

Biodiversity Conservation:

A Guide for USAID Staff and Partners



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United States Agency for International Development
Office of Environment and Natural Resources
Bureau of Economic Growth, Agriculture, and Trade

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PREFACE

The biosphere, the thin film of life that envelops our planet, constitutes both the context and totality of all known life in the universe. The ever-evolving product of hundreds of millions of years of evolution, the biosphere is an almost incomprehensibly complex phenomenon in which all species—including humans—play interactive and interdependent roles. The health of the biosphere is critical to human existence and, increasingly, is dependent on the responsible behavior of the human species. Unfortunately, we have not been behaving very well. The current acceleration in the extinction rate of species is largely the result of human numbers and environmental misbehavior. Given the need to modify this behavior, out of self-interest and out of our respect for the integrity of the biosphere, the concept of biodiversity conservation has emerged and become recognized as integral to responsible, or sustainable, development. Biodiversity conservation is now a crucial component of the U.S. Agency for International Development’s (USAID) programmatic agenda. Biodiversity conservation is important for USAID staff in all sectors. It is important for us to “do” biodiversity conservation well and to link it with other facets of development.

The Guide is intended to help USAID staff understand how to achieve biodiversity conservation and how it relates to the Agency’s development agenda. It should also help USAID staff adopt a common vocabulary to talk about the environment and biodiversity. Growing out of the work of many creative and dedicated people, it incorporates lessons learned by USAID and its partners, over the last 20 years. Through the presentation of these lessons in an accessible format, I hope the Guide will help USAID improve the effectiveness of its future biodiversity conservation programs.

The Guide would not exist were it not for the efforts of several talented and committed people who have pulled together a vast amount of information and put it into the USAID context. Teri Allendorf and Bruce Byers were the primary authors of the Guide. Many others drafted sections of the Guide or otherwise helped in its development. In particular, thanks go to Connie Campbell, Steve Dennison, Cynthia Gill, Gary Harrison, Ramzy Kanaan, Robin Martino, Mary Rowen, Tracy Simmons, and Allen Turner. Others, including Carl Gallegos, Doug Mason, Mary Melnyk, Dan Moore, Lori Pommerenke, and Scott Smith, gave valuable input into drafts of the Guide. There are many others, too numerous to list, who contributed ideas to different sections of the Guide. Thanks also to USAID’s partners, particularly the conservation nongovernmental organizations, who have contributed significantly to our thinking and approach to biodiversity conservation and to shaping the information in the Guide.

Finally, I would especially like to acknowledge the Biodiversity Support Program (BSP), a USAID-funded partnership of the U.S. World Wildlife Fund, The Nature Conservancy, and the

World Resources Institute. BSP's field and analytical work over 13 years laid the foundation for much of the information found in the Guide.

Bill Sugrue

Director, Office of Environment and Natural Resources

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ABOUT THIS GUIDE

Goal

The goal of this Guide is to provide USAID staff with basic information about designing, managing, and implementing biodiversity conservation programs or activities. What do you need to know, as a USAID manager, to design, implement, manage, and evaluate a biodiversity conservation program or activity? What are the critical elements of success for biodiversity programs and activities?

This Guide is also intended to provide useful information about USAID's approach to biodiversity for our partners and colleagues.

Audiences

For USAID staff, the Guide is designed to be useful for program managers who have a strong background in biodiversity conservation in addition to those who may have little or no experience with conservation activities.

For partners who collaborate with USAID on biodiversity conservation projects as well as on cross-sectoral activities (e.g. biodiversity and human health or governance issues), we hope this Guide proves helpful in better understanding USAID's philosophical and programming approaches in our biodiversity funding.

For our colleagues in the donor community, we hope that this Guide is useful in understanding the history, approach, and operating mechanisms for biodiversity funding of one of the largest bilateral donors of biodiversity conservation.



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INTRODUCTION

Overview

USAID and Biodiversity Conservation

OVERVIEW OF BIODIVERSITY

What is Biodiversity?

Biological diversity, or *biodiversity*, is the variety and variability of life. The best way to think of biodiversity is as a system consisting of many elements or aspects: genes, species, ecosystems, and ecological processes that both support and result from this diversity. All of these elements of living systems interact with each other to produce the web of life on Earth—the biosphere—a whole much greater than the sum of its parts.

Species are fundamental units of life. Examples include the eastern bluebird of the United States, the tiger of India, and the Komodo dragon of Indonesia. Some species play a larger role in ecosystems than others; *keystone species* are those that have a dominant influence over the structure of ecosystems. African elephants are a good example, because through their feeding they control the balance of trees and grassland in many savanna ecosystems. Our own human species is now a keystone species in every ecosystem on Earth.

Species interact with each other in a variety of ecological relationships to form what biologists call *ecosystems*. Tropical rainforests, savannas, deserts, and coral reefs are examples.

The diversity of *ecological processes* is another aspect of biodiversity. The feeding relationships of species, in which some species eat other species, thereby allowing energy to flow through the food webs of ecosystems, are one such process. The pollination of plants by insects and the control of pest species by their predators are other examples. The cycling of nutrients that maintains soil fertility and the cycling of water through ecosystems are also ecological processes. These processes are created when species interact with each other and with the physical environment. Each species depends on these processes to survive and reproduce.

Genes are the smallest elements of biological diversity. They combine in unique patterns to form individuals and populations of each species. Genetic diversity within each species changes over generations, shaped by interactions with other species and the ecosystem.

Biodiversity is not a simple concept. As the brief description above indicates, it is complex and multifaceted.

