prepare and implement strategies for the environmentally sound management of freshwater and related coastal ecosystems.

(d) Key Issues and Questions for Discussion

Protection of Water Resources

1. Objectives, Targets and Priority Activities

- (a) How relevant and feasible are the objectives, targets and priority activities for your sub-region and country? Which

ones deserve highest priority? Are there others which should be added?

2. Implementing Agenda 21 in Africa

- (a) Since 1992 what progress has been made in Africa, your sub-region and country in implement-ing the Agenda 21 recommendations on the protection of water resources? Have you taken significant steps on other water protection issues that are not reflected in Agenda 21?
- (c) What are the major achievements, problems & constraints in Africa, your sub-region & country?

3. Development Assistance

- (a) Since 1992 have water protection issues received new and additional development aid in your country? Which issues? Which bilateral and UN agencies have been most supportive?
- (b) What other water protection priorities need but still lack external funding?

D. Drinking Water Supply and Sanitation

31. This programme area contains 39 recommendations for national and international action on strengthening the protection of the environment and health, institutions and human resources, national and community management, public information and participation, science and technology, education and training and capacity building for improved drinking water supply and sanitation. The estimated cost in Agenda 21 of implementing these recommendations during 1993-2000 is \$20 billion annually. That total includes \$7.4 billion in external grants or concessional financing plus another \$12.6 billion from national budgets.

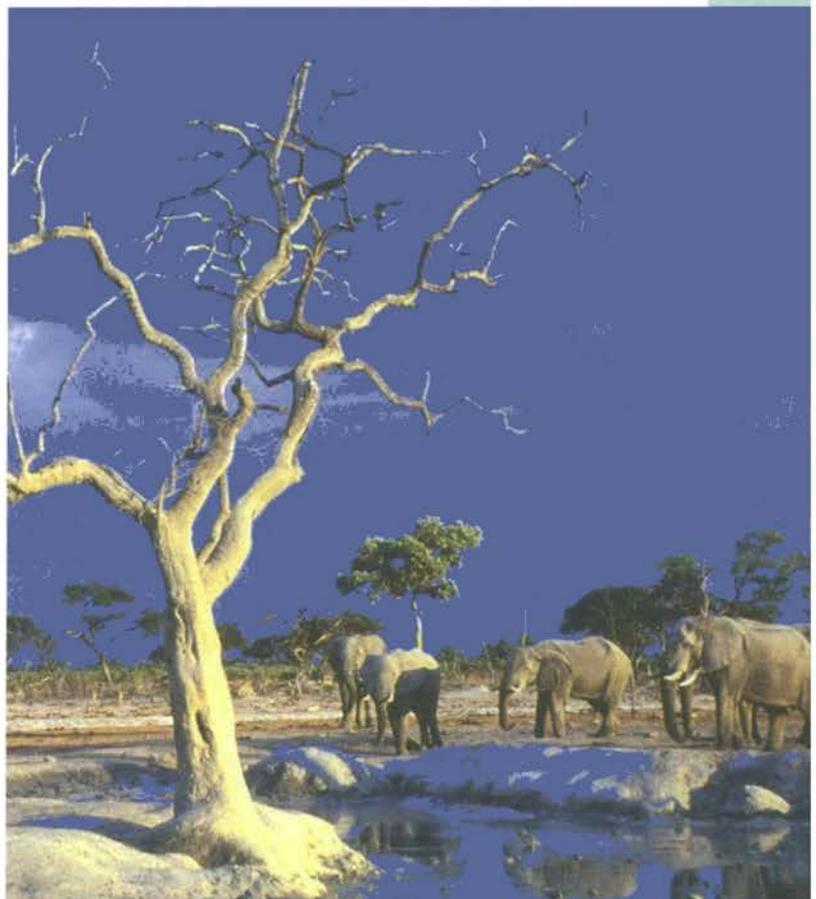
32. Other relevant recommendations are included in the Agenda 21 programme areas on "Combating Poverty" (para. 3.8.p) and "Biotechnology" (para. 16.13.d).

(a) Objectives and Targets

Water Supply and Sanitation

33. Agenda 21 highlights the 1990 New Delhi Statement on "the need to provide, on a sustainable basis, access to safe water in sufficient quantities and proper sanitation for all, emphasizing the 'some for all rather than more for some' approach." The four principal objectives cited in Agenda 21 are:

1. To protect the environment and safeguard health through the integrated management of water resources and liquid and solid wastes.
2. To reform institutions to achieve an integrated approach to water management, including changes in procedures, attitudes and behaviour and the full participation of women at all levels.



3. To ensure community management of services and the strengthening of local institutions for implementing and sustaining water and sanitation programmes.
4. To improve financial practices and the management of existing services as well as the widespread use of appropriate technologies.

34. Agenda 21 notes that the 1990 World Summit for Children set unrealistic targets to achieve by 1995 the universal access to water supply and sanitation and the eradication of guinea worm disease. It also notes that the more realistic target of full coverage for water supply by 2025 would require the doubling of current investment levels. Instead, Agenda 21 emphasizes that specific targets should be set by each country and recommends the development of lower cost but adequate services that can be implemented and sustained at the community level.

(b) Key Issues and Constraints

Water Supply and Sanitation

35. Agenda 21 identifies the following key issues and constraints for drinking water supply and sanitation programmes.

- During the International Drinking Water Supply and Sanitation Decade (1981-90) progress was unprecedented but not enough. One in three people in the developing world still lacks these two basic requirements for health and dignity.
- An estimated 80% of all diseases and over one third of all deaths in developing countries are caused by contaminated water. On average as much as one tenth of each person's productive time is sacrificed to water related diseases.
- Human excreta and sewage are important causes of deteriorating water quality in developing countries.

- The introduction of appropriate technologies and construction of sewage treatment facilities are needed to bring significant improvement.

(c) Implementing Agenda 21 in Africa

Water Supply and Sanitation

36. The following four objectives for drinking water supply and sanitation in Africa are set in the "African Strategies for the Implementation of Agenda 21":

1. To protect human health and the environment through the integrated management of water resources and liquid and solid wastes;
2. To undertake institutional reforms promoting an integrated approach with the full participation of women;
3. To strengthen the community management of services and local institutions for implementing and sustaining water and sanitation programmes;
4. To ensure sound financial practices and the widespread use of appropriate technologies.

37. The programme of action identifies the following 27 priority activities for improving water resources assessment in Africa (ECA, 1993b, pp. 28-30):

Environment and health

1. Establish protected areas for sources of drinking water;
2. Ensure sanitary disposal of excreta and sewage and use appropriate systems to treat waste waters;
3. Expand urban and rural water supply and develop rainwater catchment systems;

