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S U S T A I N E D   U S E  
O F  
N A T U R A L   R E S O U R C E S**

**A report for and at the request  
of the Government of Mali**

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**PREFACE**

During the spring of 1989 the Government of Mali requested that USAID provide a consultancy for preparation of a briefing paper on Environmental Degradation and Sustainable Development in Africa. This report is a response to that request. The original was prepared in English.

Because of other commitments and difficulties in finalizing the terms of reference, the author spent only nine days in Mali gathering information and writing the report. The report would undoubtedly benefit from further reflection and editorial comment.

Many offered pertinent information through discussions and provision of written documents. Conversations and information provided by Toby Pierce, Asif Shaik, Peter Freeman, and Jeffrey Lewis were invaluable. Others who contributed included: David Atwood, Henc Breman, Bessie Boyd, Stephen Cobb, Oumar Dia, Moulaye Diallo, Bocar Diallo, Lance Jepson, Wayne McDonald, Michael McGahuey, Christopher Potter, Ambassador Robert Pringle, and Abdul Wahab.

Special thanks to Martine Keita, who typed the report on very short notice and Oumar Dia, who advised me in many ways and who

overcame the deficiencies in my French during communications with the Ministry of Environment and Livestock and during translation of the report. I bear full responsibility for any inaccuracies or failures in logic. The interpretations and opinions are my own and do not represent the position of USAID or the Government of the United States.

Thurman L. Grove  
June 30, 1989

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## EXECUTIVE SUMMARY

### Introduction

The survival of Africa requires reversal of the degradation of its lands, waters, and biological resources and the consequent loss of productivity that result from the collective actions of millions of rural poor who are desperate and have no alternative. Problems that have available technological solutions, such as air and water pollution, are relatively easily resolved with technology, if institutions and capital are available. Solutions to "green" problems, such as devegetation, loss of biodiversity, and degradation of the landscape, are more difficult and require sustainable natural resource management. Requirements for sustainable development include improvement in the livelihoods of the poor, conservation of the natural resource base, and a merger of environment and economics in decision-making processes.

### Environmental Problems in Africa

The fact of environmental degradation in Africa is apparent, but the extent and rates are poorly known. The continent suffers a paucity of environmental data. Loss of soil productivity resulting from erosion and deterioration of soil properties threaten nearly all agricultural soils in Africa. Devegetation threatens rural livelihoods, ecosystem services (e.g., watershed

protection and control), and biodiversity, and exacerbates soil degradation. Many inland waters and coastal resources are degrading at increasing rates from pollution, overexploitation, and lack of information and management capability. Africa's biological diversity is a precious and practical resource whose loss is irreversible.

### Developmental Responses to Environmental Problems in Africa

Continent wide responses typically include networks to broaden and share knowledge and resources concerning common problems. Included are the Cairo Action Plan, the Environmentally Sound Management of Inland Waters program, FAO's soil map project, the International Board on Plant Genetic Resources, and NGO programs on biological diversity.

Regional responses are common in the drought affected areas and include CILSS, UNSO, DESCON, and IUCN's Sahel Program. National responses include environmental planning, reforestation, soil conservation, and legal and institutional reforms to facilitate sustainable development. NGOs typically work at local levels and are increasingly in a position to become significant players in rural development.

## Principles for Sustainable Development

The 1987 WCED report not only established the role of natural resource management and conservation in economic development, but also called for new directions and priorities in developmental processes. Sustainable development requires a strengthening and broadening of the partnership among rural people, African governments, and the international development community. Sustainability is enhanced when local people participate in planning and implementation of programs. It is greatly strengthened when people are empowered to control their own fates. Rural people are more likely to practice sustainable management, if they benefit from the fruits of their labor. Effective government policies support local incentives. Development successes around the globe indicate that land tenure and usufruct rights are fundamental incentives for sustainable resource management. Governments have a critical role in provision of research, extension, and education. Natural resource management systems must be adapted to the biological, physical and socio-economic environment and such adaptation requires understanding of that environment. There are no prescriptives for sustainable development. Flexibility within development programs, the willingness to learn from mistakes and try anew, and a long-term commitment are important contributors to success. Increases in productivity are usually prerequisite to sustainable natural resource management.

## Opportunities

Improvements in environmental and developmental networks can serve the critical needs for information about African natural resources and their management. A focus on development of human capital in appropriate disciplines and creation of a capacity for systems analysis and planning would contribute greatly to sustainable development. All sectors should be responsible for the environmental sustainability of their activities.

Frequent reiteration of the goal of sustainable natural resource management at national, regional, and international levels helps to internalize the concept in human behavior. National food security may be a more realistic goal than self-sufficiency as the potential productivity of many African countries is limited. Sustainability would be enhanced by modifying national accounting to treat natural resources as productive capital assets rather than treating their harvest as current income.

The global community has mutual and vested interests in improvement of livelihoods and the environment in Africa as such improvement improves the global environment. New partnerships based upon this mutuality may have synergistic results on development processes. South-south relationships and NGOs have great potential for transfer of appropriate information, but further development is required to provide full advantage.

The African elephant is a symbol of Africa and an indicator of environmental health. If the elephant survives the next few decades it will indicate that sustainable natural resource management has succeeded in Africa. African nations might consider making the elephant the symbol of African unity and taking steps towards its protection by signing the C.I.T.E.S. convention and implementing appropriate action plans.