Why is Biodiversity Valuable?

Biodiversity has many values, both material and non-material. Material values include both direct use and ecosystem services. *Direct uses* of biotic resources meet human needs for food, fuel, fiber, shelter, and medicine.

The importance and value of *ecosystem services* in providing our life-support system are increasingly recognized (see Table 1). Biodiversity can help buffer variations in weather and

climate. Forests can soak up, store, and slowly release water, for example, and protect watersheds and soil from erosion following the extreme winds and torrential rains of hurricanes.

Table I. Ecosystem Service Values of Biodiversity

What are nature’s life-support services worth? In one of the first efforts to calculate a global number, a team of researchers has put an average price tag of US \$33 trillion a year on these fundamental ecosystem services—nearly twice the value of the global gross national product of US \$18 trillion.

Ecosystem Services	Value (trillion US\$)
Soil formation	17.1
Recreation	3.0
Nutrient cycling	2.3
Water regulation and supply	2.3
Climate regulation (temperature and precipitation)	1.8
Habitat	1.4
Flood and storm protection	1.1
Food and raw materials production	0.8
Genetic resources	0.8
Atmospheric gas balance	0.7
Pollination	0.4
All other services	1.6
Total value of ecosystem services	33.3

Source: R. Costanza et al., The Value of the World’s Ecosystem Services and Natural Capital, *Nature*, Vol. 387, Table 2, p. 256, 1997. The US \$33 trillion calculation is a synthesis of results from more than 100 published studies using a variety of different valuation methods. In synthesizing these results, the team looked at the value of 17 categories of services in each of 16 types of ecosystems. They calculated an average dollar value per hectare for each type of service in each ecosystem, then multiplied that dollar value by the total area that each ecosystem type occupies on the globe.

Nonmaterial Values

Biodiversity also has many *nonmaterial values*—the spiritual, aesthetic, educational, recreational, historical, and scientific benefits that people derive from the natural world and its resources. The value that people place on conserving biodiversity for future generations is also a nonmaterial value.

The diversity of life constitutes a unique resource for us and future generations. Wild species are the gene bank used to maintain the vigor of many of our crops. The extinction of each additional species brings the irreversible loss of unique genetic codes, which could have contributed to the development of medicines, foods, and other valuable biotechnologies. When we overexploit living resources, we threaten our own survival and the well-being of future generations.

The Economic Value of Biodiversity

It is difficult, and controversial¹, to place monetary values on the benefits of biodiversity. Attempts to do so include:

Globally, fifteen percent of our energy is derived from burning plant materials. In developing countries, as much as 80% of energy needs may be met by wood fuels. In the United States, wild species contribute around 4.5 percent of GDP².

Billions of people still harvest wild or "bush" food around the world. Between a fifth and a half of all food consumed by the poor in the developing world is gathered rather than cultivated, while at global level we obtain 16 percent of our animal protein from sea fish caught in the wild³. Seventy-five percent of the world's staple crops rely on wild animal species for pollination⁴.

The World Health Organization (WHO) estimates that more than 60 percent of the world's population relies on traditional plant medicines for day-to-day primary health care⁵, and 3,000 plant species are used in birth control alone⁶.

However, biodiversity's role extends far beyond these direct uses. We may today only eat a small proportion of the 70,000 plants known to have edible parts, but most food crops constantly require an infusion of "wild" genes to maintain their resistance to ever-evolving pests. These raids on nature's "genetic library" enable increases in crop productivity of about 1 percent a year, worth in excess of a billion dollars⁷.

Globally, it has been estimated that the pharmaceuticals industry gains US\$32 billion in profits a year from products derived from traditional remedies⁸. Approximately 118 out of the top 150 prescription drugs sold in the United States are laboratory versions of chemicals found by "bioprospectors" in the wild – mostly synthesized from plants but also from fungi, bacteria and extracts from vertebrate animals such as snakes⁹. Aspirin, for instance, derives from an acid first taken from the bark of willow trees. The promising anti-cancer drug taxol was first extracted from the wild Pacific yew tree.

The State of Biodiversity

Nobody knows how many species there are in the world or how fast they are disappearing. Fewer than 2 million species have been cataloged and estimates of the total vary wildly, ranging from 7 million to as many as 80 million species¹⁰.

The United Nations Environment Program's Global Biodiversity Assessment estimates current extinction rates at 50 to 100 times "normal", and anticipates a tenfold or even 100-fold increase in this rate over the next quarter century. This rate could result in a loss of 2-25 percent of species worldwide¹¹.

We know that more than 31,000 plant and animal species are threatened with extinction. We may be losing as many as 27,000 species a year.

Mammals

- In the last 400 years, one mammal has gone extinct every 16 years. This is more than 50 times faster than the background extinction rate.
- Twenty four per cent of the world's mammal species are now facing a high risk of extinction. One hundred and eighty mammal species are critically endangered and 340 mammals species are endangered¹².
- Primates, with the exception of human beings, constitute the most endangered order of mammals; some 46 percent are known to be at risk.

Birds

- One in eight bird species, or 12% of the world's 9,500 species of birds - have a real risk of becoming extinct in the next 100 years. Another 600 to 900 species are close to being added to the threatened list.
- Scientists from Oxford University and the World Conservation Monitoring Centre estimate that half of the world's bird species listed as threatened in the IUCN Red Book will become extinct in the next 200-300 years¹³.
- One hundred and eighty two bird species are critically endangered and 321 bird species are endangered.