Table 2
Safe Water and Sanitation in Africa

Source: UNDP, Human Development Report 1995

| Countries By Main Groups | Safe Water | | | | Sanitation | | | |
|--|------------------------------|------------------------------|------------------------------|----------------------------------|------------------------------|------------------------------|------------------------------|----------------------------------|
| | Access % total 1988-93 | Access % urban 1988-93 | Access % rural 1988-93 | No Access millions 1988-93 | Access % total 1988-93 | Access % urban 1988-93 | Access % rural 1988-93 | No Access millions 1988-93 |
| Southern & East Africa (14) | 50 | 77 | 41 | 107.0 | 38 | 62 | 31 | 112.4 |
| Angola | 41 | 71 | 20 | 5.8 | 19 | 25 | 15 | 8.0 |
| Botswana | 89 | 100 | 77 | 0.1 | 55 | 91 | 41 | 0.6 |
| Ethiopia | 25 | 91 | 19 | 37.7 | 19 | 97 | 7 | 40.8 |
| Kenya | 49 | 74 | 43 | 13.0 | 43 | 69 | 35 | 14.5 |
| Lesotho | 47 | 59 | 45 | 1.0 | 22 | 14 | 23 | 1.5 |
| Malawi | 56 | 97 | 50 | 4.5 | 60 | 30 | 81 | 4.1 |
| Mozambique | 22 | 44 | 17 | 11.5 | 20 | 61 | 11 | 11.8 |
| Namibia | 52 | 98 | 35 | 0.7 | 14 | 24 | 11 | 1.2 |
| South Africa | ... | ... | ... | ... | ... | ... | ... | ... |
| Swaziland | ... | ... | ... | ... | ... | ... | ... | ... |
| Tanzania | 50 | 67 | 46 | 13.6 | 64 | 74 | 62 | 9.8 |
| Uganda | 31 | 58 | 28 | 13.3 | 57 | 94 | 52 | 8.3 |
| Zambia | 53 | 70 | 28 | 4.1 | 37 | 75 | 12 | 5.5 |
| Zimbabwe | 84 | 95 | 80 | 1.7 | 40 | 95 | 22 | 6.3 |
| Indian Ocean (4) | 60 | 76 | 52 | 10.3 | 51 | 56 | 51 | 13.0 |
| Comoros | ... | ... | ... | ... | ... | ... | ... | ... |
| Madagascar | 23 | 55 | 9 | 10.3 | 3 | 12 | 3 | 13.0 |
| Mauritius | 97 | 98 | 96 | ... | 99 | 99 | 99 | ... |
| Seychelles | ... | ... | ... | ... | ... | ... | ... | ... |
| Central Africa (10) | 49 | 66 | 36 | 44.0 | 50 | 68 | 45 | 41.8 |
| Burundi | 57 | 99 | 54 | 2.5 | 49 | 71 | 47 | 3.0 |
| Cameroun | 50 | 57 | 43 | 6.1 | 74 | 100 | 64 | 3.2 |
| Central African Republic | 24 | 19 | 26 | 2.3 | 46 | 45 | 46 | 1.7 |
| Chad | ... | 30 | 25 | 4.3 | ... | ... | ... | ... |
| Congo | 38 | 92 | 2 | 1.5 | ... | ... | ... | ... |
| Equatorial Guinea | ... | ... | ... | ... | ... | ... | ... | ... |
| Gabon | 68 | 90 | 50 | 0.4 | ... | ... | ... | ... |
| Rwanda | 66 | 75 | 62 | 2.5 | 58 | 77 | 56 | 3.1 |
| Sao Tome & Principe | ... | ... | ... | ... | ... | ... | ... | ... |
| Zaire | 39 | 68 | 24 | 24.4 | 23 | 46 | 11 | 30.8 |
| West Africa (16) | 52 | 67 | 47 | 105.6 | 35 | 63 | 25 | 119.5 |
| Benin | 51 | 66 | 46 | 2.4 | 34 | 42 | 31 | 3.3 |
| Burkina Faso | 56 | 51 | 72 | 4.2 | 25 | 88 | 15 | 7.1 |
| Cape Verde | ... | ... | ... | ... | ... | ... | ... | ... |
| Coté d'Ivoire | 76 | 70 | 81 | 3.1 | 60 | 59 | 62 | 5.1 |
| Gambia | ... | ... | ... | ... | ... | ... | ... | ... |
| Ghana | 52 | 93 | 35 | 7.7 | 42 | 64 | 32 | 9.3 |
| Guinea | 55 | 50 | 56 | 2.8 | 21 | 84 | 10 | 4.8 |
| Guinea-Bissau | 41 | 56 | 35 | 0.6 | 31 | 27 | 32 | 0.7 |
| Liberia | 50 | 93 | 22 | 1.4 | ... | ... | 8 | ... |
| Mali | 41 | 53 | 38 | 5.8 | 24 | 81 | 10 | 7.5 |
| Mauritania | 66 | 67 | 65 | 0.7 | ... | 34 | ... | ... |
| Niger | 59 | 60 | 59 | 3.4 | 14 | 71 | 4 | 7.1 |
| Nigeria | 36 | 81 | 30 | 65.4 | 35 | 40 | 30 | 66.4 |
| Senegal | 48 | 84 | 26 | 4.0 | 55 | 85 | 36 | 3.5 |
| Sierra Leone | 37 | 33 | 37 | 2.6 | 58 | 92 | 49 | 1.8 |
| Togo | 60 | 77 | 53 | 1.5 | 23 | 56 | 10 | 2.9 |
| Arab States (8) | 70 | 82 | 58 | 45.3 | 69 | 86 | 53 | 58.1 |
| Algeria | 68 | 85 | 55 | 8.4 | 79 | 96 | 60 | 5.5 |
| Djibouti | ... | ... | ... | ... | ... | ... | ... | ... |
| Egypt | 90 | 95 | 86 | 5.9 | 50 | 80 | 26 | 29.5 |
| Libya | 97 | 100 | 80 | 0.1 | 98 | 100 | 85 | 0.1 |
| Morocco | 54 | 92 | 14 | 11.7 | 65 | 95 | 38 | 8.9 |
| Somalia | 37 | 50 | 29 | 5.6 | 18 | 44 | 5 | 7.3 |
| Sudan | 48 | 55 | 43 | 13.5 | 75 | 89 | 65 | 6.5 |
| Tunisia | 99 | 100 | 99 | 0.1 | 96 | 98 | 94 | 0.3 |
| Sub-Saharan Africa (44) | 43 | 73 | 35 | 270.0 | 36 | 59 | 29 | 290.0 |
| Africa (52) | 62 | 73 | 45 | 315.3 | 52 | 67 | 36 | 348.1 |
| All developing countries | 69 | 88 | 60 | 1,290.0 | 36 | 69 | 18 | ... |

4. Build and expand sewage treatment facilities and drainage systems;
5. Treat and make safe re-use of domestic and industrial waste waters;
6. Control water-related diseases;

People and institutions

7. Strengthen the functioning of national governments and local authorities in water resources management;
8. Encourage participatory approaches for water development and management;
9. Make decisions at the lowest appropriate level with public consultation and involvement of users in the planning and implementation of water projects;
10. Develop human resources at all levels, including special programmes for women;
11. Undertake broad based education programmes with particular emphasis on hygiene, local management and risk reduction;
12. Provide international support mechanisms on programme funding, implementation and followup;

National and community management

13. Support and assist communities to manage their own systems on a sustainable basis;
14. Involve the local population in water management, especially women and youth;
15. Link national plans and community management of local water resources;

16. Integrate community management of water resources in overall planning;
17. Promote primary health and environmental training and care at the local level;
18. Assist service agencies to be more cost-effective and responsive to consumer needs;
19. Give more attention to under-served rural and low-income urban areas;
20. Rehabilitate defective systems, reduce wastage and make safe re-use of water;
21. Ensure rational water use and better operation and maintenance;
22. Expand research and development of appropriate technical solutions;
23. Increase urban waste water treatment capacity to cope with increasing loads;

Public information and participation

24. Strengthen monitoring and information management at the national and local levels;
25. Process, analyse and publish national and local monitoring results annually;
26. Use limited indicators at the regional and global levels to promote the sector and raise funds;
27. Improve sector coordination, planning and implementation, particularly in community-based self-help projects.

(d) Key Issues and Questions for Discussion

Water Supply and Sanitation

1. Objectives, Targets and Priority Activities

- (a) How relevant and feasible are the drinking water supply and sanitation objectives and priority activities for your sub-region and country? Which ones deserve highest priority? Are there others which should be added?