## SOMMAIRE

### Introduction

Il est indispensable, pour assurer la survie de l'Afrique, de renverser le sens de la dégradation de ses terres, de ses eaux et de ses ressources biologiques et de la perte de productivité liée à cette dégradation et qui résulte des actions collectives de millions de paysans pauvres et désespérés, et auxquels ne s'offre aucune autre option. Les problèmes ayant des solutions techniques, tels les problèmes de pollution de l'air ou de l'eau, sont relativement aisément résolus grâce à la technologie, si les institutions et les capitaux nécessaires sont disponibles. Les solutions aux problèmes "verts", tels que la dévégétation ou la destruction de la végétation, la perte de la diversité biologique et la dégradation du paysage sont plus difficiles et requièrent la gestion à long-terme des ressources naturelles.

Les conditions d'un développement durable comprennent l'amélioration des conditions de vie des non-nantis, la conservation du capital de ressources naturelles, et une association des problèmes d'environnement et d'économie dans les processus de prise de décision.

## Problèmes d'environnement en Afrique

La réalité d'une dégradation de l'environnement en Afrique est évidente mais sa dimension et son rythme sont mal connus. Le continent souffre d'une pauvreté en données sur l'environnement. La perte de productivité des sols provenant de l'érosion et de la détérioration des propriétés pédologiques menace pratiquement tous les sols agricoles d'Afrique. La dévégétation menace les conditions de vie rurale, les services de protection des écosystèmes (par exemple la protection et le contrôle des eaux de ruissellement), la diversité biologique et elle exacerbe la dégradation des sols. De grandes ressources des eaux à l'intérieur des terres et le long des côtes se dégradent à des vitesses plus grandes du fait de la pollution, de la surpopulation et du manque de moyens d'information et de gestion. La diversité biologique de l'Afrique est une ressource précieuse et pratique dont la perte est irréversible.

## Réponses du développement aux problèmes d'environnement de l'Afrique

Les réponses à l'échelle du continent comprennent typiquement la création de réseaux établis pour élargir et exploiter ensemble les connaissances et ressources concernant les problèmes communs. Dans cette perspective se trouvent inclus le Plan d'Action du Caire, le Programme de Gestion du point de vue de l'environnement

des Eaux Intérieures, le Projet de Cartographie des Sols de la FAO, le Bureau International des Ressources Génétiques des Plantes, et les programmes de diversité biologique des ONG.

Des réponses régionales sont courantes dans les zones affectées par la sécheresse et comprennent le CILSS, UNSO, le DESCON et le Programme du Sahel de l'UICN. Les réponses nationales comprennent la planification de l'environnement, le reboisement, la conservation des sols et les réformes légales et institutionnelles dont l'objet est de faciliter un développement durable. Les ONG travaillent spécialement aux niveaux locaux et se trouvent de plus en plus en position de jouer un rôle d'acteurs importants du développement rural.

### Principes d'un développement durable

Le rapport WECD de 1987 a non seulement défini le rôle de la gestion et de la conservation des ressources naturelles dans le développement économique, mais a aussi mis l'accent sur de nouvelles directions et priorités pour les processus de développement. Un développement durable exige un renforcement et un élargissement de la coopération entre les différents partenaires que sont les populations rurales, les gouvernements africains et la communauté internationale chargée du développement. Le développement durable se trouve renforcé lorsque les individus ont les moyens de contrôler leurs propres

destins. Les populations rurales sont plus enclines à pratiquer une gestion durable si elles bénéficient des fruits de leur labour. Des politiques efficaces menées par les gouvernements appuient les motivations locales. Les succès en matière de développement connus à travers le monde indiquent que les droits de tenure et d'usufruit des terres sont des motivations fondamentales pour assurer une gestion durable des ressources. Les gouvernements ont à jouer un rôle critique en assurant la recherche, la vulgarisation et l'éducation. Les systèmes de gestion des ressources naturelles doivent être adaptés à l'environnement biologique, physique et socio-économique et une telle adaptation exige la compréhension de cet environnement. Il n'existe pas de prescriptions arrêtées de développement durable. La souplesse au sein des programmes de développement, la volonté de tirer la leçon des fautes commises et de reprendre à nouveau, et un engagement à long-terme sont des éléments importants en vue de succès. Les gains de productivité sont généralement les conditions premières d'une gestion durable des ressources naturelles.

### **Possibilités**

Les progrès des réseaux de développement et d'environnement peuvent servir à la connaissance critique des besoins essentiels d'information sur les ressources naturelles africaines et leur gestion. Porter l'accent sur le développement du capital humain

dans les disciplines appropriées et créer les capacités d'analyse et de planification des systèmes contribuerait grandement à un développement durable. Tous les secteurs devraient être responsables d'une exploitation durable de l'environnement dans leurs activités de développement.

Une réaffirmation constante de l'objectif de gestion durable des ressources naturelles aux niveaux national, régional et international aide à intérioriser le concept dans les attitudes de comportement humain. La sécurité alimentaire nationale pourrait être un but plus pratique que l'auto-suffisance étant donné que la productivité de nombreux pays africains est limitée. La durabilité serait renforcée par une modification de la comptabilité nationale permettant de traiter les ressources naturelles comme des biens en capital plutôt qu'en traitant leurs fruits comme revenu courant.

La communauté mondiale a des intérêts mutuels et directs dans l'amélioration des conditions de vie et de l'environnement en Afrique car de tels progrès améliorent l'environnement mondial. De nouvelles formes d'associations fondées sur la mutualité ont des effets synergétiques sur les processus de développement.

