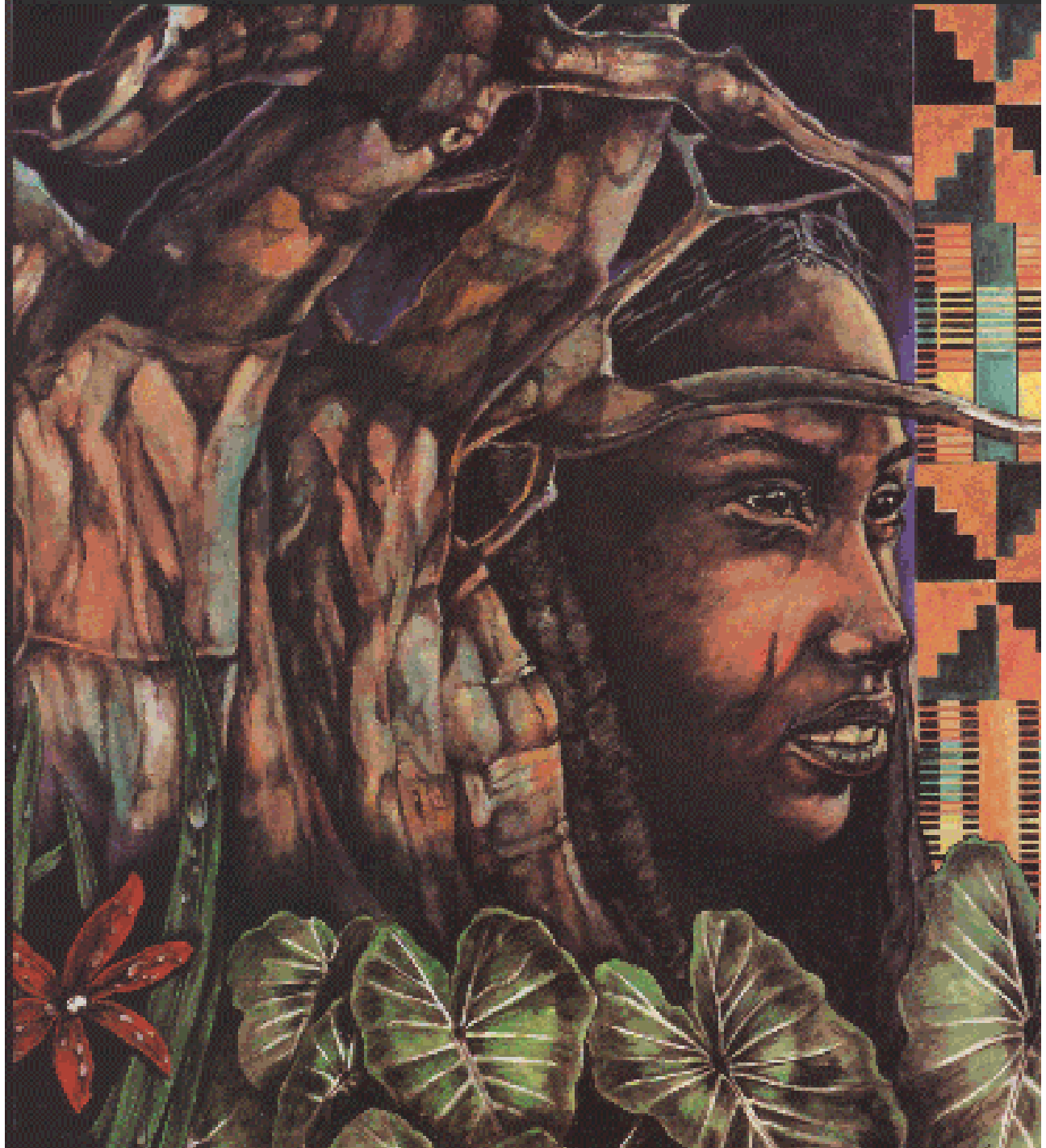


African Biodiversity: Foundation for the Future

Biodiversity Support Program



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*A Framework for Integrating Biodiversity
Conservation and Sustainable Development*

Biodiversity Support Program

**A USAID-funded Consortium of World Wildlife Fund,
The Nature Conservancy, and World Resources Institute**



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African Biodiversity: Foundation for the Future
A Framework for Integrating Biodiversity Conservation and Sustainable Development.