2. Implementing Agenda 21 in Africa

- (a) Since 1992 what progress has been made in Africa, your sub-region and country in implementing the Agenda 21 recommendations on drinking water supply and sanitation? Have you taken significant steps on other drinking water supply and sanitation issues that are not reflected in Agenda 21?
- (b) What are the major achievements, problems and constraints in Africa, your sub-region and country? To what extent has water supply planning, decision-making and implementation been decentralized to the community level?

3. Development Assistance

- (a) Since 1992 have drinking water and sanitation issues received new and additional development aid in your country? Which bilateral and UN agencies have been most supportive?
- (b) Has the emphasis been on urban or rural projects? On "some for all" or "more for some"? On large scale or smaller community based projects?
- (c) What other drinking water supply and sanitation priorities need but still lack external funding?

E. Water and Sustainable Urban Development

38. This programme area contains 34 recommendations for national and international action on strengthening the protection of water resources from depletion and pollution, the efficient and equitable allocation of water, institutions and laws, public participation, local capacities, access to sanitary services, science and technology, education and training and capacity building for water resources assessment. The estimated cost in Agenda 21 of implementing these recommendations during 1993-2000 is \$20 billion annually. That total includes \$4.5 billion in external grants or concessional financing plus another \$15.5 billion from national budgets.

39. Other relevant recommendations are included in the Agenda 21 programme areas on "Human Health" (para. 6.41.c (ii)) and "Management of Solid Wastes and Sewage" (para. 21.35.f).

(a) Objectives and Targets

Water and Sustainable Urban Development

40. In Agenda 21 the overall objective is "to support local and central Government's efforts and capacities to sustain national development and productivity through environmentally sound management of water resources for urban use." Supporting this objective is "the identification and implementation of strategies and actions to ensure the continued supply of affordable water for present and future needs and to reverse current trends of resource degradation and depletion."

41. Agenda 21 sets the following three main targets for water and sustainable urban development:

1. By the year 2000 to ensure all urban residents each get 40 litres of safe water daily and 75% have on-site or community sanitation facilities.

2. By the year 2000 to establish and apply quantitative and qualitative discharge standards for municipal and industrial effluents.
3. By the year 2000 to collect, recycle or dispose of 75% of urban solid wastes in an environmentally safe manner.

(b) Key Issues and Constraints

Water and Sustainable Urban Development

42. Agenda 21 identifies the following key issues and constraints on water and sustainable urban development.

- ç Rapid urban population growth and industrialization are putting severe strains on the water resources and environmental protection capabilities of many cities.
- Special attention needs to be given to the growing effects of urbanization on water demands and usage and to the critical role of local and municipal authorities in managing the supply, use and overall treatment of water.
- Better management of urban water resources, including the elimination of unsustainable consumption patterns, can make a substantial contribution to the alleviation of poverty and improvement of the health and quality of life of the poor.
- A high proportion of large cities are located around estuaries and in coastal zones. Pollution from their municipal and industrial discharges plus over-exploitation of available water resources threaten the marine environment and the supply of freshwater resources.

(c) Implementing Agenda 21 in Africa

Water and Sustainable Urban Development

43. The programme of action in the "African Strategies for the Implementation of Agenda

21" identifies the following 11 priority activities for improving water resources assessment in Africa (ECA, 1993b, pp. 30-31):

1. Protect water resources from depletion, pollution and degradation;
2. Implement urban storm water runoff and drainage programmes;
3. Promote the recycling and re-use of waste water and solid wastes;
4. Control industrial sources of water pollution;
5. Protect watersheds from harmful activities such as depletion of forest cover;
6. Promote research on the contribution of forests to sustainable water resources development;
7. Encourage appropriate management practices to minimize the impact of agrochemicals on water resources;
8. Reconcile city development planning with the availability and sustainability of water resources to meet the basic water needs of the urban population and use appropriate water tariffs;
9. Promote city-wide approaches to water resources management involving the local people, private sector and NGO's;
10. Introduce policies and laws to support increased investments, technical expertise and capabilities in urban water and waste management;
11. Implement water, sanitation and waste management programmes using affordable and appropriate technologies which focus on and involve the urban poor.

(d) Key Issues and Questions for Discussion

Water and Sustainable Urban Development

1. Objectives, Targets and Priority Activities

- (a) How relevant and feasible are the water and sustainable urban development objectives, targets and priority activities for your sub-region and country? Which ones deserve highest priority? Are there others which should be added?

2. Implementing Agenda 21 in Africa

- (a) Since 1992 what progress has been made in Africa, your sub-region and country in implementing the Agenda 21 recommendations on water and sustainable urban development? Have you taken significant steps on other water and sustainable urban development issues that are not reflected in Agenda 21?
- (b) What are the major achievements, problems and constraints in Africa, your sub-region and country?

3. Development Assistance

- (a) Since 1992 have water and sustainable urban development issues received new and additional development aid in your country? Which issues? Which bilateral and UN agencies have been most supportive?
- (b) What other water and sustainable urban development priorities need but still lack external funding?

F. Water for Sustainable Agriculture and Rural Development

44. This programme area, one of the largest and longest in Agenda 21, contains 68 recommendations for national and international action on improving water supply and sanitation for the rural poor, water use efficiency, drainage, the control of waterlogging and salinity, water

quality management, water resource development programmes, the management of scarce water resources, water supply for livestock, inland fisheries, aquaculture, science and technology, education and training and capacity building for sustainable agriculture and rural development.

45. The estimated cost in Agenda 21 of implementing these recommendations during 1993-2000 is \$13.2 billion annually. That total includes \$4.5 billion in external grants or concessional financing plus another \$8.7 billion from national budgets.

(a) Objectives and Targets

Water for Sustainable Agriculture

46. Agenda 21 highlights the International Action Programme on Water and Sustainable Agricultural Development with the main objective "to assist developing countries in planning, developing and managing water resources on an integrated basis to meet present and future needs for agricultural production, taking into account environmental considerations."

47. The objectives on water management for inland fisheries and aquaculture include the conservation of water quality and related requirements for optimum production and prevention of water pollution; the sustainable management of capture fisheries; and the development of environmentally sound approaches for the intensification of aquaculture.

48. The objective on water management for livestock supply is to provide and protect adequate amounts of safe drinking water to meet the needs of different animal species.

49. Agenda 21 states that no global targets can be set on water for sustainable agriculture and rural development "owing to large regional and intra-country variations".

(b) Key Issues and Constraints

Water for Sustainable Agriculture

50. Agenda 21 identifies the following key issues and constraints on water for sustainable agriculture and rural development.

- The challenge is to develop and apply water saving technology and management methods and enable communities to strengthen institutions and incentives for the rural population to adopt new approaches for both rain-fed and irrigated agriculture.
- The productivity and sustainability of irrigation systems have been constrained by problems of waterlogging and salinization. The development of irrigation schemes often proceeds without assessing and taking into account their environmental and social impacts.
- Soil erosion, mismanagement and overexploitation of natural resources and acute competition for water have all contributed to increased poverty, hunger and famine. Soil erosion caused by overgrazing is often responsible for the siltation of lakes.
- The lack of water supply of suitable quality is a significant constraint on livestock production in many countries. Improper disposal of animal wastes can pollute water supplies for humans and animals.
- Inland fisheries are and will remain an important source of food and protein. As fishing and aquaculture may themselves damage aquatic ecosystems, their development should conform to guidelines for reducing adverse environmental impacts.
- The anticipated rapid expansion of irrigation systems could lead to environmental problems such as wetlands destruction, water pollution,

increased sedimentation and reduced biodiversity. Assessments should be made of the likely environmental impacts of new irrigation schemes and technologies, including potential conflicts with other land users. Water user groups should be actively involved.