Les rapports sud-sud et les ONG représentent déjà un potentiel important pour le transfert d'informations appropriées, mais un plus grand développement est nécessaire pour en tirer tous les avantages.

L'éléphant d'Afrique est un symbole de l'Afrique et un indicateur de la santé de son environnement. Si l'éléphant survit au cours des prochaines décades, cela indiquera qu'une gestion durable des ressources naturelles aura réussi en Afrique. Les nations d'Afrique pourraient envisager de faire de l'éléphant le symbole de l'Unité Africaine et prendre des mesures en vue de sa protection en signant la Convention C.I.T.E.S. et en mettant en oeuvre des plans d'action appropriés.

## INTRODUCTION

The survival of Africa depends upon the abilities of Africans, African governments, and their partners in the international development community to reverse degradation of the continent's lands, waters and biological resources. Of principal concern is the downward trend in standing stocks and productivity of the resource base. Although exacerbated by the negative environmental impacts of ill-conceived development projects, degradation is primarily the result of the more secular influences of population growth, weak economies, poverty, and drought. It is the result of the collective actions of millions of individuals who are often desperate and have no alternatives. While degradation of the African environment has been called the tyranny of many small actions, it is the smallness of the actions which offers the greatest hope for its reversal. If desperate and disadvantaged people are given secure access to natural resources, and the opportunities and support to manage them in an environmentally sustainable manner, then perhaps degradation can be reversed.

Environmental problems can be considered as a continuum at one end of which are relatively simple problems that arise from identifiable sources and for which remedial actions are known. Air and water pollution are common examples. Improvements in these kinds of problems are generally straightforward and require

technology, institutional capacity, and financial resources. Technologies for controlling air, water, noise, and other sorts of pollution are typically well known and available. Institutional capacity and financial resources are required to provide and maintain the control technologies.

Governments and development agencies are usually sensitive to problems at the pollution end of the spectrum as effects are usually on human health and thus of immediate concern. Experience in industrialized countries indicates that control of pollution will be internalized in government policies and practices when such problems become sufficiently threatening to human health. In African countries pollution is primarily an urban problem which results from increasing urban populations and industrialization. The cost of controlling pollution can be high, especially if treated retroactively. The cost is much less, if control is designed in advance. African nations can and have frequently taken advantage of control technologies. Challenges for the future include the building of infrastructure to control pollution and establishment of environmental, health, and safety standards for urban and industrial development.

At the other end of the environmental continuum are "green" problems, those of biodiversity, devegetation, and degradation of the landscape. These problems have multiple and complex causes which threaten the long-term productivity of the resource base.

Solutions to "green" problems are much more difficult. They require a new understanding, development of sustainable natural resource management methodologies, and the collaborative and concerted efforts of people, nations, and development organizations. The world at large has only recently recognized the severity of these problems which were in 1987 brought to international attention in the report of the World Commission on Environment and Development (WCED) entitled "Our Common Future."

In between these two extremes are a host of intermediate problems such as soil degradation, destruction of watersheds, and degradation of aquatic resources. While the causes of these intermediate problems have often been recognized for several years, application of remedial solutions are complicated by the need for incorporating solutions into the practices of millions of rural people who make their livelihoods directly from the natural resource base. Solutions to "green" end and intermediate environmental problems must involve the development, promotion, and application of sustainable rural livelihood strategies and environmentally sound natural resource management. African nations and development organizations are challenged to create conditions in which the rural populace can fulfill its needs through sustainable use of natural resources.

Environmental problems can also be considered over a continuum of scale. Local environmental impacts such as land and water

degradation lead to loss of local productivity and threaten livelihoods of individuals. Global threats from green-house gases, climate change, and loss of biodiversity affect everyone. National and regional problems such as watershed deterioration, degradation of common lands, and food insecurity threaten the stability of nations and regions within Africa. A strengthening of the partnership among African peoples, African nations and the international development community will likely result from focusing development efforts upon those problems that have mutual effects upon all. The strengthened partnership should focus its efforts upon the rural populace who hold the future of the continent in their hands.

Sustainable development, the primary thrust of the WCED report, is replacing the goal of unlimited economic growth. This subtle change is important as it assigns an indispensable role in economic development to the conservation and management of natural resources and the environment. The concept of sustainability has served to sharpen the focus of global thinking that has evolved since 1971 on the relationship between environment and development. An international seminar on Environment and Development in Founex, Switzerland during June 1971 dispelled the idea that the two are incompatible. This theme was echoed in the 1972 Stockholm Conference on the Human Environment. Thinking evolved further in 1974 at the Cocoyoc, Mexico Symposium on Patterns of Resource Use, Environment, and

Development Strategies. Discussions on sustainable development emphasized the links between poverty and environmental problems and the imperative for developing countries to find alternative patterns of development that recognize the need for sound natural resource management. The African nations reiterated and addressed these concerns in the 1985 Cairo Program for African Cooperation which has been followed by a series of actions and meetings of the African Ministerial Conferences on the Environment (AMCEN).

Sustainable development is defined by the WCED report as development that meets the needs of the present without compromising the abilities of future generations to meet their own needs which cannot be predicted. Sustainable development requires meeting the following objectives:

- reviving growth and changing the quality of growth;
- meeting essential needs for jobs, food, energy, water and sanitation;
- conserving and enhancing the resource base;
- reorienting technology and managing risk; and
- merging environment and economics in decision-making.

The report emphasizes the need for economic growth and development as a prerequisite to address environmental issues linked with poverty.