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*See Biographical Summaries

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PREFACE

African Biodiversity: Foundation for the Future. A Framework for Integrating Biodiversity Conservation and Sustainable Development is the principal product of the first phase of the Biodiversity Analysis for Africa (BAA) Project, implemented by the Biodiversity Support Program (BSP)¹ and funded by the Africa Bureau of the United States Agency for International Development (USAID). The goal of the BAA Project is to help improve efforts in Africa to conserve biological diversity while promoting human prosperity through an analysis of biodiversity conservation approaches currently in use or being tested in Africa.

The analysis is intended to help USAID's Africa Bureau and missions in Africa, African governments, and both international and African nongovernmental organizations (NGOs) shape organizational strategies and programs that are more effective in conserving biological diversity while promoting sustainable development. This will be achieved by providing implementors with current information on the lessons learned from on-going efforts in the field.

The first stage of the project was to develop the strategic framework of critical issues in African biodiversity conservation described in this report. This framework is intended to help guide on-going USAID and other efforts in the field as well as shape the BAA analysis. In order to develop an analytical framework that would be most successful in meeting these objectives, it was evident that the definition and prioritization of the critical issues for the conservation of biodiversity in Africa should emanate directly from the point of view of Africans themselves.

To learn of the African perspective on biodiversity conservation, BSP established the African Biodiversity Advisory Group. The women and men of the Advisory Group were selected to represent diverse regions (east, southern, central, and west Africa), disciplines (both the natural and social sciences), institutions (governments, NGOs, academia), gender, and biomes (forest, marine, savanna, arid). We sought the most balanced and realistic view of conservation possible in a small group. While most of the members are African, one is American, providing the perspective of a Western conservationist with many years of experience in implementing NGO and donor-funded conservation activities in Africa.

The Advisory Group identified, discussed, and prioritized the critical biodiversity conservation issues included in this report. Based on their guidance, a team of BSP staff and consultants wrote the majority of the report. The Advisory Group reviewed drafts and wrote individual analytical reports that are included, in part, in this document. (These individual reports will be published in a separate volume.) The hard work, patience and wise counsel of the members of the Advisory Group were invaluable in the development of this report.

The success of the Advisory Group has generated a great deal of interest from USAID and other donors, in part because past biodiversity conservation strategies in Africa have often been developed

¹The Biodiversity Support Program is a consortium of World Wildlife Fund, World Resources Institute

and The Nature Conservancy, funded by the United States Agency for International Development. with limited African input. The Advisory Group was in a unique position to articulate new ideas, some of which challenge conventional wisdom, and to identify issues that are priorities for Africans. This process of collaborative action between U.S. and African individuals and organizations was an educational and rewarding experience for everyone involved.

EXECUTIVE SUMMARY

As the worldwide loss of biodiversity has accelerated in recent decades, awareness has grown of the potentially disastrous consequences of this trend for the earth's ecological functions and the fulfillment of basic human development needs. This trend is especially important in sub-Saharan Africa where people depend on biological resources to a far greater extent than most other parts of the world. Throughout the continent, biological resources are fundamental to human well-being: agriculture, livestock, logging, and fisheries, for example, account for most subsistence survival, employment, export earnings, and economic output in much of sub-Saharan Africa.

Africa's enormous dependence on biological resources brings with it a particular vulnerability. In the event of declining productivity due to environmental degradation, few alternative development paths are readily available and financial resources for carrying out environmental restoration are limited. The ecosystems that provide critical biological resources are diverse at many levels including genetic variability, species richness, and overall ecosystem characteristics. Important ecological functions may depend to differing degrees on this biodiversity. Environmental degradation that leads to the destruction of these ecosystems must therefore be viewed as a serious threat to Africa's future.