(c) Implementing Agenda 21 in Africa

Water for Sustainable Agriculture

51. The programme of action in the "African Strategies for the Implementation of Agenda 21" identifies the following 9 priority activities for improving water resources assessment in Africa (ECA, 1993b, pp. 31-32):

1. Implement safe water supply, sanitation and water-related disease control programmes for the rural poor using appropriate technologies, equitable financial mechanisms and community participation;
2. Increase the efficiency and productivity of agricultural use of limited water resources;
3. Improve drainage and control waterlogging and salinization in irrigated and rainfed areas;
4. Establish water quality standards and monitoring programmes for agricultural water uses and reduce adverse impacts of agricultural chemicals and activities on water resources and aquatic ecosystems;
5. Develop appropriate and environmentally sound water supply, irrigation and integrated water management systems for meeting the needs of rural people, livestock and ecosystems;
6. Develop and implement long-term strategies and programmes for agricultural water use in water-scarce areas, including special drought preparedness measures;

7. Improve availability, quality & multi-use of water for livestock, especially in extensive grazing areas;
8. Strengthen research, monitoring & sustainable management for inland fisheries & aquatic ecosystems;
9. Develop aquaculture technologies and management practices that are economically, socially and environmentally sustainable.

(d) Key Issues and Questions for Discussion

Water for Sustainable Agriculture

1. Objectives, Targets and Priority Activities

- (a) How relevant and feasible are the objectives and priority activities for your sub-region and country? Which ones deserve highest priority? Are there others which should be added?

2. Implementing Agenda 21 in Africa

- (a) Since 1992 what progress has been made in Africa, your sub-region and country in implementing the Agenda 21 recommendations on water for sustainable agriculture? Have you taken significant steps on other water and sustainable agriculture issues that are not reflected in Agenda 21?
- (b) What are the major achievements, problems & constraints in Africa, your sub-region & country?

3. Development Assistance

- (a) Since 1992 have water for sustainable agriculture and rural development issues received new and additional development aid in your country? Which issues? Which bilateral and UN agencies have been most supportive?
- (b) What other water for sustainable agriculture priorities need but still lack external funding?

G. Impacts of Climate Change on Water Resources

52. This programme area, one of the smallest and shortest in Agenda 21, contains 15 recommendations for national and international action on improving monitoring and research, science and technology, education and training and capacity building for assessing the impacts of climate change on water resources.

53. The estimated cost in Agenda 21 of implementing these recommendations during 1993-2000 is \$100 million annually. That total includes \$40 million in external grants or concessional financing plus another \$60 million from national budgets.

(a) Objectives and Targets

Water and Climate Change

54. In Agenda 21 the three main objectives on water and climate change are:

1. To understand and quantify the likely impacts of climate change on water resources.
2. To facilitate the implementation of effective national countermeasures.
3. To assess the potential impacts of climate change on areas prone to droughts and floods.

55. No targets are set for this programme area in Agenda 21.

(b) Key Issues and Constraints

Water and Climate Change

56. Agenda 21 identifies the following key issues and constraints on water and climate change issues.

- Among the most important impacts of climate change would be its effects on the hydrologic cycle and water management systems and, through them, on socio-economic conditions. Increases in the

incidences of extremes such as floods and droughts will also increase the frequency and severity of disasters.

- Higher temperatures and less precipitation would lead to decreased water supplies and increased water demands. They might also cause deterioration in water quality and further strain the already fragile balance between water supply and demand in many countries.
- Even if precipitation increased there would be no guarantee it would occur at the time of year it was needed. It might also lead to increased flooding.
- Any rise in sea level will cause salt water intrusion in estuaries, low coastal areas and coastal aquifers.
- Programmes must be strengthened for research, monitoring and exchanging relevant data and information.

(c) Implementing Agenda 21 in Africa

Water and Climate Change

57. The programme of action in the "African Strategies for the Implementation of Agenda 21" identifies the following 7 priority activities for improving water resources assessment in Africa (ECA, 1993b, pp. 26-27):

1. Monitor the hydrologic regime and related climate factors, especially in vulnerable areas and countries;
2. Develop and apply techniques and methodologies for assessing the potential adverse effects in Africa of climate change;
3. Assess the possible linkages between climate changes and the present occurrences of droughts and floods in Africa;
4. Assess the resulting social, economic and environmental

impacts;

5. Develop and initiate response strategies to counter the adverse impacts of climate change;
6. Develop agricultural activities based on brackish water use;
7. Contribute to international research on climate change.

(d) Key Issues and Questions for Discussion

Water and Climate Change

1. Objectives, Targets and Priority Activities

- (a) How relevant and feasible are the objectives and priority activities for your sub-region and country? Which ones deserve highest priority? Are there others which should be added?

2. Implementing Agenda 21 in Africa

- (a) Since 1992 what progress has been made in Africa, your sub-region and country in implementing the Agenda 21 recommendations on the likely impact of climate change on water resources? Have you taken significant steps on other water and climate change issues that are not in Agenda 21?
- (b) What are the major achievements, problems & constraints in Africa, your sub-region & country?

3. Development Assistance

- (a) Since 1992 have water and climate change issues received new and additional development aid in your country? Which bilateral and UN agencies have been most supportive?
- (b) What other water and climate change priorities need but still lack external funding?

Part 2

Moving Beyond Agenda 21: A 'Fair Share'

Strategy for Water Management in Africa

"If the poor sometimes behave in a way that degrades the environment it is not because they choose to do so. They only do so when they have no other choices.. The Earth Charter and Agenda 21 must provide a new basis for a new deal for the majority of poor people and countries in order to secure and sustain our common future."

SADCC Report to the 1992 Earth Summit, p. 32

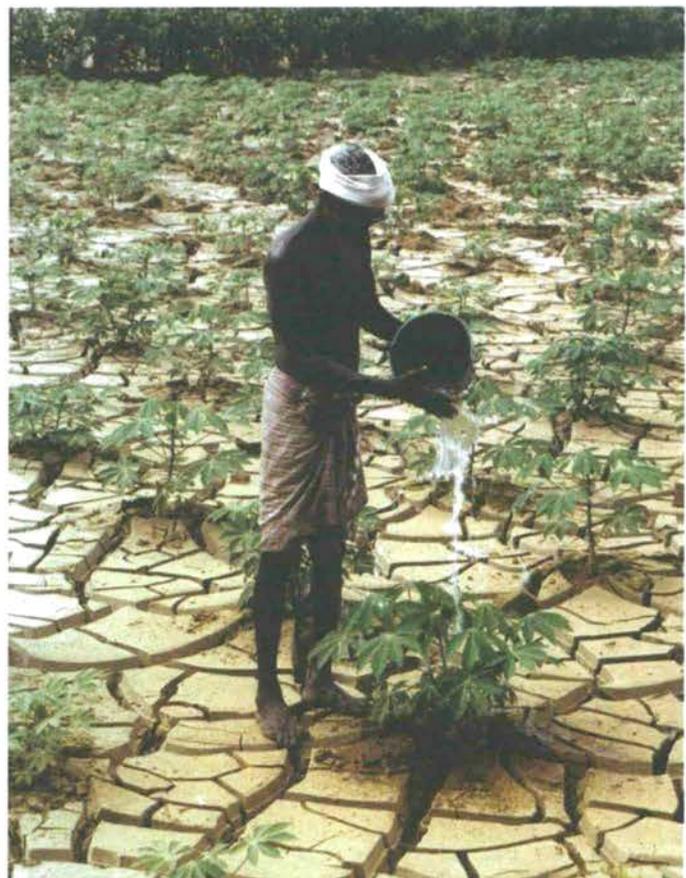
A. Moving Beyond Agenda 21 in Africa

58. After a decade of largely *unsustainable* development in Africa the livelihoods of many people and the economic prospects of most countries continue to be threatened by environmental degradation. Today most African countries face a formidable series of critical demographic, social, economic, agricultural, energy, technological and institutional transitions in order to move toward development that is economically, socially and environmentally sustainable.