Reptiles, Amphibians, and Fish

- One in four reptiles so far assessed are listed as threatened.
- One in five amphibians so far assessed are listed as threatened.
- One in three or 30 per cent of fishes (mainly freshwater) so far assessed are listed as threatened.

Insects

- Between 100,000 and 500,000 species of insects are projected to become extinct in the next 300 years, a rate that equals losing 7-30 species per week¹⁴.

Higher Plants

- More than 8,750 (approximately 10%) of the world's 80,000 to 100,000 tree species known to science are threatened with extinction. This includes almost 1,000 species believed to be critically endangered, with some species known only from one or a handful of individuals. Fewer than a quarter of these threatened tree species currently benefit from conservation measures (such as situated in a national park)¹⁵.

Ecosystems

- The World Resources Institute estimates that from 1960 to 1990, one fifth of all natural tropical rain forest cover was lost.
- The World Resources Institute estimates that as much as 10% of the world's coral reefs - the aquatic equivalents of tropical rain forests - have been degraded beyond recovery, and an additional 30% are predicted to collapse over the next 10 - 20 years. The world's coastal

mangroves, a vital nursery ground for countless species, are also at risk; 50% of them have already been cleared¹⁶.

- More than half of the world's coral reefs are potentially threatened by human activities, with up to 80% at risk in the most populated areas¹⁷.
- If climate change is not stopped, coral bleaching is set to steadily increase in frequency and intensity all over the world until it occurs annually by 2030-2070. This would devastate coral reefs globally to such an extent that they would be eliminated from most areas of the world by 2100. Current estimates suggest reefs could take hundreds of years to recover¹⁸.

Threats to Biodiversity

The major threat to biodiversity is habitat loss, fragmentation and degradation, due to the need for land for farms, dwellings, industry, services, transport and leisure. Other threats include overexploitation of species for commercial gain, subsistence, and sport; the introduction of alien species; and pollution and climate change.

Of those species that are threatened, UNEP reports that habitat loss affects 44 percent of the bird species, 55 percent of the fishes, 68 percent of the reptiles, and 75 percent of the mammals. IUCN reports that habitat loss and degradation affects 89% of all threatened birds, 83% of mammals, and 91% of threatened plants assessed. In the last 500 years, human activity has forced 816 species to extinction (or extinction in the wild).

- Approximately half the land on Earth has been transformed for human use. Around 11% each for farming and forestry, 26% for pasture, and at least another 2-3% for housing, industry, services and transport¹⁹.
- The area used for growing crops has increased by almost six times since 1700, mainly at the expense of forest and woodland²⁰.
- Humans use more than half of the easily accessible freshwater. Humans have regulated the flow of around two thirds of all rivers on Earth, creating artificial lakes and altering the ecology of existing lakes and estuaries²¹.
- Through fossil-fuel burning and fertilizer application, humans have altered the natural cycles of carbon and nitrogen. The amount of nitrogen entering the cycle has more than doubled over the last century, and humans now contribute 50 percent more to the nitrogen cycle than all natural sources combined. The excess is leading to the impoverishment of forest soils and forest death, and at sea to the development of toxic algal blooms and expanding "dead" zones devoid of oxygen²².
- By burning fossil fuels in which carbon was locked up hundreds of millions of years ago, we have increased the carbon dioxide content of the atmosphere by 30 percent over pre-industrial levels. We have boosted methane content by 145 percent over natural levels²³.

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USAID AND BIODIVERSITY CONSERVATION

Why does USAID Support Biodiversity Conservation?

Biodiversity is the foundation for Earth's essential goods and services, providing material and nonmaterial values and benefits. Biodiversity conservation is important for sustainable development because biodiversity is the natural biological wealth that supports human life and well-being.

Biodiversity is being lost at an unprecedented rate. Human activities are driving many species to extinction and damaging or converting natural habitats around the world.

The United States recognizes that the extinction of plant and animal species is an irreparable loss with potentially serious environmental and economic consequences for developing and developed countries alike. The U.S., therefore, has taken a lead role in preventing biodiversity loss, and is currently one of the largest bilateral funders of biodiversity conservation around the world. The U.S. Foreign Assistance Act (FAA) mandates USAID address biodiversity concerns. The FAA Section 119 emphasizes the importance of biodiversity conservation and instructs USAID and other appropriate international organizations to give high priority to preventing biodiversity loss. [Contact saggarwal@usaid.gov for a copy of "Biodiversity Conservation: A Report on USAID's Biodiversity Programs in Fiscal Year 2002."]

USAID supports the conservation of biodiversity because its loss bears directly on several U.S. national interests:

- ***Peace and National Security:*** Conflicts over increasingly scarce, vital natural resources can generate severe social and ethnic stresses inside countries, stimulating subnational insurgencies, ethnic clashes, and mass migration. Many humanitarian crises and biodiversity loss share underlying causes.
- ***Economic Prosperity:*** A country's economy depends on a healthy environment. Sustainably managed natural resources are the foundation of a country's prosperity. For example, biodiversity is essential to agricultural productivity. Insects and other animals help plants reproduce, contribute to soil fertility, and regulate pest populations.
- ***Human Health:*** Intact ecosystems provide clean water and food, and contribute to the health of people. Degraded ecosystems contribute to increased prevalence and distribution of pathogens and disease vectors.

- **Democracy and Human Rights:** Improved governance and decentralization can be hampered by disputes over key natural resources, such as forest and water. Empowering local government and communities to manage natural resources is an opportunity to promote more effective democracies and just societies.