Africa's ecosystems are coming under increasing pressure, and it is evident that ways must be found to raise production and incomes and, at the same time, learn how to better manage the biological resource base. Africa is, and will continue to be, dependent on its biological resources for food, shelter, and income. The maintenance of healthy, productive, and diverse ecosystems will allow Africa to meet the challenges of the next decades.

In Africa, about two-thirds of the land that could support habitats for wild plants and animals is now used for other purposes (MacKinnon and MacKinnon 1986). Nevertheless, Africa still contains a wealth of biodiversity. Whereas in certain parts of the world it may be too late to stem the loss of much of the biodiversity that formerly existed, in most of Africa the opportunity still exists for proactive intervention. To the extent that biodiversity represents an important international as well as national and local resource, Africa's competitive advantage is enhanced not only by the fact that its environment is among the world's richest biologically but also by the fact that it has not yet sacrificed its endowment of these resources.

Efforts to Conserve Biodiversity in Africa

In the past, conservation efforts in Africa have tended to emphasize the international, scientific values of biological diversity and focus on areas of high species richness and endemism (places where there are species and varieties that are found nowhere else). These values have largely dictated what, where, and how conservation efforts have taken place in Africa. However, given sub-Saharan Africa's overwhelming dependence on biological resources, new, aggressive strategies for biodiversity conservation that incorporate local and national values are urgently needed.

Defining Biodiversity, Biological Resources, and Conservation

Biological diversity, or biodiversity, is a concept that is used to describe the variety of life forms. Biodiversity can be measured in terms of: biomes (e.g. tropical moist forest or coastal wetland); ecosystems (a portion of the biome in which the living organisms seem to be self-sustaining); species; and genetic varieties (McNeely *et al.* 1990; Salwasser 1990; USAID 1988).

Another widely used definition of biodiversity is "*the variety and variability among living organisms and the ecological complexes in which they occur*" (OTA 1987). The ecological complexes are the intricate and interdependent relationships that often occur among coexisting organisms, including the ecosystem processes that are more than just the collection of its parts.

Biological Resources include genetic resources, organisms or parts thereof, populations, or any other biotic component of ecosystems with actual or potential use or value for humanity. (United Nations Convention on Biodiversity 1992) These biological resources represent an indispensable resource endowment: the food that is eaten, the fuel with which the food is cooked, and the products that sustain livelihoods and generate wealth.

Conservation is defined as the management of human use of the biosphere so that it may yield the greatest sustainable benefit present generations while maintaining its potential to meet needs and aspirations of future generations. Thus, conservation embraces preservation, maintenance, sustainable utilization and restoration, and enhancement of the natural environment (IUCN, UNEP, WWF 1980).

Both biological diversity and biological resources need to be conserved. The conservation of biological resources depends on the continued health and productivity of local ecosystems. The African ecosystems that provide biological products are diverse systems in terms of genetic variability, species richness, and ecosystem characteristics. The diversity of these systems is an important factor in their stability and productivity. In general, more complex and diversified systems exhibit greater resilience and less vulnerability to environmental stresses than do less complex systems. In the words of biologist E.O. Wilson, "An ecosystem kept productive by multiple species is an ecosystem less likely to fail" (Wilson 1992). Thus it is not enough to simply protect selected, highly valued biological resources. In order to maintain these desirable products, the genetic, species, and ecosystem diversity of Africa's biological systems must be conserved.

Conservation of biological resources in specially selected sites in Africa began many years ago, and arose from several motivations: the desire of colonial authorities to preserve game populations for (white) hunters, misunderstanding of traditional African patterns of hunting and resource use, and concerns about deforestation and other environmental problems such as drought, tsetse fly, and rinderpest. The alienation of land for national parks, forest reserves, and hunting reserves was part of a larger pattern of colonial restructuring of African land-use traditions. Over time, as the conservation ethic grew in the North, concerns to set aside land for protection of endangered species and habitats were also transferred to Africa.