The objectives of this paper are threefold. The first is to establish the state of the African environment. The second is to present a discussion of components and methodologies of sustainable development. Lastly this paper seeks to make suggestions for furthering cooperation among the partners in development - the African people, African nations, and the international development community.

## OVERVIEW OF ENVIRONMENTAL PROBLEMS IN AFRICA

### Introduction

The fact of environmental degradation in Africa is apparent. The evidence is clear as one travels through the landscape. Increasing human hardship reflects the fact of environmental degradation. However, assessment of the extent and rates of degradation are severely hampered by the lack of information. Data and information are not only scarce, but that which exists is collected by a diversity of largely uncoordinated organizations and activities. Lack of information not only hampers assessment, but makes it difficult to measure success of interventions in natural resource management. The efforts of the Cairo Plan and development organizations to overcome this problem are laudable.

### Land Degradation

Loss of soil productivity as a result of erosion, loss of nutrients, acidification, compaction, and salinization threatens nearly all agricultural soils in Africa. Most of these soils are highly weathered and thus are inherently of moderate to low fertility. FAO estimated potential loss of rainfed cropland to wind and water erosion between 1975 and 2000. If no conservation measures are taken they predict loss of 203 million hectares or

16 percent of the total soils of Africa. They further suggest that erosion will lower productivity on the remainder. Erosion is a principal threat because of the intensity of rainstorms, the erosivity of many soils, and the sparseness of vegetation.

Erosion directly affects soil productivity through reductions in soil depth, water holding capacity, nutrient supply, and the capacity to retain nutrients. Declining productivity also results from leaching of nutrients, extraction of nutrients by crops, loss of organic matter, salinization, and alkalization. Erosion and the decline in soil productivity are symptoms of overly intensive cultivation, lack of conservation practices, and expansion of agriculture onto marginal lands. Sub-Saharan cropland increased from 113 million to 142 million hectares between 1966 and 1985 with large increases in the semi-arid countries and East African highlands.

### **Devegetation**

Rural livelihoods, sustainability of agricultural and pastoral systems, and the hydrological cycle in Africa depend largely on trees and other woody species. Trees yield an array of products used by rural Africans and sold in cities. Most of rural Africa and much of urban Africa use wood and charcoal as fuel. Trees buffer winds, temperature extremes, and erosive rains. They enrich the soils with falling leaves and litter. Within

watersheds trees reduce runoff and erosion upstream and buffer floodpeaks and sedimentation downstream.

The principal concerns are loss of dense closed forests in humid lowlands and uplands, loss of primary forests in semi-humid and semi-arid zones, degradation and loss of forest and grazing reserves, and degradation of woody vegetation in agricultural landscapes. FAO estimated that 4 million hectares of forest are cleared or degraded annually, mainly in the sub-humid and humid zones. African forests have been reduced by half in this century. During the past decade, 103 million hectares of closed forests were cleared annually, with the most rapid rates in the lowlands of West Africa where only 10 percent of the original forest remains. On Madagascar and in the highlands of East and West Africa, where plants and animals are diverse and unique, loss of forests represents loss of biological diversity.

In semi-arid to sub-humid climates trees and other woody vegetation serve the needs of animals and people. Livestock which is common in this agro-ecological zone, depend upon woody browse species during the dry periods. Agricultural gains within this zone have been largely by expansion of farmlands, by shortening of tree fallows or by advancing into woodlands and pastoral zones, rather than through intensification. Where

forests or bush fallow are used to restore soil fertility, progressive shortening of the fallow period has led to degradation of soils and fallow vegetation.

Fuel needs have exerted particularly heavy demand on vegetation especially around villages, towns, and cities in semi-arid Africa.

In addition to wood and charcoal, many other forms of combustible materials are used including grass, weeds, crop residues, and dung. Burning of these materials rather than returning them to the soil sacrifices soil productivity. The sustainability of agriculture in semi-arid regions may depend upon resolution of fuel shortages so that fallows, crop residues, and animal manures are available to restore soil fertility.

### Inland Water Resources

Pollution, overfishing, and the negative impacts of dam construction and management are affecting the environment and human health in many African lakes and rivers. Wetlands are experiencing the combined effects of drought and development. Over-exploitation of aquifers is a growing problem. Recharge of aquifers is impaired by devegetation and soil degradation. Formulation of management strategies for inland waters suffers from a lack of information.

Africa's rivers and lakes serve many purposes. They supply water for power, urban water supplies, and irrigation. They yield substantial harvests of fish and crustaceans. Wetlands are important habitats for resident and migratory birds and nursery grounds for fish and invertebrates that are harvested for food.

African lakes are important scientifically, support tourism, and provide fish for food and income. Lake Malawi supports a large diversity of unique fish species that are harvested and sold to a broad and international market of fish culturists. Lake Tanganyika supports an important fishery. Lakes Nakuru and Baringo attract spectacular bird life that supports a major tourist industry.

Pollution from industry, cities, and development is poorly documented, but known. Pesticide pollution is of particular concern. In Lake Tanganyika DDT metabolites have been found in sun dried fish. They have also been found in dried fish flour in Burundi. Metabolites of pesticides used to control the insect vectors of river blindness and sleeping sickness have been found in fish and birds of the Lake Chad and Lake Victoria basins.