In August of 2002, the World Summit on Sustainable Development (WSSD) also placed high importance on these and other linkages. The Convention drew attention to the important contribution of biodiversity towards environmental services, human health, economic growth, and human security. It also recognized the role of poverty, poor governance, and political instability as significant limiting factors in achieving biodiversity conservation. Linkages such as these play an important role in many USAID programs, where ties between conservation and development programs are proving to be mutually beneficial.

USAID's Investment in Biodiversity Conservation

In 1987, the Agency invested five million dollars in biodiversity conservation; this figure grew to \$90 million by 1992. Throughout the 1990s the Agency invested between \$65 and \$90 million in biodiversity conservation. Congressional earmarks have maintained the level of investment at approximately \$100 million in the past two years.

USAID's Approach to Biodiversity Conservation

USAID is helping developing countries maintain biologically diverse habitats and environmental services while supporting sustainable development and economic growth. USAID's major emphasis in biodiversity conservation is to help countries maintain and manage the variety of species, genetic resources, and ecosystems in situ—in place, where they exist—in natural settings such as forests, grasslands, wetlands, and coastal habitats. In situ conservation can maintain not only individual species, but also functioning ecosystems and the valuable ecological services they provide.

USAID pioneered and now supports one of the most comprehensive biodiversity conservation programs of any bilateral donor. USAID's approach to conservation has evolved since the 1980s from programs that focused on protected area management to programs that conserve biodiversity across large landscapes using a variety of interventions. This approach recognizes that biodiversity cannot be conserved in isolated areas and that much biodiversity is not located in protected areas. This approach emphasizes that participation by local stakeholders in conservation programs is critical to their success.

USAID emphasizes developing appropriate activities to mitigate key threats to biodiversity in priority sites. Since the threats to conservation are wide-ranging, from local small-scale agri-

culture to industrial timber production, the toolkit for interventions is equally broad. Conservationists are as likely to be negotiating the adoption of best practices for mining and logging as strengthening local enforcement capacity and implementing of environmental education programs.

The approaches the Agency applies in its biodiversity conservation programs include:

- Community-based conservation,
- Protected area management,
- Sustainable use of natural resources,
- Economic incentives for conservation,
- Environmental education and communication, and
- Policy development and reform.

Conservationists have identified generally accepted geographic biodiversity priority areas, and the Agency contributes toward the conservation of these areas. In some countries, a mission may support the conservation of a site for national or local reasons, such as the conservation of a watershed for local economic use and clean water supply, in addition to supporting areas of global priority. The habitats conserved by Agency programs include:

- Forest ecosystems,
- Grassland ecosystems,
- Wetland habitat,
- Coastal and ocean habitats, and
- Desert ecosystems.

USAID's Strengths in Biodiversity Conservation

Linking biodiversity and development: One of USAID's strengths in biodiversity conservation is the Agency's development experience, which enables the Agency to link biodiversity to benefits for people. Conserving biodiversity is important for meeting people's livelihood needs. While biodiversity is a global resource, it is also a critical local resource, providing watershed protection, direct economic opportunities, and local cultural needs. USAID works with people and decision makers in community-managed lands, private lands and protected areas, employing a range of conservation approaches, such as community based natural resource management, enterprise-based conservation, and other natural resource management techniques.

Linking biodiversity with other sectors: Increasingly, USAID's conservation efforts are integrated with other sectors, linking biodiversity conservation and other development initiatives,

such as economic growth, agriculture, democracy and governance, population, and natural resource management. This integration is mutually beneficial. For example, a biodiversity program may build local capacity for community management of a forest and secure land tenure for the community. In this case, the program conserves biodiversity, promotes economic growth, and strengthens civil society.

Linking with partners: USAID's partnerships with other organizations working to conserve biodiversity are another strength of the Agency's portfolio. Programs are implemented through a variety of partners, including nongovernmental organizations (NGOs), government organizations and private organizations. Agency programs build in-country capacities of governments and local organizations, which are the foundation for long-term conservation efforts. One of the newest and most innovative ways that USAID works with partners is through the Global Development Alliance (http://www.usaid.gov/our_work/global_partnerships/gda/). The Global Development Alliance serves as a catalyst to mobilize ideas, efforts, and resources of the public sector, the private sector and NGOs in support of shared objectives. A development alliance is an agreement between two or more parties to jointly define a development problem and jointly contribute to its solution. Alliance members share resources, risks and rewards in pursuit of a development objective that is not likely to be achieved without the alliance. An alliance achieves its development objective by bringing new actors to the development challenge or significantly expands an alliance with existing partners, using new and innovative instruments or approaches, and leveraging significant resources.

USAID Capacity

USAID is a leader in international biodiversity conservation. The Agency has vast experience in conservation and development programs, and this experience is reflected in the programs implemented by the Agency. The Agency implements both tried-and-true conservation programs and cutting edge programs.

The majority of biodiversity conservation programs are implemented through the USAID missions. Many missions have long-term and successful programs in biodiversity conservation that conserve areas of global, national, and local priority.

The majority of biodiversity conservation programs are implemented through the USAID missions. Many missions have long-term and successful programs in biodiversity conservation that conserve areas of global, national, and local priority.

The USAID Biodiversity Working Group plays a key role in facilitating biodiversity programs across the agency. The group includes representatives from the regional bureaus and the pillar

Bureau for Economic Growth, Agriculture, and Trade (EGAT) who have a common interest in the conservation of biodiversity.

In order to promote the conservation of biodiversity, the USAID Biodiversity Team, located within the Environment Office of EGAT:

- Implements a portfolio of *in situ* conservation activities to test cutting edge approaches and support mission programs;
- Provides technical and programmatic support to missions; and
- Supports global initiatives to build USAID's role as a leader in biodiversity conservation internationally.