There are multiple studies that have been influential in the establishment of priorities for biodiversity conservation projects; however in almost all of them, African knowledge and value systems have been consistently marginalized by "Northern" values (see glossary for definition). The priorities are based only on scientific information that often has little or no relation to the indigenous knowledge base, which has led to an emphasis on national parks and other protected areas. As a result, local people remain marginalized in conservation efforts across the continent. For Africans, the creation of national parks has often meant that rural people are excluded from traditional grazing and farm lands, in the interest of protecting wildlife and natural habitats. Thus, efforts to protect the natural environment in Africa have often sacrificed the interests of Africans for foreign interests.

New strategies for conserving biodiversity in Africa are urgently needed that:

- 1) respect and incorporate African values, knowledge systems and priorities;
- 2) involve local people in the management and use of biological resources;
- 3) can control or reverse the loss of biodiversity in every country in the region; and
- 4) treat biodiversity conservation and economic development as integral aspects of the same process of sustainable development.

Incorporating African Values, Priorities, and Knowledge Systems

Many past biodiversity conservation strategies and approaches have failed to effectively address African values, priorities, and practices. International values, as opposed to national and local values, have tended to dominate biodiversity conservation efforts. Africa's dependence on biological resources for economic and cultural purposes has not been given appropriate recognition. In many traditional African societies, natural resource use tended to cause little damage to biodiversity, in part because of low population density. In addition, these societies fostered belief systems as well as social norms that encouraged or even enforced limits to exploitation. Such production methods, and the values that underlie and reinforce them, were well adapted to local conditions in the past, but in some cases at least, they are now becoming obsolete and perhaps counterproductive. How to best retain the best attributes of traditional societies under conditions of rapid modernization and urbanization must be considered one of the most pressing issues for African nations.

Involving Local People

Human activity is often associated with environmental degradation, and with the loss of biodiversity. Rural African people throughout most cultures and societies have traditionally been practitioners of complex environmental processes designed to conserve, and in some instances nurture their environment. Northern conservation efforts were introduced during the colonial period, when specially-selected sites were set aside and most human exploitation within them

was prohibited. Rather than being an integral component of the existing social system, these national parks and reserves were imposed from outside. Given the historical antecedents of today's protected area system in sub-Saharan Africa, it is perhaps not surprising that the attitudes of local people living near national parks and reserves often reflect suspicion and mistrust of conservation policies. This legacy is one of the reasons that new approaches toward people-oriented conservation have been introduced in recent years, and must be fostered in the future.

Conserving Biodiversity in Each African Nation

Many current biodiversity conservation strategies focus on countries that have large numbers of endemic species. Understanding that the loss of biodiversity ultimately affects all people - Africans and non-Africans alike - leads to the conclusion that it is important to conserve biodiversity in *all* African countries, not just in those with the greatest number or uniqueness of species. Most African nations now are aware of the value of biodiversity conservation, and want to pursue programs that will ensure the long-term conservation of natural resources as a means of ensuring sustainable development. An important element of the approach articulated in this report is that every nation should strive to better manage its biological resources for the long-term welfare of its own citizens as much as for global benefit.

Linking Biodiversity Conservation and Sustainable Development

Economic development in sub-Saharan Africa is unsustainable largely because biological resources are being mismanaged and cannot be sustained at their present rates of use. The transition to sustainable economic growth requires a broad-based change in thinking about Africa's natural resource base and in the ways that decisions about investment and exploitation are made.

There is a new awareness among international donors and African governments that sustainable development and biodiversity conservation are intricately linked (IUCN 1991). Human use of biological resources is fundamental to development in Africa. Biodiversity conservation must therefore be relevant to the needs of Africans, and people must be part of the decision-making process.