59. *Unsustainable* development in Africa has largely been driven by economic and sectoral policies which are too narrowly conceived and focused. They particularly neglect the adverse impacts on the poor majority and the environment. Conventional 'react-and-cure' responses simply cannot keep up with the escalating pace and scale of environmental degradation. Moreover, none of the national environment and resource management agencies in Africa have enough staff or funds to address all of the problems effectively. To break away from *unsustainable* to sustainable development in

Africa, environmental concerns need to be fully integrated into the development policies and decision-making of all major economic and sectoral Ministries.

60. Agenda 21 contains many recommendations for integrating environment *and* develop-



ment in all major sectors and proposes a broad range and mix of regulatory measures and economic incentives to ensure national development becomes ecologically *and* economically sustainable. Agenda 21 sets 38 main policy goals to be tackled through 131 priority programmes with a combined total of over 2,500 recommendations for national and international action.

61. However, Agenda 21 does not provide "a new basis for a new deal for the majority of poor people and countries". Alleviating the poverty of the majority of the over 660 million people in Africa remains the overriding goal and priority. For crucial water supply and sanitation services (see Tables 1-2) as well as a range of key economic, health and human development indicators (see Table 3), many African countries, sub-regions and the continent as a whole fall significantly below the averages for all developing countries and the world. A third crucial element must therefore be added to 'environment and development' to make Agenda 21 more applicable and operational in Africa. The critical missing link is *equity*.

62. Throughout Africa the poverty of the poor majority remains the main cause *and* consequence of environmental degradation which in turn undermines the possibilities for future economic growth. Although the poor majority inevitably suffer first and most, the poor are not the problem. The national development and inter-national aid policies which fail to reach, involve and benefit the poor majority are the problem. Major changes are needed in key national economic and sectoral policies, including environment, water and other natural resource management policies, to achieve greater equity *for* sustainable development.

B. Equity-Led Growth for Sustainable Development in Africa

63. The crucial starting point for sustainable development is *equity-led growth* within and among African countries. Previous economic,

industrial or export-led development strategies have not produced significant improvements in economic performance or human welfare for the majority of people and countries in Africa. Growth strategies which fail to improve the lives and livelihoods of the poor majority are *not* socially defensible or even politically sustainable. Growth strategies which degrade the environment and resource base needed for future development are *not* ecologically or even economically sustainable. Growth strategies which are *not* economically, socially and environmentally sustainable are *not* and should *not* be considered as development.

64. Accelerated economic growth is nevertheless needed throughout Africa. Without growth, greater equity will be difficult to achieve as there will be few or no benefits to share. Without growth, poverty-driven environmental degradation will continue to escalate. Without growth there will be no additional financial resources for tackling the already large backlog of environmental degradation.

65. Economic growth is not at issue. At issue is the kind and content of that growth. Future growth in Africa must be more equitable, less polluting and more efficient in the use of energy and natural resources, especially water resources. National *and* international equity-led growth strategies are needed to provide "a new basis for a new deal for the majority of poor people and countries in order to secure and sustain our common future."

Main Goals for Equity-Led Growth

66. Equity-led growth strategies which put the focus of development on the poor majority of people and countries are needed to accelerate the transition toward sustainable development in Africa. By shifting the focus to people rather than projects or technologies, equity-led growth shares many of the goals of the sustainable *human* development approach pioneered by UNDP as development *of* the people *for* the people and *by* the people.