CONSERVATION PLANNING

Key Questions

Choosing Conservation Priorities and Targets

Selecting Scale and Sites

Identifying Threats and Designing Activities

Monitoring, Evaluating, and Managing Adaptively

Creating Partnerships

Financial Planning

KEY QUESTIONS

This section, Conservation Planning, is designed around some basic, key questions that can be asked about USAID activities and of partners who are implementing programs with you.

Choosing Conservation Priorities and Targets

- What elements of biodiversity does this program aim to conserve?
- Why are these elements being emphasized?
- What elements of biodiversity will not be a focus of this program?
- Who chose these conservation priorities?

Selecting Scale and Sites

- At what scale(s) are activities needed to conserve the priorities and targets?
- At what site(s) will the program work?

Identifying Threats and Designing Activities

- What are the threats to the biodiversity targets at the scale and sites chosen?
- What activities are needed to address the threats?
- What threats are not being addressed?
- Do activities take advantage of existing opportunities for conservation at the site?

Monitoring, Evaluating, and Managing Adaptively

- Are appropriate social and ecological indicators being monitored?
- Are appropriate analyses being done and lessons being learned?
- Are activities being adapted based on the lessons being learned?

Creating Partnerships

- Are all of the key stakeholders involved in the conservation planning process?
- Do stakeholders have a sense of ownership over the planning process and a clear sense of their role and responsibilities in the conservation planning process?
- What are the costs and benefits of participation for different stakeholders in the process?
- Do stakeholders agree on the conservation priorities?
- Are mechanisms and processes in place to deal with conflicts?

Financial Planning

- What are the priorities of the financial plan?
- What financial mechanisms will support the program?
- What is the balance of short-term and long-term funding mechanisms?
- How does the financial plan account for the long-term sustainability of the program?

CHOOSING CONSERVATION PRIORITIES AND TARGETS

This section explains some general principles of setting conservation priorities, and some of the specific approaches and methods that are being used by U.S. government and international agencies and by conservation NGOs.

What will the Program Conserve?

A necessary step in designing a conservation program is to decide what elements or components of biodiversity the program will conserve. Many conservation NGOs have their own approaches to setting priorities. USAID environmental staff designing a biodiversity conservation program should recognize that partners, although experts in conservation, are stakeholders themselves, and their values and perspectives may differ from other international, national, and local stakeholders. USAID should try to involve all relevant stakeholders in the process of setting conservation priorities for a given region or country.

Key Questions

- What elements of biodiversity does this program aim to conserve?
- Why are these elements being emphasized?
- What elements of biodiversity will not be a focus of this program?
- Who chose these conservation priorities?

A critical component of conservation planning is gaining stakeholder consensus and prioritization on the many values of biodiversity (e.g., direct material uses, ecosystem services, and nonmaterial values). Such a consensus-building process can be time-consuming in the beginning, but the end result of having built stakeholder ownership of conservation interests and actions is invaluable for long-term results. Conservation programs can then be designed to focus on several things:

- Not all species are equal in their ecological importance. It may be especially important to identify and conserve keystone species because, by definition, they have a major influence on ecosystem structure, composition, and function.
- All species exist only as part of functioning ecosystems. Conservation of any one species requires the conservation of enough of the ecosystem in which it is found to maintain a viable population that will persist over time.
- Some ecological communities require periodic disturbance—such as fires, floods, or periodic outbreaks of insects or diseases—to persist. If such disturbances must be allowed to take place in order to conserve biodiversity, management of relatively large landscapes over relatively long time scales may be required.

Setting priorities implies tradeoffs. Focusing conservation efforts on certain aspects or components of biodiversity automatically means less effort will be given to conserving aspects or components of lower priority. However, effective conservation must factor in the systemic na-

ture of biodiversity. One particular species cannot be conserved without conserving at least part of the ecosystem in which it exists. A particular ecological process, such as pollination or soil nutrient cycling, cannot be conserved except by conserving the species involved in that process.

Should a higher priority be given to the situations where biodiversity is under the *greatest* threat or the *least*? For example, if the conservation priority is an intact natural landscape, some conservationists would give the highest priority to working in remote areas with few people, where fewer resources are needed now. Others argue that such remote areas are “self-protecting” for a while, at least, and that conservation investments are needed most urgently where there is the greatest threat to landscapes—typically in areas much closer to roads, cities, and agricultural regions. Or, if the conservation target is a single species, some conservationists argue that the massive investment that may be needed to conserve the last few individuals of a species on the brink of extinction takes money away from activities on behalf of a threatened species that may have a better chance of long-term survival than a species already “on the brink.” There are not necessarily right and wrong answers in such debates, but you do need to consider carefully the tradeoffs among urgency, cost, and probability of success.

Table 2 lists the main elements of biodiversity that could be chosen as conservation targets and provides information for each of these major elements:

1. Some examples or an explanation,
2. Some advantages, and
3. Some disadvantages.

Whose Choice is it?

Before deciding what to conserve, designers of conservation programs have to decide whose choice is it—or *should* it be? Experience has shown that “top-down” conservation, where scientists or technically trained managers set the priorities, doesn’t work well. This does not mean, however, that science has no role in setting priorities.