The loss of biodiversity in Africa may have less to do with the amount of land under protection than with the forms of land use taking place on the rest of the landscape. Through the introduction of better land-use planning and more appropriate matching of production technologies to local ecological constraints, it might be possible to stabilize and perhaps even reverse the trend toward environmental degradation. Strategic natural resource and land-use planning at the national level as well as the provincial and local levels is needed to ensure that Africa's unique biological heritage is not needlessly sacrificed to the inadvertent effects of poorly managed economic development policies.

Poverty is one of the prime forces eroding biodiversity in Africa. Development can be a potent force in conservation, provided that economic growth improves the well-being of all members of society. As agriculture and land use management practices change, the availability and uses of

wild resources change, having profound implications for the food and economic security of marginal populations, as well as for biodiversity. An important part of the enabling environment for the conservation of biodiversity, therefore, is meaningful progress toward the reduction of poverty in Africa. Thus, combining conservation efforts with initiatives for sustainable development is one of the key recommendations of this report.

An Action Program

This report outlines an "Action Program" to assist decision-makers in their efforts to conserve Africa's biodiversity while promoting sustainable development. Details would vary between and within countries, depending on ecological and human conditions, but the guiding principles and recommendations outlined here are intended to provide a starting point for implementation of a strategic framework for conserving biodiversity and sustaining development in sub-Saharan Africa.

This report identifies numerous recommendations for action to slow the loss of biodiversity in Africa and to make development more sustainable. These recommendations, and a sample of specific action items illustrating in more detail how these measures can be put into effect, are discussed in Chapter 2.

Six recommendations merit particular emphasis because of their fundamental role in laying the groundwork for other measures to conserve biodiversity in sub-Saharan Africa. While these six actions are not necessarily prerequisites to the other recommendations in terms of timing or phasing of activities, these actions would considerably enhance their implementation. In this sense, they should be considered priorities for implementing this report's framework for conservation.

1. In each African country, establish a strategic natural resource and land-use planning system that incorporates biodiversity issues.
2. Decentralize power to manage biological resources thereby enabling local communities to use resources sustainably, supported by local government.
3. Create a policy environment conducive to land-use systems that conserve biodiversity.
4. Develop participatory management systems for formal protected areas as well as for production systems on non-protected lands.
5. Combine the best of indigenous and modern knowledge systems to develop a deeper understanding of the full range of biodiversity conservation concerns.
6. Incorporate into biodiversity-related projects effective research, monitoring, and evaluation components which measure progress in terms of conservation and community well-being.

Critical Issues

The African Biodiversity Advisory Group identified seven major issues that need to be addressed

in order to conserve biodiversity in Africa. These issues briefly summarized below, are discussed in detail in Chapters 3 through 9 of this report.

1. Values in Biodiversity Conservation

People value biological resources in different ways: spiritually, economically, aesthetically, culturally, and scientifically. Biodiversity values also differ at the international, national, and local levels. Conservation of biodiversity is directly relevant to local residents, for whom biological resources often represent their primary source of livelihood, medicine, and spiritual values. Nation-states may also express values related to biological resources, often in relation to economic benefits brought about through biological resource use, both consumptive (timber harvesting, hunting) and nonconsumptive (tourism). Biodiversity conservation has become an international issue as well, based on a global concern for maintaining the existing species richness on earth, expressed in terms of the common heritage of humans. (Johnson, in prep.)

These different values can be difficult to reconcile. It is important to be able to clarify different values that underlie positions taken on various sides of a given issue relevant to biodiversity and to understand how values can affect willingness to adopt different patterns of resource use or to reach compromises.

Many traditional societies fostered belief systems as well as social norms which encouraged or even enforced limits to exploitation of biological resources. Economic change, population growth, and other factors, however, have brought far-reaching shifts in traditional patterns.

There is a need to assess the ways in which cultural practices and value systems have fostered conservation in specific settings and to investigate how such cases can be encouraged, strengthened, and replicated. Value systems compatible with sustainable development cannot be prescribed, but must emerge through local participation, and with respect for traditional beliefs and practices that have effectively conserved biodiversity for centuries. African perspectives on the need to utilize as well as conserve existing resources need to be incorporated in any new biodiversity conservation initiatives.