The loss to sedimentation, drainage, and irrigation of wetlands, at rivermouths and inland deltas has adverse impact on fisheries, such as shrimp, that depend on wetlands as spawning and nursing

grounds. The marine fisheries of Africa produce over 5 million metric tons of fish valued at 100 to 300 U.S. dollars per ton. Information is unavailable to assess how much of the fishery is dependent upon wetlands, but the potential impact is great. Inland wetlands are important to fish which have food and economic value and to wildlife which has value for tourism and which potentially contributes to preservation of biodiversity. Analyses of development plans for wetlands rarely consider their ecological values. The Inner Niger Delta Project in Mali seeks to reconcile the needs of the local population with the ecological values of the delta.

### Coastal Resources

Coastal resources are found in estuaries, on the seashore, and in shallow waters off the continent or around the islands of the Indian Ocean. Included are beaches, lagoons, tidal flats, mangroves, sea-grass beds, coral reefs, and the fish and other organisms that inhabit these diverse habitats. Coral reefs occur principally in the warm waters off East Africa and in the Indian Ocean. African coastal peoples have exploited the living resources of the coastal zone for millennia. Currently, over 2 million tons of fish from the marine fishery are harvested by Africans especially on the West African coast. An additional 3.5 million tons of fish are harvested from the deeper waters of the coast by foreign fishing fleets.

Coastal beaches and coral reefs attract thousands of tourists and are correspondingly of economic importance. The mangrove forests of Africa cover 10.2 million hectares, one-third of which is around the Gulf of Guinea and bordering the Indian Ocean. Mangroves are important for construction and fuelwood and also provide spawning and nursery habitat for many species of fish and crustaceans.

Degradation of Africa's coastal resources is poorly documented. Reports from East and West Africa indicate overcutting of mangroves, overfishing, sedimentation in estuaries and coral reefs from upstream erosion, and pollution. IUCN listed 32 coastal and marine species in East Africa whose existence is threatened. Little attention has been given to development of Africa's coastal resources.

### Loss of Wildlife and Biological Diversity

Africa's wildlife is a unique and precious resource. Its international significance is reflected in the considerable earnings of foreign exchange from visitors to national parks. Pressure from growing human populations for agricultural and pastoral lands, poaching, and weak management threaten Africa's wildlife. Reports of the dramatic reductions over the past decade in black rhino and elephant populations have filled the

world press. The revenues from parks in Kenya and Parc des Volcans in Rwanda demonstrate the tremendous economic potential of protecting and maintaining wildlife. Yet the threat grows. The trend will undoubtedly continue until there is widespread improvement in rural livelihood.

Biological diversity encompasses genetic diversity within species and varieties, species diversity which is measured by the number of species, and ecosystem diversity which is the diversity of assemblages of plants and animals and the environments in which they live. Preservation of biological diversity is a practical, as well as philosophical, consideration. Rural African people harvest biological diversity to maintain and stabilize their livelihoods. They directly harvest wild foods, especially when cultivated crops are in short supply, and use a variety of plants for medicines and other necessities. Their animals typically graze on wild plants. Future progress in agriculture, forestry, and animal husbandry will likely depend upon wild genetic material as it has in the past. The forests of Madagascar, which previously yielded an effective remedy for childhood leukemia, recently provided a caffeine-free coffee whose economic potential is as yet unknown.

The status of changes in biological diversity in Africa is poorly known due to inadequate baseline information, monitoring, and reporting. Ecosystems are disappearing and being modified by

encroachment of agricultural and pastoral land use into natural ecosystems. The rate of change appears especially rapid in tropical humid regions which have higher population densities, such as those in Madagascar, Rwanda, and West Africa.

## DEVELOPMENTAL RESPONSES TO ENVIRONMENTAL PROBLEMS

### Introduction

The problems which were discussed in the preceding section have prompted responses from African nations and international organizations. The following brief discussion can only serve as a sampling of important initiatives. The selection and discussion of activities are intended to be illustrative of promising responses, rather than representative of the range of responses.

### Continental Responses

The Cairo Action Plan that was adopted by the 1985 African Ministerial Conference on the Environment has a primary objective of halting and reversing environmental degradation. It is an African initiative, conceived and managed by Africans, with support of a secretariat provided by UNEP. The program focuses on using successful grassroots development experience and promotion through technical and scientific cooperation at regional and sub-regional levels between and among African countries. Pilot projects, to number 180, aim to achieve self-sufficiency in food and energy by using traditional skills and experience in development that is community based, scientifically appropriate, economically feasible, socially acceptable, and

environmentally sound. The pilot projects are also envisioned as facilitating governments to think practically about reforms in development policy and as increasing awareness among local governments and institutions.

The Environmentally Sound Management of Inland Waters (ENIWA) project of UNEP focuses on water management. An action plan has been developed and adopted by the riparian states of the Zambezi River Basin. Similar plans are envisioned for additional river basins.

FAO is preparing a soil conservation strategy for Africa which is currently under review by African soil scientists. The first conference of the African Soil Science Society was held in Kampala in 1989.

Collections of economically important plants are coordinated by the International Board on Plant Genetic Resources. Living collections are maintained by several centers in Africa, including ILCA, IITA, ICRISAT and in vitro in Europe and the U.S.A. The collections are woefully incomplete.

The International Union for the Conservation of Nature, World Wildlife Fund, and the African Wildlife Foundation and other

local and international NGOs perform research, monitor the status of African plants and animals, and conduct environmental education.