Table 3
Equity and Development in Africa

Source: UNDP, Human Development Report 1995

| Countries By Main Groups | Human Dev Index rank 1995 | GNP per cap US\$ 1992 | Life expectancy years 1992 | Health access % 1985-93 | Daily calories per cap 1992 | Adult literacy % 1992 | Women workers % 1994 | Refugees in country 000's 1992 | Debt & exports % 1992 | Trade terms 1987=100 1992 |
|--|------------------------------------|--------------------------------|-------------------------------------|----------------------------------|--------------------------------------|--------------------------------|-------------------------------|---|--------------------------------|------------------------------------|
| Southern & East Africa (14) | ... | 816 | 53.3 | 66 | 2,082 | 64.2 | 38 | 2,728 | 25 | 83 |
| Angola | 164 | ... | 46.5 | 30 | 1,840 | ... | 38 | 11 | ... | ... |
| Botswana | 74 | 2,450 | 64.9 | 89 | 2,288 | 67.2 | 35 | 1 | ... | ... |
| Ethiopia | 171 | 110 | 47.5 | 46 | 1,610 | 32.7 | 36 | 432 | 14 | 79 |
| Kenya | 130 | 330 | 55.7 | 77 | 2,075 | 74.5 | 39 | 402 | 27 | 67 |
| Lesotho | 131 | 610 | 60.5 | 80 | 2,201 | 68.6 | 43 | ... | ... | ... |
| Malawi | 157 | 230 | 45.6 | 80 | 1,827 | 53.9 | 40 | 1,059 | 24 | 90 |
| Mozambique | 167 | 70 | 46.4 | 39 | 1,680 | 36.9 | 47 | ... | 8 | ... |
| Namibia | 108 | 1,670 | 58.8 | 72 | 2,120 | ... | 24 | ... | ... | ... |
| South Africa | 95 | 2,830 | 62.9 | ... | 2,705 | 80.6 | 36 | ... | ... | 104 |
| Swaziland | 124 | 1,080 | 57.5 | ... | 2,706 | 74.0 | 41 | 56 | ... | ... |
| Tanzania | 147 | 100 | 52.1 | 76 | 2,021 | 64.4 | 47 | 292 | 32 | 71 |
| Uganda | 158 | 180 | 44.9 | 49 | 2,162 | 58.6 | 40 | 196 | 40 | 42 |
| Zambia | 136 | 370 | 48.9 | 75 | 1,931 | 75.2 | 30 | 142 | ... | 109 |
| Zimbabwe | 121 | 580 | 53.7 | 85 | 1,989 | 83.4 | 33 | 137 | 32 | 101 |
| Indian Ocean (4) | ... | 1,187 | 60.9 | 82 | 2,243 | 68.3 | 36 | ... | 14 | 94 |
| Comoros | 139 | 530 | 56.0 | ... | 1,897 | 55.6 | 38 | ... | ... | ... |
| Madagascar | 135 | 230 | 56.5 | 65 | 2,135 | ... | 38 | ... | 19 | 85 |
| Mauritius | 60 | 2,800 | 70.2 | 100 | 2,696 | 81.1 | 26 | ... | 8 | 102 |
| Seychelles | 62 | ... | ... | ... | ... | ... | 42 | ... | ... | ... |
| Central Africa (10) | ... | 884 | 50.6 | 59 | 2,036 | 58.6 | 38 | 759 | 17 | 70 |
| Burundi | 165 | 210 | 50.2 | 80 | 1,941 | 32.9 | 47 | 272 | 35 | 38 |
| Cameroun | 127 | 830 | 56.0 | 41 | 1,981 | 59.6 | 32 | 42 | 16 | 66 |
| Central African Republic | 149 | 410 | 49.4 | 45 | 1,691 | 53.9 | 45 | 19 | 10 | 61 |
| Chad | 162 | 220 | 47.5 | 30 | 1,989 | 44.9 | 21 | ... | 5 | 78 |
| Congo | 122 | 1,110 | 51.3 | 83 | 2,297 | 70.7 | 40 | 10 | 12 | 86 |
| Equatorial Guinea | 142 | 340 | 48.0 | ... | ... | 75.3 | 40 | ... | ... | ... |
| Gabon | 114 | 4,220 | 53.5 | 90 | 2,511 | 58.9 | 37 | ... | 17 | 89 |
| Rwanda | 156 | 250 | 47.3 | 80 | 1,821 | 56.8 | 46 | 25 | 23 | ... |
| Sao Tome & Principe | 133 | 370 | ... | ... | ... | ... | ... | ... | ... | ... |
| Zaire | 143 | ... | 52.0 | 26 | 2,060 | 74.1 | 35 | 391 | ... | ... |
| West Africa (16) | ... | 439 | 49.5 | 46 | 2,274 | 37.8 | 35 | 922 | 22 | 87 |
| Benin | 155 | 410 | 47.6 | 18 | 2,532 | 32.9 | 47 | ... | 4 | 74 |
| Burkina Faso | 169 | 310 | 47.4 | 49 | 2,387 | 17.4 | 45 | ... | 6 | 88 |
| Cape Verde | 123 | 840 | 64.7 | ... | ... | 66.4 | 32 | ... | ... | ... |
| Cote d'Ivoire | 145 | 680 | 51.0 | 30 | 2,491 | 36.6 | 34 | 174 | 32 | 65 |
| Gambia | 161 | 370 | 45.0 | ... | 2,360 | 35.6 | 39 | 4 | ... | ... |
| Ghana | 129 | 460 | 56.0 | 60 | 2,206 | 60.7 | 39 | 12 | 27 | 45 |
| Guinea | 168 | 490 | 44.5 | 80 | 2,390 | 33.0 | 38 | 479 | 12 | ... |
| Guinea-Bissau | 163 | 220 | 43.5 | 40 | 2,556 | 51.7 | 39 | 12 | 93 | 115 |
| Liberia | 159 | ... | 55.4 | 39 | 1,640 | 35.4 | 29 | 100 | ... | ... |
| Mali | 172 | 310 | 46.0 | ... | 2,279 | 27.2 | 15 | 13 | 7 | 86 |
| Mauritania | 150 | 540 | 51.5 | 45 | 2,685 | 36.2 | 23 | 38 | 17 | 107 |
| Niger | 174 | 290 | 46.5 | 32 | 2,257 | 12.4 | 47 | 4 | 14 | 100 |
| Nigeria | 141 | 330 | 50.4 | 66 | 2,125 | 52.5 | 35 | 5 | 29 | 84 |
| Senegal | 152 | 780 | 49.3 | 40 | 2,265 | 30.5 | 38 | 72 | 14 | 106 |
| Sierra Leone | 173 | 160 | 39.0 | 38 | 1,695 | 28.7 | 32 | 6 | 21 | 80 |
| Togo | 140 | 400 | 55.0 | 61 | 2,243 | 47.9 | 35 | 3 | 7 | 91 |
| Arab States (8) | ... | 1,328 | 59.2 | 71 | 2,795 | 52.6 | 22 | 980 | 27 | 93 |
| Algeria | 85 | 1,850 | 67.1 | 88 | 2,897 | 57.4 | 10 | 219 | 71 | 86 |
| Djibouti | 154 | ... | 48.3 | ... | ... | 43.2 | 40 | 28 | ... | ... |
| Egypt | 107 | 650 | 63.6 | 99 | 3,336 | 49.1 | 10 | 6 | 16 | 95 |
| Libya | 73 | ... | 63.1 | ... | 3,310 | 72.4 | 10 | ... | ... | ... |
| Morocco | 117 | 1,050 | 63.3 | 70 | 2,985 | 40.6 | 21 | ... | 24 | 100 |
| Somalia | 166 | ... | 47.0 | 27 | 1,505 | ... | 38 | 1 | ... | 87 |
| Sudan | 144 | ... | 53.0 | 51 | 2,202 | 42.7 | 23 | 726 | 5 | 91 |
| Tunisia | 75 | 1,760 | 67.8 | 90 | 3,333 | 62.8 | 24 | ... | 21 | 97 |
| Sub-Saharan Africa (44) | ... | 559 | 51.3 | 56 | 2,096 | 54.4 | 37 | 4,410 | 21 | 88 |
| Africa (52) | ... | 773 | 53.0 | 60 | 2,252 | 52.3 | 34 | 5,390 | 22 | 84 |
| All developing countries | ... | 982 | 63.2 | 79 | 2,546 | 68.4 | 35 | ... | 22 | 99 |

67. The eleven SADC countries are already considering a new regional policy and strategy on equity-led growth for sustainable development. Kenya has incorporated key elements of an equity-led growth strategy in its National Development Plan for 1996-97. In both cases the three main goals are:

- To accelerate economic growth with greater equity and self reliance;
- To improve the health, income and living conditions of the poor majority;
- To ensure equitable and sustainable use of the environment and natural resources for the benefit of present and future generations.

68. These three goals constitute *one agenda for action*. None are achievable without the other two. However, these goals are not achievable without significant changes in international trade and debt policies. Without more equitable international economic arrangements, most developing countries in and outside Africa have limited scope and little hope for achieving economic, social and environmental sustainability.

Integrating EIA³ in Decision-Making

69. Throughout Africa the largely separate policies and programmes for economic reform, social progress and environmental improvement must be increasingly integrated in a *single agenda and strategy* for sustainable development. The new agenda needs to be anchored and reinforced by incorporating impact assessments as an integral part of decision-making in at least three key respects:

- EIA¹** Assessing the likely *environmental impacts* of economic policies and activities;
- EIA²** Assessing the likely *economic impacts* of environmental policies and measures;
- EIA³** Assessing the likely *equity impacts* of both economic and environmental policies.

70. The integration in all key policy sectors of economic, environmental and equity impact assessments (EIA³) will not make decision-making easier. It will improve the chances of making better decisions by compelling decision-makers to assess and defend their choices in terms of economic, social and environmental sustainability. Although there are few absolutes in public policy at least one should prevail in Africa. *If an EIA³ review of a proposed policy or programme reveals that it will not lead to at least some improvement in the living conditions and prospects of the poor majority, then a sustainable alternative must be found that does.*

C. A 'Fair Share' Strategy for Water Management in Africa

71. Throughout Africa and especially in areas of water stress or scarcity, the dominant challenge for policy makers and planners for the next decade is the equity issue of ensuring that everyone gets reasonable access and a 'fair share' of safe water.

72. At present the poor majority of people in Africa get far less than their fair share of safe water. Although circumstances vary among regions and countries, nearly half of the people in Africa lack reasonable access to safe water or sanitation (see Table 2). The available statistics indicate that people in rural areas generally have less access to safe water and sanitation than those in urban areas. However, the urban statistics are averages which disguise the plight of the poor in large slums where most families do not have reasonable or affordable access to safe water. As the urban poor buy water in small containers, they pay as much as ten times more than the metered rates of their wealthier neighbours (Serageldin, 1995, p. 7). Although they get far less than their fair share of water, the poor make good use of it. By circumstance and choice, the urban and rural poor are experts in water conservation and recycling for multiple use.