2. Indigenous Knowledge

Lack of recognition, understanding, and use of Africa's indigenous knowledge, technology and practices have contributed to environmental degradation and to biodiversity loss. The knowledge and skills developed by Africans in many millennia of adaptation to, and manipulation of, their land, flora and fauna constitute an invaluable and largely untapped resource. The use of the African knowledge base together with input from Northern biological science is required in order to realize the goal of sustainability in biodiversity and development programs.

Many aspects of biodiversity and its conservation may be found embedded in Africa's indigenous taxonomies, food production practices, and religions. Attention to species diversity is reflected in highly detailed classification of plant and animal species. Concern for maintaining and developing cultivar and herdstock diversity is well documented for numerous populations. Finally, concepts affirming an ecological balance or interdependency between human, plant, and

animal life can be identified in many indigenous religions. Indigenous knowledge has been available for some time, but until recently, much of this information has been largely ignored in conservation work.

3. Biodiversity Conservation Systems

Valuable ecosystems are found in all African countries. Each country should therefore formulate and adopt a national strategy for conserving its natural resources. National parks and many other kinds of protected areas serve a vital function in conserving biodiversity. With the vast majority of biodiversity on land and water outside protected areas, however, it is necessary for biodiversity conservation efforts to extend beyond national parks and protected areas. Improved land-use planning at all levels, the national, provincial, and local, is recommended as an important action for more effectively conserving biodiversity.

People need to use natural resources, so innovative ways of conserving biodiversity through sustainable use and other alternatives must be explored for areas that lie outside of strict nature preserves. Biodiversity conservation in Africa should involve longer-term, more comprehensive, proactive measures, rather than fragmented responses to the loss of species and habitats. In addition, there should be a change in focus from conserving primarily conspicuous animals and plants to a recognition of the need to conserve all kinds and sizes of living organisms, as well as the ecosystems within which they have evolved.

To control the rate of biodiversity loss and to increase production, foreign conservation technologies must be adapted to the African context to complement traditional technologies. Neither traditional production methods nor modern production methods alone can do the job (see Glossary for definition of "modern"). New combinations of traditional and modern methods can be sensitive to biodiversity conservation while providing adequate levels of sustainable production. This approach, however, can succeed only with local participation. Local people must have a voice in, and be part of, the process of developing and implementing such innovative systems. Local people, too, must be the principal beneficiaries.

4. Policies

An array of policies in many different sectors affects biodiversity in various ways, ranging from indirectly creating incentives to exploit natural resources in unsustainable ways to directly requiring improved management of biological resources. At present, few countries have adopted comprehensive policies on biodiversity. Although many countries have strong laws related to conservation within protected areas, these laws often are not enforced.

Land tenure and other legal issues related to land ownership and land use are important areas in which the national policy environment can contribute to destructive patterns of landscape change. The lack of appropriate land tenure and land-use planning in general, and land-use planning sensitive to biodiversity specifically, represents one of the most significant omissions within the policy environment in most African countries. Better land-use planning is needed, which can appropriately match various forms and levels of intensity of production with specific agro-ecological zones.

Land pressure, the need for foreign exchange, and high levels of poverty also pose major barriers to improving sustainability of resource use and conservation of biodiversity. Decision-makers may feel they have little choice but to acquiesce to activities that may prove to be detrimental to biodiversity. One challenge, therefore, will be to find ways of minimizing the adverse biodiversity impacts of such enterprises, without imposing an unrealistic burden on governments unable to provide alternative jobs or other means of gaining livelihoods.

Successes, failures, and lessons learned from recent policy reform efforts targeting biodiversity conservation are important research topics. The way in which new policies are implemented, not just formulated, however, will be a key factor in the success of policy reform programs.