### Regional Responses

The majority of regional responses to environmental degradation have concerned the drought affected areas of the Sahelo-Sudanian region and Eastern and Southeastern Africa. CILSS and its secretariat at the Club du Sahel have assisted in the formulation of National Master Plans for Combatting Desertification. The UN Sahelo-Sudanian Office (UNSO) serves as a clearinghouse for environmental information on the region. IFAD's Program for Sub-Saharan Countries Affected by Drought and Desertification addresses agroforestry and environmental rehabilitation through country programs. UNEP's DESCON project is concerned with desertification and has recently emphasized assistance to Mali and Sudan on decentralization and small-scale development of phosphorus fertilizers, a commonly limiting nutrient of the soils in the region. IUCN's Sahel Program involves governments and NGOs in planning and implementing ecological rehabilitation in the Sahel.

Regional action programs on watersheds and the seas are in various stages of planning and implementation with involvement of AMCEN, FAO, and UNEP.

## National Responses

African countries have given increasing attention to environmental matters. National responses have included environmental planning, reforestation and soil conservation initiatives, and legal and institutional reforms to facilitate environmentally sustainable development. Many African countries have ratified the international treaties and protocols on environmental protection and conservation of biological diversity.

Laws, codes, and standards within African nations are fundamental to environmental protection. Laws for protection of the environment exist in most African nations, but are not adequately enforced. They do, however, reflect a political commitment that can guide development activities. Few nations have developed environmental standards for pollution or occupational safety.

National Conservation Strategies have been formulated, in concert with the World Conservation Strategy, in African countries including Madagascar, Botswana, and Zambia. Others are in the planning stage. The World Bank has initiated Environmental Action Plans in several countries and is developing national land and natural resource management programs in the Sahel and elsewhere.

Most European donors, Canada, Japan, Australia, the United States, and OPEC nations are providing bilateral assistance for natural resource management in Africa. Past programs have focused on institution building and agricultural development. Recent efforts, such as USAID's Natural Resource Management Support Project (NRMS), are broader and seek to embrace environmentally sustainable development within all programs.

#### Non-governmental Organizations - NGOs

Within African countries, many NGOs are engaged in soil conservation, village afforestation, water development, renewable energy development, and wildlife preservation. Most are involved in rural development at the community level. A recent survey by the International Institute for Environment and Development concluded that African NGOs are increasingly in a position to participate in various stages of development. Associations of national and regional NGOs are evolving. The Environmental Liaison Center of UNEP and the African Network of Environmental NGOs provide linkages among these organizations.

## PRINCIPLES FOR SUSTAINABLE DEVELOPMENT

### Introduction

The 1987 report of the World Commission on Environment and Development not only established the critical role of natural resource conservation and management in economic development, it also called for new directions and priorities in developmental processes. The kinds of changes that are required are perhaps best summarized by Robert Chambers of Sussex University. He stated that,

"Until recently the debates on environment and development have been dominated by values which reflect the 'first' biases of normal professionalism. These start with things rather than with people, the rich rather than the poor, men rather than women, and numbers rather than qualities. They bear the imprint of interests that are urban, industrial, and central in location rather than rural, agricultural, or peripheral. Poor rural children, women, and men have been treated as residual not primary, as terminal problems not starting points. Quite apart from ethical aspects, this is misguided from a practical point of view. Putting poor people first and enabling them to gain sustainable and secure rural livelihoods in resource-poor conditions reduce outmigration and pressures on other rural and urban areas and creates preconditions for stabilizing population."

The comments of Professor Chambers suggest that environmental sustainability in poorer countries is largely a matter of improving livelihoods of the rural poor who typically make their livings on marginal resources. The role of better-endowed lands and the

intensive agricultural management that is characteristic on them are also very important. Food, fiber, and income produced on such lands are required to support growing urban populations and are often major sources of foreign exchanges. However, the vast majority of African peoples are poor, rural, and only have access to lesser resources. Improvement in their livelihoods, environmentally sound management of natural resources, and national security are intimately entwined.

Since the publication of the WCED report the environmental and developmental communities from all countries have engaged in dialogues to create a better understanding of the requirements of sustainable development. The state-of-the-art is very young and much is yet to be learned. However, as a result of the dialogue and analysis of promising sustainable programs, a number of principles are emerging.

### **Partnerships**

Sustainable development requires a partnership among rural Africans, their national governments, and international development agencies. Each must internalize sustainability as an explicit goal and find ways to attain it that are compatible with their other goals. At the Segou Regional Encounter in Mali local people voiced their needs for participation which capitalizes on their knowledge, gives them a sense of ownership, and identifies

incentives that will lead them to sustainable management of natural resources.

Governments need to create a policy environment that reinforces local incentives. They can provide the technical and institutional support to enable rural inhabitants to manage resources. Governments also have a role to play in risk management. In North America and Europe practically all governments provide support to stabilize incomes of the agricultural sector during adverse conditions.

The international development community brings to the partnership resources and global experience. The lessons learned within their own countries and in the developing countries of South America and Asia are invaluable to Africa. The lessons learned within the Central Selva Project of Peru, in which USAID was a partner, are remarkably similar to statements resulting from the Segou Encounter.

In the Amboeseli Game Park of Kenya pastoral Masai came in conflict with the government when they watered and grazed their cattle within the park. The Masai complained that they derived no benefit from the park, which had been part of their tribal lands, and that they had no other source of water in the dry season. The government changed park policy so that the Masai shared in the park revenues and USAID and the World Bank financed

a water supply outside the park. With these new incentives the Masai now state that the park has gained an additional 3,000 pairs of eyes to watch over the wildlife.