73. The poor also rarely share in the benefits of large scale water supply, sanitation, irrigation or hydropower projects which dominate investments in the water sector in most African countries. The poor are either not connected to the water and electricity supply systems or cannot afford the prices charged. Moreover, the poor are often displaced by large-scale water projects, are exposed to water borne diseases spread through badly managed irrigation systems, suffer impaired health because of industrial and agrochemical pollutants or sustain serious losses in their livelihoods due to reduced flows (e.g. floodplain farmers) or increased siltation (e.g. riverine fishermen).

A Fair Share for the Poor Majority

74. *The main political, economic, social and environmental goal for African governments for the next decade is to ensure that the poor majority in urban and rural areas get their fair share of safe water and water based services. Their water and water based needs must also get a fair share of national and local authority budgets.*

75. In the 1992 "African Common Position" for the Earth Summit and the post-Rio "African Strategies for the Implementation of Agenda 21", the "Efficient and equitable use of water resources" is among the top priorities. In both cases it is preceded by "food security". However, food cannot be produced without adequate water. People also die sooner from lack of water than lack of food. Many of the other priority issues on Africa's environment and development agenda are water related or water dependent. Water scarcity and recurring droughts are also major

causes of mass migrations and instability within and among African countries.

A Fair Share Among Competing Uses

76. *A fair share allocation of water among competing uses and users, especially agriculture, industry and households, also deserves high priority on Africa's new water and sustainable development agenda.* The most recent estimates on average water withdrawals in Africa are 88% for agriculture, only 7% for households and a mere 5% for industry (WRI, 1994, p. 346). As water is widely underutilized in Africa with most countries using less than 4% of their available water resources (see Table 1), increasing water supply to meet rising demand is the most obvious and sometimes the only option considered by governments.

77. However, protecting, conserving and making more efficient use of water deserves far higher priority in the future plans and budgets of governments. As agriculture already dominates the water sector in Africa, making irrigation more efficient is a major goal for moving toward sustainable water use. For industry and cities, with proper incentives for water protection and efficient use they can reduce their use, pollution and costs of water, create more room for new



water demand and postpone or avoid the need for expensive new dams, wells or treatment plants. As new water supply projects usually cost more per unit of water than existing supplies, water conservation and efficiency measures can help governments reduce expenditure or release funds for other human development projects.

A Fair Share for the Environment

78. *Human self-interest and survival requires that aquatic species, habitats and ecosystems also get their fair share of water.* As the demand for water to meet human needs inevitably rises there is a high risk that nature will lose out. As elsewhere, the "damming, diverting and polluting of watercourses with little regard for the environmental services they provide and the services they support has wreaked havoc on the world's wetlands, deltas, lakes and riverine habitats".

79. However, "protecting water systems also depends on regulating the use of those critical areas of land that help moderate water's cycling through the environment... Fortunately, many of the measures that can help safeguard water supplies also enhance crop production in upland areas. Terracing, mulching, agroforestry and planting vegetative barriers on the contour are just a few ways soil and water can be conserved while improving agricultural output." (WWI, 1993, pp. 40-41).

A Fair Share Among Neighbours

80. *Countries must also get their fair share of safe water.* With the exception of island states, most of the 'national' water resources in Africa are shared by at least two and often five or more countries. Yet few of Africa's over 50 international water basins are covered by effective agreements on fair use and environmental protection. The uncoordinated exploitation of shared water is already causing significant adverse environmental, agricultural and social impacts in water basins (WB, 1994, p.

22). The unfair use or abuse of water must not become yet another source of conflict in Africa where a third of the countries already suffer from civil conflict with over 23 million refugees displaced in or outside their countries. To ensure sustainable use as well as avoid serious conflicts over the unfair use or abuse of shared water resources, new and more effective agreements for managing shared water basins and measures for avoiding or resolving disputes over water are urgently need throughout Africa.

A Fair Share for Local Communities

81. *For all of the above issues, local authorities, communities, user groups, women and youth must also have a fairer share and much larger role in the planning, development, management and protection of water resources.* A recurring theme in the pre-Rio "African Common Position", Agenda 21 and the post-Rio "African Strategies for Implementing Agenda 21" is the need to decentralize water management responsibilities to local authorities and increase the involvement of local groups and users in decision-making.

82. With rising demand and increasing competition among various water uses and users, a community based and multi-stakeholder approach becomes crucial for ensuring decisions are both fair and effective, especially in the many water stressed and scarcity areas in Africa where conservation and efficient use of water is often a matter of life or death.

83. Local user groups, women and youth can make major contributions in implementing programmes and projects for developing, conserving and protecting water resources. Once engaged, local communities and users become more responsible and accountable for project performance. Few rural water projects have succeeded without direct public participation. Many studies "have shown that when farmers actively participate in projects and have some

responsibility for their operation, canals and other infrastructure function better, a greater proportion of the project area gets irrigated and crop yields rise." (WWI, 1993, p. 30).

A Fair Share for Smaller Projects and Technologies

84. *Smaller projects and appropriate technologies should get a fairer and much larger share of the water management and economic development budgets of governments.* National water management programmes and budgets in Africa are often dominated by large scale irrigation, water supply, sanitation and hydropower projects whose benefits rarely reach the poor majority of people.

85. Many more small projects on a larger scale using practical and affordable technologies have a far better chance of involving and meeting the needs of the poor majority (e.g. hand dug wells, micro dams, rainwater harvesting, moisture conserving land techniques), especially the rural poor in dispersed settlements and farms. Cost differences can be enormous. For example, at least 80-100 hand dug wells can be built for the cost of a single drilled borehole. In much of sub-Saharan Africa "the use of simple, low-cost wells and pumps to tap shallow groundwater or local rivers and streams offers great potential to increase food production and cash income for farm families." (WWI, 1993, p. 32)

A Fair Share of Capacity Building

86. *Education and training in the water sector should receive at least a fair share and preferably more of existing and new capacity building programmes.* In the water sector in Africa there are already too many itinerant expatriate experts and too few local experts for conventional water management approaches and disciplines.

87. As a precondition for sustainable use and management of national and shared water resources in Africa, many more local experts

are needed in traditional fields such as hydrology, civil and hydraulic engineering, geology and meteorology as well as related technical areas such as irrigation economics, fisheries, limnology and pollution control. (Okidi, 1994, pp. 31-32). However, even higher priority should be given to the training of existing and many new experts in the community based, participatory and appropriate technology approaches for water management that now need to be rapidly expanded throughout Africa.

A Fair Share for Women and Children

88. *Women and children constitute over 70% of the population of Africa but get far less than their fair share of water.* The costs of too little or unsafe water are borne disproportionately by women and children who spend long hours and many calories collecting water, get less for drinking and personal hygiene and suffer most from poor water quality and water related diseases (Serageldin, 1995, p. 27). Future planning and decision-making on the allocation and use of water must involve women and children more directly and ensure their needs are met.

A New Fair Share Water Initiative in Africa

89. "Growth, Equity and Sustainable Development" is a main theme and strategic imperative for the UN New Agenda for Development in Africa in the 1990's. The three equity-led goals of economic, social and environmental sustainability are also featured in the New Agenda and in the UN Plan of Action for African Economic Recovery and Development.

90. Building on these earlier plans and strategies, the still evolving Special Initiative on Africa by the UN Secretary-General proposes a new 'Fair Share' approach to water resource management and includes among its top priorities "Assuring the Equitable and Sustainable Use of Freshwater Resources" (UN, 1995, p. 6). The Special Initiative programme focuses primarily on changes in water policies, institu-

tions and laws for bringing the poor majority from the margins to the centre of the sustainable water development agenda for Africa.