5. Participation

Throughout the last two decades, the development community has moved away from "top-down" approaches towards more participatory, "bottom-up" approaches. In general, there has been a growing recognition that local cooperation, participation, and management are crucial to achieving both short-term and long-term objectives. Similarly, the conservation community is beginning to appreciate the necessity of incorporating local participation in biodiversity conservation efforts. Conservationists are now looking to the development experience for useful lessons in how to bring local people into the conservation process in Africa.

It appears that the future viability of protected areas in Africa hinges on the cooperation and support of local people. One of the main problems in engendering participation in conservation efforts is that local people often view conservation as antithetical to development (Gartlan 1992). Efforts to involve local people in the conservation of biodiversity in Africa will not succeed in the long-term unless local people perceive those efforts as serving their economic and cultural interests (Brown and Wyckoff-Baird 1992). It follows, therefore, that in order for communities to be effectively involved, they also must have a degree of control over the resources to be conserved.

Involving local people in the conservation of biodiversity is a complex, time-consuming task. Many donor organizations and project managers are under pressure to spend money quickly and do not commit the time necessary to assess community variables, initiate community dialogue, and encourage community involvement in every phase of a project. The need for patience may also conflict with feelings of urgency about the need to change or stop destructive patterns of degradation (Wells and Brandon 1992). In order to facilitate community participation at all these stages, existing community institutions must be strengthened or new ones established where necessary.

Experimentation with new, more participatory, models for conserving biodiversity is especially important in light of the need to conserve biodiversity throughout the African landscape. With Africa's new wave of democratic reforms on local and national levels, now more than ever, it may be possible to build institutions and devise policies that will enable the participation of people at all levels to engage in sustainable natural resource management and biodiversity conservation.

6. Education, Training, and Networking

Awareness and understanding of biodiversity conservation issues need to be improved throughout the populace, including national government officials and lender/donor agencies. Awareness-raising, training, and human-resource development are necessary steps to the implementation of strategies for conserving biodiversity.

It is not enough to educate future generations through the formal education system. Many Africans will receive no such education, yet deal with biological resources on a day-to-day basis. Widespread degradation of these resources is a pattern which many observe but are unable to halt without assistance. Non-formal education is one form of help required. Basic literacy is a means of empowerment, enabling people without formal education to better deal with bureaucracies that affect their lives. Environmental issues, including biodiversity conservation, could usefully be included in the material used in literacy campaigns. Properly trained and oriented extension services can include biodiversity conservation among their concerns.

National governments must address training needs and staff development. Technical staff in a wide variety of line ministries and departments should be made aware of how their work impinges upon biodiversity conservation and other environmental matters. Greater cross-sectoral understanding and co-ordination is vital to the broad strategies advocated in this report. In-service workshops, seminars and study tours are important conventional means of updating information. Field training should also be an integral component of staff development.

Within conventional conservation organizations (e.g., wildlife departments, national parks systems) substantial re-orientation and retraining is needed in two respects. First, attention should be paid to all taxa and all elements of the landscape rather than concentrating upon megafauna and protected areas. Second, community participation in protected area management and biodiversity conservation activities outside protected areas needs to become an integral concern of these organizations.

7. Monitoring, Evaluation, and Research

In much of sub-Saharan Africa, there is a serious lack of natural resource inventories and other baseline data that are of fundamental importance for monitoring biodiversity trends. Consequently, biodiversity conservation projects and development projects often are designed and implemented using inadequate information. The projects usually lack built-in provisions for monitoring changes in biodiversity and ecological relationships, as well as the economic and social well-being of local residents. Consequently, it is impossible to accurately assess the success of most projects and to provide adequate feedback for making corrections and refinements.

The purpose of monitoring is to recognize changes (direction, size, rate) when they occur, to assess the reasons for the changes, and to predict their consequences. Inventories provide information on existing levels and patterns of biodiversity. This basic information provides the foundation for project monitoring and evaluation, and a framework for management decisions. Baseline inventories of biological and ecological characteristics, human conditions, and other

factors allow later comparisons. Such trend information can be used to make refinements and course corrections in conservation projects. If carefully selected, indicators can help identify both positive and negative trends in conservation.