Priorities must be set through a participatory process. In the context of the Convention on Biological Diversity, for example, the first of the so-called “Malawi Principles” states that:

The objectives of management of land, water, and living resources are a matter of societal choice. Different sectors of society view ecosystems in terms of their own economic, cultural and societal needs. Indigenous peoples and other local communities living on the land are important stakeholders and their rights and interests should be recognized....Societal choices should be expressed as clearly as possible. (ces.iisc.ernet.in/hpg/cesmg/susfor/Malawi.html)

Table 2

Biodiversity Element	Example	Advantage	Disadvantage
Single Species	<ul style="list-style-type: none"> ▪ Rare, threatened, and endangered ▪ Keystone ▪ Charismatic, “flagship” species (e.g., the panda, tiger, black rhino) ▪ Indicator ▪ Umbrella ▪ Endemic 	<ul style="list-style-type: none"> ▪ Simplifies development of a programmatic focus and may, in the case of charismatic species, help with fundraising for conservation from some stakeholders 	<ul style="list-style-type: none"> ▪ Other valuable elements of biodiversity at larger scales (e.g., communities, landscapes) may receive reduced attention and funding for conservation and may not be conserved ▪ Requires simultaneous action at larger scales to conserve critical habitat
Genetic Variation within a Focal Species	<ul style="list-style-type: none"> ▪ Genetic variation in tigers ▪ Genetic variation in wild relatives of crop species (e.g., coffee, maize) 	<ul style="list-style-type: none"> ▪ Sometimes economically valuable, so conservation may have funding support from some stakeholders 	<ul style="list-style-type: none"> ▪ Requires conservation of multiple populations at sites across the range of distribution of the species
Multiple Species	<ul style="list-style-type: none"> ▪ Areas with a large number of species (i.e., a high species “richness”) and/or high percentage of endemic species 	<ul style="list-style-type: none"> ▪ Simplifies development of a programmatic focus and may help with fund-raising for conservation from some stakeholders 	<ul style="list-style-type: none"> ▪ Other valuable elements of biodiversity at larger scales (e.g., communities, landscapes) may receive reduced attention and funding for conservation and may not be conserved
Ecological Communities	<ul style="list-style-type: none"> ▪ Distinct communities and assemblages of species 	<p>Conserves many species and their interactions without a focus on individual species</p>	<ul style="list-style-type: none"> ▪ Requires development of representative network of conservation areas ▪ Other elements of biodiversity (e.g., species) may receive reduced attention and funding for conservation and may not be conserved
Ecosystems	<ul style="list-style-type: none"> ▪ Mosaics of ecological communities large enough to maintain natural disturbance processes such as fires or floods and successional patterns (e.g., Amazonian seasonally flooded forest, coral reefs) 	<ul style="list-style-type: none"> ▪ Conserves many species, communities, and the dynamics of the system, without a focus on individual species 	<ul style="list-style-type: none"> ▪ Social issues more complex than at smaller scales ▪ Requires complex analysis and action to affect socioecological systems ▪ Some smaller-scale elements of biodiversity (e.g., species and communities) may receive reduced attention and funding for conservation and may not be conserved

Biodiversity Element	Example	Advantage	Disadvantage
Ecoregions	<ul style="list-style-type: none"> A relatively large unit of land or water within which environmental conditions create structurally and functionally similar types of ecosystems (e.g., African miombo woodland, boreal forest/taiga) 	<ul style="list-style-type: none"> Conserves many smaller-scale elements of biodiversity (species, communities, ecosystems) without focusing specifically on them 	<ul style="list-style-type: none"> Transboundary political issues take on growing importance, in addition to social issues as for ecosystems, above Some smaller-scale elements of biodiversity may receive reduced attention and funding for conservation and may not be conserved
Ecological Processes and Functions	<ul style="list-style-type: none"> Watersheds Carbon sequestration Nutrient cycling Pollination Pest and pathogen control Soil formation and erosion control 	<ul style="list-style-type: none"> Requires maintaining overall structure and resilience of most communities, landscapes, and ecosystems Ecological functions are often economically valuable to societies, making it possible to develop more consensus for conservation than for some other elements of biodiversity 	<ul style="list-style-type: none"> Some smaller-scale elements of biodiversity may receive reduced attention and funding for conservation and may not be conserved

Glossary for Table 2

- **Keystone species:** a species that plays a major ecological role in determining the composition and structure of an ecological community; if a keystone species disappears, the whole community will change. Example: African elephant.
- **Indicator species:** a species that is particularly sensitive to ecological changes, such as pollution or the loss of natural ecological disturbances such as fire, whose presence indicates the overall integrity, resilience, or “health” of a community, landscape, or ecosystem. Sometimes referred to as “the canary in the coal mine.” Example: some lichens.
- **Charismatic species:** attractive, appealing, cute, unique, or otherwise attention-getting species; if threatened or endangered may serve as “flagship” species. Examples: cheetah, lion, orangutan, gorilla, sea turtles, whales.
- **“Flagship” species:** a species, usually a charismatic species, that can serve as a symbol of nature and conservation and be used as a logo or otherwise in fundraising and education by conservation organizations. Example: WWF panda.
- **Umbrella species:** a wide-ranging species whose conservation requires a large area of natural habitat in which many other species can survive; sometimes a keystone, charismatic, or “flagship” species, but not necessarily so. Examples: elephant, tiger.
- **Endemic species:** a species found only in a relatively small geographic area and nowhere else. Example: Galapagos finches.