91. The Secretary-General's proposed programme applying the 'Fair Share' approach has the following five key components (UN, 1995, pp. 33-34):

1. Assessing all future national and international water policies, plans and programmes in terms of their economic viability, environmental sustainability and equity impacts.
2. Assisting governments to incorporate the 'Fair Share' approach in their water development policies, plans and programmes and secure the active involvement of local communities and peoples in water management planning and decision-making.
3. Assisting governments to implement the 'Fair Share' approach and disseminate practical and affordable techniques for helping the poor majority get access to safe water in the shortest possible time. In addition to some large scale projects what is now needed are many more small scale projects and appropriate technologies (e.g. hand dug wells, household water tanks, rainwater harvesting, etc.).
4. Accelerating existing projects to emphasize and demonstrate the 'Fair Share' approach (e.g. the Zambezi Action Plan) and the advantages of community participation in water management planning and decision-making.
5. Assisting governments to set up more effective water basin agreements and institutions for avoiding or resolving disputes over equitable access and use of shared water resources.

Annex 1

Abbreviations

| | |
|------------|--|
| ADB | African Development Bank |
| AMCEN | African Ministerial Conference on the Environment |
| COMESA | Community of Eastern and Southern African States |
| ECA | Economic Commission for Africa |
| ELMS | SADC Environment and Land Management Sector Coordination Unit |
| EMINWA | Environmentally Sound Management of Inland Waters Programme (UNEP) |
| FAO | Food and Agriculture Organization of the United Nations |
| GDP | Gross Domestic Product |
| GEMS/WATER | Global Water Quality Monitoring Programme (UNEP) |
| GNP | Gross National Product |
| IAP-WASAD | International Action Programme on Water and Sustainable Agricultural Development (FAO) |
| IIED | International Institute for Environment and Development |
| ILO | International Labour Organization |
| IMF | International Monetary Fund |
| IUCN | World Conservation Union |
| NGO | Non-Governmental Organization |

| | | | |
|--------|--|---------|---------------------------------------|
| OAU | Organization of African Unity | Bank | Reconstruction and Development (IBRD) |
| ODA | Official Development Assistance | WWI | Worldwatch Institute |
| PTA | Preferential Trade Area for Eastern and Southern Africa | WRI | World Resources Institute |
| SADC | Southern African Development Community | WWF | WorldWide Fund for Nature |
| UN | United Nations | ZACPLAN | Zambezi River System Action Plan |
| UNCED | United Nations Conference on Environment and Development | | |
| UNCSD | United Nations Commission for Sustainable Development | | |
| UNDP | United Nations Development Programme | | |
| UNEP | United Nations Environment Programme | | |
| UNESCO | United Nations Educational, Scientific and Cultural Organization | | |
| UNFPA | United Nations Population Fund | | |
| UNHCR | United Nations High Commissioner for Refugees | | |
| UNICEF | United Nations Children's Fund | | |
| UNIDO | United Nations Industrial Development Organization | | |
| WCED | World Commission on Environment and Development | | |
| WHO | World Health Organization | | |
| WMO | World Meteorological Organization | | |
| World | International Bank for | | |

Abbreviations Used in the Tables

| | | |
|---------|---|--|
| % | = | per cent |
| CAR | = | Central African Republic |
| Eq | = | Equatorial |
| GNP | = | Gross National Product |
| km | = | kilometer |
| per cap | = | per capita |
| pop | = | population |
| yr | = | year |
| ... | = | No data available (or less than the minimum unit used) |

Annex 2

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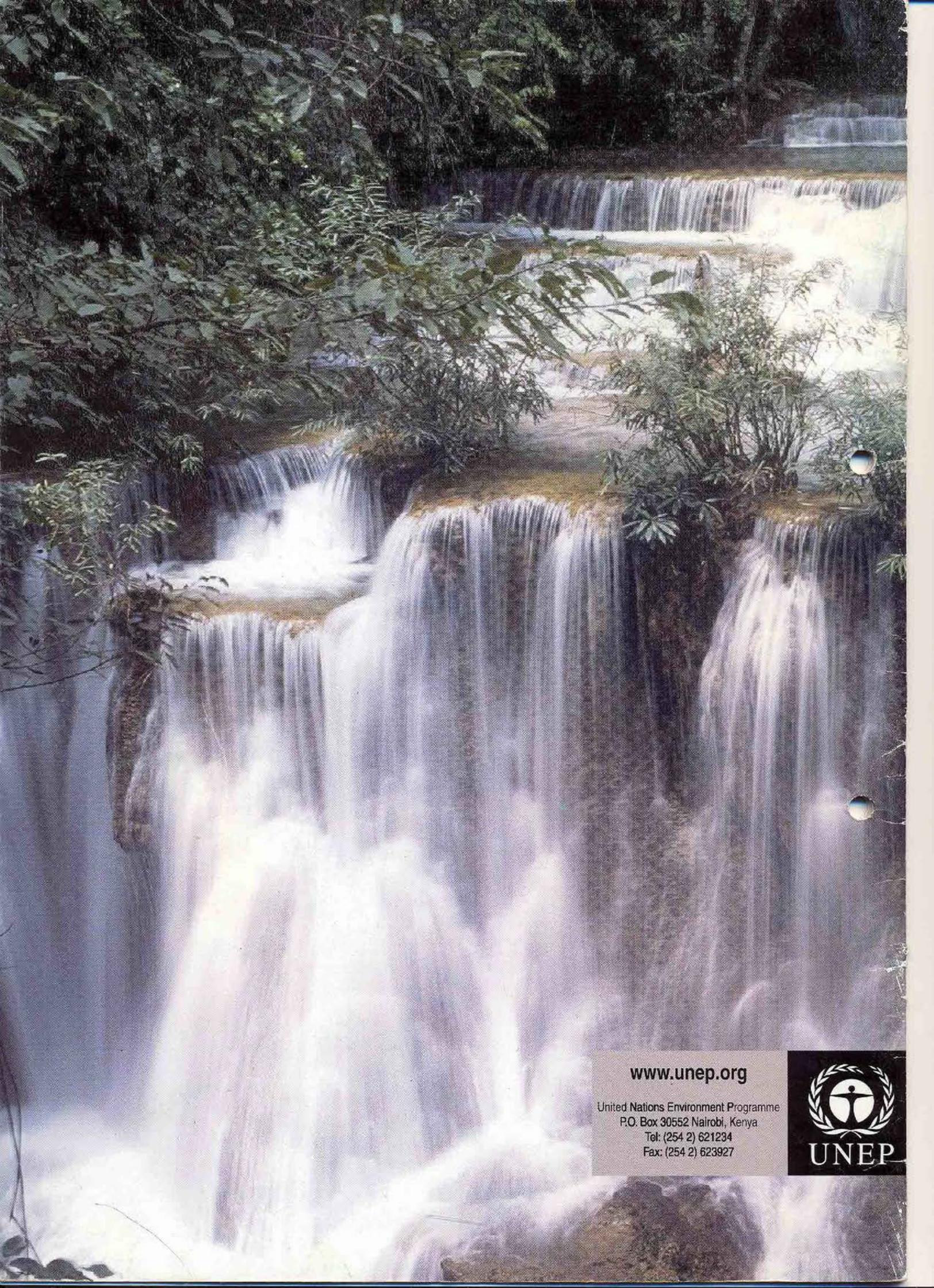
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