### Decentralization

The empowerment of local communities to plan, execute, and benefit from natural resource management will favor long-term and sustainable, rather than short-term, strategies. Such infrastructural and accompanying structural changes have been shown to be necessary and fundamental by development experiences on all continents. The Cairo Action Plan and the Segou Regional Encounter reflect this understanding. Local empowerment capitalizes upon local knowledge that often evolved over centuries. Local participation leads to a sense of ownership early in developmental programs. In the Amboeseli Park program the Masai identified the need for intervention and thus, were enthusiastic about project activities from the very beginning. Community management of Niger's Guesselbodi National Forest stimulated local interest in its sustainable use.

Those who implement development must benefit. The rural populace cannot be expected to protect natural resources unless they are direct beneficiaries. Forest, soil, and water conservation in the Guesselbodi National Forest of Niger have resulted from the Forestry and Land Use Project (FLUP). Critical to the project's

success is the use of the forest by surrounding communities. Controlled cutting of trees and controlled grazing benefit the people, while the intact forest restores and protects the land.

Local participation is the best means of determining what incentives will change local behaviors. Residents around the area that became Parc des Volcans of Rwanda encroached on the area for fuel and agricultural lands. They also poached the endangered gorillas who lived there. Enforcement efforts had little effect upon poaching and encroachment. A survey of local people showed that they had little understanding of the importance of forest cover in protecting the steep watersheds that surrounded their lowland farms. Nor was there much value placed on protecting gorillas. Local people did, however, identify a strong need for additional income. Creation of the park created several hundred jobs, thus providing income, and encroachment upon the forest practically stopped. Agriculture benefits from the watershed protection.

### **Policies**

Reversal of perverse national policies that stimulate excessive exploitation of natural resources is fundamental to natural resource management. Rural poor have little incentive for improvement or maintenance of natural resources, if they have no

or insecure rights to resources and land, a sentiment that was echoed at the Segou Encounter and that has been repeatedly verified on all continents.

Policies should reinforce local incentives. Zimbabwe's Matobo National Park was threatened by incursion of pastoralists along its borders. Overgrazing of their lands had reduced the amount of grass available for grazing and roof-thatch. Within the park grass was thick and healthy. The park modified its policies to allow harvest within its boundaries of thatch, which resulted in annual income to pastoralists of 20,000 to 60,000 U.S. dollars. Poaching, trespassing of cattle, and wildfires have decreased significantly.

National policies must accommodate structural and infrastructural changes in rural communities. People cannot simply think their way to improved livelihoods. They must be empowered to control their use of natural resources. Empowered communities are more likely to invest labor and capital in sustainable management. Local empowerment also enhances sustainability of resource management through tumultuous changes of government, which are common in Africa. The Central Selva Project of Peru has maintained many of its activities through use of local labor and capital despite the interruption of government support that resulted from Peru's economic recession and the revolutionary activities in the countryside.

Public policies in support of research, development, and extension at national and local levels strengthen grassroots development. Rural people are limited in their capacity to innovate. In the Mali Village Reforestation Project removal of the policing role of forestry agents increased villagers' receptivity to extension services. In Mali, field extension and training, mobilization of local organizations, national publicity campaigns, and direct political mobilization have dramatically increased use of more efficient earthen woodstoves.

#### Adaptation of Management Systems

Natural resource management systems must be adapted to their physical, biological, and socio-economic environments.

Traditional systems are typically well adapted to traditional situations. Natural resource degradation often results from the adaptive response of traditional peoples and communities to outside influences such as external markets or medical interventions that lead to increased population growth. The goal of development programs should be to create conditions that foster adaptive responses that are environmentally sustainable.

Development programs should be based upon thorough understanding of the physical, biological, and socio-economic environment of the target populace. Rural people are important sources of

information. Traditional wisdom is passed through generations and farmers are often experimental. The USAID sponsored NRMS project in Mali, Niger, Senegal, and Gambia found that experimental farmers are not only innovative, but serve as role models when neighbors see their success. Angel Togo, of Mali's Fifth Region, has become famous in development circles for his innovative practices, but more important, is his effect on his neighbors.

### Increases in Productivity

Increases in productivity are usually prerequisite to sustained natural resource management. But productivity is not an exclusive goal. Tradeoffs with other properties of natural resource management systems are components of decisions about resource management. Farmers frequently are keenly interested in risk reduction and often productivity is sacrificed to increase stability and reduce risk. Polyculture, which is common in Africa, reduces risk through diversity of crops, even though a monoculture may be more productive if favorable conditions prevail. Tradeoffs between short-term and long-term productivity may be required to prevent over-exploitation of natural resources. The need for tradeoffs should be explicit in development programs. The dependence of informed decision making upon communication among development partners was recognized at the Segou Encounter and in the Cairo Action Plan.

### Flexibility in Development Programs

Flexibility within development programs is a requisite for learning and readjusting activities. Sustainability is a goal, a philosophy, and a process. There are no prescriptives for its attainment. There are perhaps different solutions to every set of socio-economic and environmental conditions. Long-term commitment, willingness to learn from our mistakes and try new approaches, and the flexibility to adapt goals as new opportunities arise are important contributors to success. The report of USAID's Sahel Sub-Regional Natural Resource Assessment concluded that the highly successful projects at the Guesselbodi National Forest and the Magia Valley Windbreaks in Niger would have been judged failures, if evaluated within the first several years of the projects.