Website References for Table 2

The following websites provide links to the organizations and agencies that are cited in Table 2. (Each website’s URL begins with http://)

Single Species

- CITES: Convention on International Trade in Endangered Species of Wild Fauna and Flora: www.cites.org
- IUCN Species Survival Commission: www.iucn.org/themes/ssc/aboutssc/whatisssc.htm
- Wildlife Conservation Society (WCS): wcs.org/12318
- World Wildlife Fund (WWF): www.worldwildlife.org/species

Genetic Variation within Species

- FAO: Food & Agriculture Organization: www.fao.org/EPdirect/EPPre0007.htm
www.fao.org/waicent/ois/press_ne/presseng/h8f.htm

Multiple Species

- BirdLife International: www.birdlife.org.uk/work/index.cfm
www.rspb.org.uk/wildlife/scisurv/international/priority.asp
- Conservation International (CI): www.conservation.org/xp/CIWEB/strategies/hotspots/hotspots.xml
www.cabs.conservation.org/xp/CABS/

Ecological Communities

- USGS: www.gap.uidaho.edu/About/Mission/Statement.htm
- The Nature Conservancy (TNC): nature.org/aboutus/howwework/about/art2684.html
nature.org/aboutus/howwework/about/art2692.html
- World Wildlife Fund (WWF): www.worldwildlife.org/global200/spaces.cfm

Ecosystems

- African Wildlife Foundation (AWF): www.awf.org/about
- Convention on Biological Diversity (CBD): www.biodiv.org/decisions/default.asp
ces.iisc.ernet.in/hpg/cesmg/susfor/Malawi.html
- Ecological Society of America: esa.sdsc.edu/execsum.htm
- UCN Commission on Ecosystem Management: www.iucn.org/themes/cem
www.iucn.org/themes/wetlands/ecosystemmanagement.html
- Millennium Ecosystem Assessment: www.ma-secretariat.org/en/index.htm
- UNESCO Man & the Biosphere Program (MAB): www.unesco.org/mab/brfaq.htm
www.usmab.org/general_information/geninfo.html
- U.S. Forest Service (FS): www.fs.fed.us/r6/malheur/mgmt/ecomgmt.htm
www.fs.fed.us/..._ecosystem_management_background.html
- U.S. Fish & Wildlife Service (FWS): www.nctc.fws.gov/library/Pubs9/HabitatMgmt/concept.html
ceres.ca.gov/CRA/wheeler_ecosystem_approach.html
- U.S. National Park Service (NPS): www.nature.nps.gov/partner/ecosystem.htm
- Wildlife Conservation Society (WCS): wcs.org/12311

Ecoregions

- Conservation International (CI) (“Tropical Wilderness Areas”):
www.cabs.conservation.org/xp/CABS/research/global_planning/priority_setting/
- The Nature Conservancy (TNC): nature.org/aboutus/howwework/about/art2684.html
- World Wildlife Fund (WWF): www.worldwildlife.org/global200/spaces.cfm

Ecological Processes and Functions

- Convention on Biological Diversity (CBD): www.biodiv.org/decisions/default.asp
ces.iisc.ernet.in/hpg/cesmg/susfor/Malawi.html
- Millennium Ecosystem Assessment: www.ma-secretariat.org/en/index.htm
- Ecological Society of America: esa.sdsc.edu/ecoservicesbody.home.html
- Union of Concerned Scientists: www.ucsusa.org/ssi/ssi_ecosystem.html

Different stakeholders have different values, so priority setting for conservation is a negotiation process. Surprisingly, however, discussions about conservation priorities among diverse stakeholders often take place in the absence of clear and explicit communication about the underlying values being used to set those priorities. This can later lead to conflicts that weaken a conservation program, so clear communication about the values of biodiversity to the various stakeholders is essential. The values of all stakeholders at least must be explicit, or the political

and other negotiations needed to set priorities cannot occur. In addition, an explicit, values-based framework is required to link biodiversity conservation with other development sectors and integrate it with national economic and development planning.

Setting conservation priorities with diverse stakeholders is complex and can seem daunting. Immediate action may be urgently needed, and delay may result in irreversible loss of biodiversity, whether through the extinction of a species or damage to a valuable ecological process. Acting simplistically, without careful analysis of options and their costs and benefits, is counterproductive. Take time to understand the complexity of the situation—here is where “adaptive management” can help (see *Monitoring, Evaluating, and Managing Adaptively*). In a complex situation, a project could initiate a priority-setting dialogue among stakeholders, or begin to learn more about the various elements of the biodiversity of a place. Initial activities can help conservationists and other stakeholders learn more, to answer questions that will lead to better choices and more effective interventions later.

SELECTING SCALE AND SITES

Different conservation priorities require actions at different scales. Selecting the scale of conservation action, and the sites where work will be most effective, flows from the choice of conservation priorities. The appropriate scale is as much a social as a biological issue, however. You cannot select a scale or a site using only biological criteria. You must also consider social factors (e.g., threats, opportunities) and institutional issues (e.g., how much money you have to invest, the abilities of potential partners to implement programs).