For project monitoring, precisely defined questions must be formulated, which will provide reliable answers in a timely manner. Monitoring of a project is a never-ending task; monitoring must be done as cost-effectively and simply as possible, so that it can continue indefinitely beyond the initial few years of a project. There is a role for modern "high-tech" approaches to monitoring, especially when huge areas are involved, but the most important and fundamental monitoring for biodiversity conservation and sustainable development is done by simply getting into the field, walking, looking, measuring, recording, talking, and collaborating with the local residents.

Local participation is a prerequisite for research, monitoring and evaluation, and must be encouraged and enhanced at the onset of a project. A long history and tradition of using biological resources has developed an inherent tendency among local people to monitor biological resources. Because of the closeness of most rural communities to nature, local people may be quick to detect changes anticipated in projects. Where necessary, local participation could be fostered through specialized training. It is likely that local residents can recognize: changes in effort required to harvest a product; changes in habitat boundaries; disappearance of a formerly common plant, animal, or fungal species; and arrival of alien invading species.

Guiding Principles

From the discussion of the seven critical issues in Part II of this report, eight important principles emerge that can be helpful in setting priorities and implementing biodiversity conservation initiatives in Africa.

- *Valuable ecosystems are found in all African countries.* These ecosystems are valuable not only in local or national terms but also, in many cases, in global terms. A framework for the conservation of biodiversity must take into account the multiplicity of ecosystems that exist in sub-Saharan Africa. Different approaches are necessary in different situations.
- *Local traditions, knowledge systems, institutions, and environmental conditions are important factors in biodiversity conservation.* The task of modifying or limiting activities destructive of biodiversity is simplified if efforts are made to reinforce, encourage, and further develop local practices or traditions that are already consistent with biodiversity conservation.
- *All biological resource users should be treated equitably.* Subgroups within a community, or different communities, often have different perspectives on the use and conservation of the same set of biological resources. Women and the poor, in particular, have often been ignored or disadvantaged by development activities, to the detriment of biodiversity conservation.
- *Broadly based participation is essential.* Local people must be involved at every step from planning to implementation to evaluation and redesign. Initially, governments and other

funding agencies may need to suggest new integrated projects. In time, local communities and the private sector are likely to want to initiate similar projects but will need technical and financial assistance to do so. Projects should be carried out with local communities, rather than for them.

- *Biodiversity conservation must be understood in terms of the whole system.* Even small decisions should be made with regard to the broader (national or ecosystem) perspective. utilitarian focus on preserving endemism and genetic resources needs to be modified, with increasing emphasis placed on conserving ecological systems as a whole.
- *It is important to accept that people will continue using resources.* It is the kind and intensity of resource uses that are important. Many conventional conservation efforts have advocated protection without human use; conversely, modern agricultural systems have emphasized production without conservation. The move now must be toward programs and projects that meet human needs in ways less destructive to the environment. Production systems that are sensitive to biodiversity are more likely to be sustainable in the long term.
- *A range of biodiversity conservation systems should be supported and replicated wherever possible.* Every African country has its own set of biodiversity resources. The full range of biomes in a country must be considered, and within each biome there may be several major types of ecosystems. Innovative new complexes of production activities should aim at protecting representatives of each ecosystem type. Replication is necessary, because of the unpredictable resource losses from natural disaster, wars and civil strife.
- *Appropriate incentives are needed to encourage all participants to become involved with conservation.* Direct economic incentives include provision of tax breaks for communities or businesses involved in biodiversity conservation. Secure land and resource tenure can stimulate investment (of both human energy and financial resources) in conservation of natural resources. Government officials should have incentives for effective work in rural areas. A local community voice in biological resources governance can, of itself, be an incentive to sustainable management. Also, disincentives should be applied to actions destructive of biodiversity.