### Research and Development

Continued research and development is required to feed the growing populations of Africa, to recognize attainment of sustainable natural resource management, and to replicate successes. The African population will double within the next twenty five years and place additional stress on an already distressed environment. The components and requirements of

sustainable natural resource use are still more art than science. Research is necessary to understand principles and to apply them across the environment.

## **OPPORTUNITIES**

### **Introduction**

There are opportunities and obligations for individual African governments and for organizations of African governments to enhance environmental protection and sustainable development. The suggestions discussed below are certainly not exhaustive, but are illustrative of actions that might be taken in the near future. The resources of African nations are currently stretched thin and their international development partners need to continue support through the near future.

### **Information**

The paucity of information on the African environment severely hampers the assessment of extent and location of environmental degradation, development of adapted natural resource management practices, and measures of progress or further degradation. There is no substitute for such information, but it needs to be gathered efficiently at the proper scale and stored in readily retrievable forms. The AMCEN Committees and Networks are appropriate responses to these needs, but require strengthening and maintenance. The World Bank's Environmental Action Plans, USAID's Natural Resource Management Plans, GRID in Nairobi, and

IUCN are sources of available guidance and information. Donor coordination is essential to attain efficiency and assure complementarity.

### Institutions

There is a need for greater and broader indigenous capability in data collection. Traditional disciplinary scientists frequently bring their preconceptions and biases to identification of data needs. For example, plant breeders inevitably seek solutions in plant breeding. Rapid, simple, and cost effective systems approaches such as Rapid Rural Appraisal and Agro-Ecosystem Analyses are useful to identify pertinent data needs without bias. An independent or cross sectoral institution would facilitate use of these methodologies in all sectors. Similar approaches were used by the governments of Indonesia and Thailand. The International Institute for Environment and Development (IIED) in London has preeminent expertise in this field.

The WCED report recommends that each sectoral ministry or department have responsibility for the environmental sustainability of its programs. Independent environmental departments are typically excluded from planning processes and have insufficient stature to be influential.

The development of human resources is the most enduring assistance that the international development community can provide. African governments and their partners in the development community should be encouraged to develop and retain the necessary technical expertise. Extension capacity, especially for successful indigenous technologies, is critically necessary.

### Policy

The goal of sustainable natural resource management should be reiterated frequently by AMCEN, national governments, and international organizations. Pressures to produce short-term results are a continual threat to this long-term and critical goal.

African nations should reevaluate goals of food self-sufficiency. Productivity of the marginal resources in some countries may be inadequate to support the populations that are likely to result from current growth rates. Food security may be a more appropriate goal. Analyses by the International Food Policy Research Institute (IFPRI) indicate that the collective SADCC countries can be self-sufficient in maize, the staple food of the region, even though some individual countries are unlikely to reach self-sufficiency. Internal production and development policies and regional trade policies may need revision.

Energy policy might be directed towards efficiency in households and industry and towards alternative technologies. Biogas production and the rapid advances in solar technologies have promise.

National accounting systems typically treat natural resource exploitation as current income with no depreciation of the capital stock that they represent. Management of natural resources at macro-economic scales would likely improve, if the U.N., multilateral lending institutions, and individual nations modified national income accounting to treat natural resources as productive assets. Robert Repetto of the World Resources Institute has recently published a definitive text on the subject.

### Collaboration

The global community has a vested interest in the improvement of livelihoods and the environment of African people. Senator Albert Gore of the United States recently in an editorial of the Washington Post identified environmental security as a requisite for peace and national security. Private interest groups and governments throughout the world are concerned about potential climate change and loss of biological diversity. These groups and governments might be considered by African governments as

additional resources. The root causes of the global issues of climate change and loss of biological diversity are exactly the same as the local issues of secure livelihoods and environmental protection. New partnerships based upon the mutuality of concerns could generate additional resources for addressing African environmental problems.

South-south relationships can be strengthened. South America has addressed similar problems and has useful experience. Brazil's Cerrado Research Center (CPAC) at Planaltina has preeminent expertise in management of soils of acid savannas such as those of Angola, Zaire, Zambia, and Western Tanzania. Khon Khen University of Thailand has world renown in application of Agroecosystem Analysis.

Nongovernmental organizations (NGOs) have proven extremely effective at modest cost in local extension and training. While NGOs have limited capabilities, they might be useful in the short-term while African nations develop further extension and training capabilities. AMCEN might develop stronger links with NGO networks.

## A Unified and Loud Voice

African nations and OAU could attract global attention, engender internal and external support, and precipitate action by making a symbolic and unified commitment to resolve a significant and visible environmental problem. Nothing symbolizes Africa and the challenges it faces better than the elephant. They are both large and appealing. The survival of each is threatened by degradation of the environment and the desperate acts of rural people.

The elephant is also an indicator - an indicator of environmental health. If the African elephant survives through the turn of the century, it will be indicative of Africa's successful execution of sustainable natural resource management. If the elephant goes to extinction, it will undoubtedly indicate severe degradation of the African landscape and thus failure of the continent to meet one of the first and most obvious of the Pan-African environmental challenges.

The President of the Organization for African Unity is encouraged to urge OAU to adopt the African elephant as the symbol of African unity and to ask that all African nations strive for its survival as the very survival of the continent hinges upon resolution of similar issues. He is further encouraged to urge all African nations to become signatories to C.I.T.E.S. which

regulates international trade in endangered species. A recent statement of the Groupe d'Etude du Commerce de l'Ivoire reports on the elephants' fate and is appended to this report.