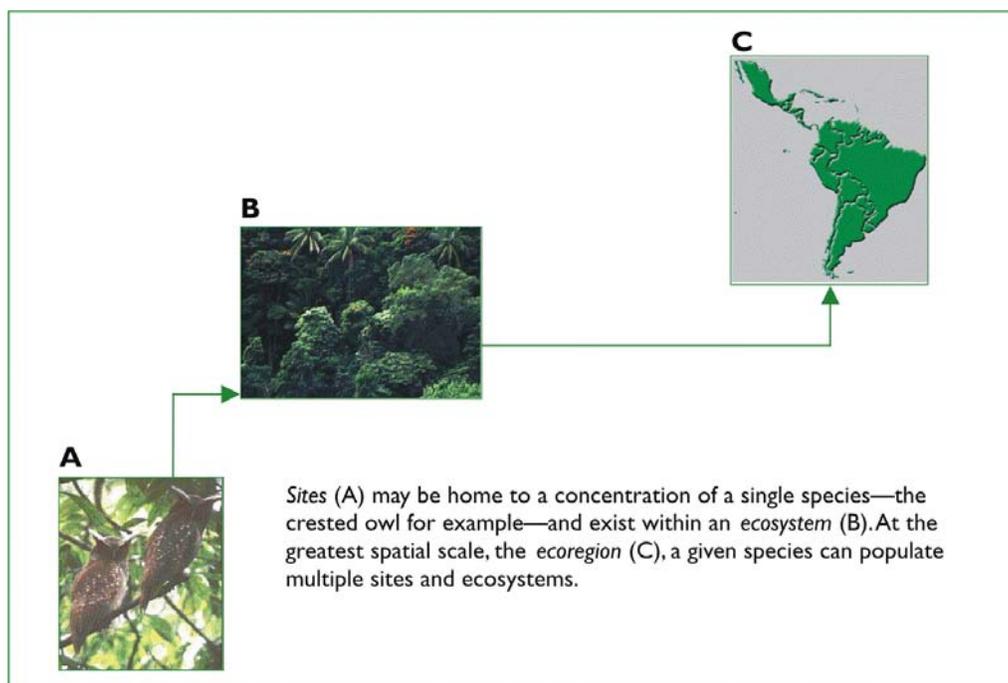
Key Questions

- At what scale(s) are activities needed to conserve the priorities and targets?
- At what site(s) will the program work?

Spatial Scales

Conservation actions are typically planned at any of three spatial scales: sites, ecosystems, or larger areas sometimes called “ecoregions.” This is, roughly speaking, a nested hierarchy: sites fall within ecosystems; ecosystems within ecoregions. These three scales are really part of an ecological continuum, and one grades into the next (see Figure 1 below).

Figure 1. Conservation areas comprise three spatial scales that form a “nested” hierarchy, in which the smallest scale grades into the next



Sites: Priority conservation sites could be relatively small and circumscribed areas of natural habitat, whether land or water. “Site” is not an ecological term, however, and some conservation organizations use the term to refer to the area in which a project works, regardless of size.

If a single species is to be conserved, that species may be well represented, or even concentrated, at particular sites. Managing those sites may provide critical habitat for the species. If the conservation priority is a “hotspot” of species richness and/or endemism, conservation at the site scale may be appropriate. One typical strategy for conservation is to make such a site a protected area (see *Protected Areas*, for a definition and discussion).

Ecosystems: Priority areas or sites for conservation exist within ecosystems. Although it may be possible to conserve some kinds of species (such as endemic plants or invertebrates) at the scale of single sites, many species (particularly large, wide-ranging birds or mammals) require conservation at scales much larger than single sites to maintain viable populations.

Ecoregions: Priority sites and ecosystems exist within ecological regions—“ecoregions.” Conservation at the ecoregional scale could involve, for example, creating a network of reserves representative of the ecosystems of the region. Or, conserving the genetic diversity found within a given species might require that populations of that species scattered at specific sites across an ecological region be maintained. Appropriate conservation actions at ecosystem or ecoregional scales might emphasize trying to influence human actions and behaviors that threaten biodiversity across the ecosystem, without focusing on priority sites (e.g., through attempts to influence policy or macro- and microeconomic conditions). A common reason for working at larger scales is to enable various organizations and stakeholders to coordinate efforts across a large geographic region.

Table 3 illustrates how you can match various conservation priorities with the appropriate scale for action. Checkmarks indicate the spatial scale or scales needed for conservation of that particular element, or aspect, of biodiversity; comments explaining scale issues are sometimes given as well.

Table 3

Biodiversity Element	Scale for Conservation Activity		
	Site	Ecosystem	Ecoregion
Single endangered species	✓		
Endemic species	✓		
Early success regional species (require periodic disturbance)		✓ must conserve dynamic system; cannot conserve at one site	
Wide-ranging species	✓	✓	
Genetic variation within a focal species	✓ requires multiple sites dispersed across species range to conserve genetically diverse populations of a species		

Multiple species (sites with large number of species)	✓		
Ecological communities (distinct functional association of species)	✓ can conserve one community at a site, but requires multiple sites to conserve typical examples of all communities	✓ must conserve multiple sites across ecosystem to conserve typical examples of all communities	
Ecosystem		✓ requires conservation of keystone species and a dynamic mosaic of ecological communities	
Ecoregion		✓	✓ requires conservation at ecosystem scale and larger
Ecological processes and functions		✓ many ecological processes and functions conserved at the ecosystem scale	✓ some ecological processes and functions may require conservation at scales larger than ecosystems

Matching Priorities with Scale

- If a unique, narrowly endemic plant species found only in a single, 10-hectare swamp were the conservation priority chosen, conservation could take place at a small site. If, however, the priority were to conserve a species of large cat—such as the tiger—widely but sparsely distributed over a large range, the appropriate scale of conservation action would be much larger.
- If the conservation priority were to conserve the genetic diversity of the wild relatives of a crop plant, such as maize or coffee, you would need to conserve wild populations at sites scattered across their range.
- If the priority were to conserve the greatest number of species, focusing on sites with high species richness (i.e., a large number of species concentrated in that area) would be the appropriate scale.
- If your focus is a unique forest community that occurs only in a few small patches, conserving some of those patches would be an appropriate goal. To conserve representative examples of each type of ecological community in an ecoregion, on the other hand, would generally require a widely distributed network of conservation sites.

Natural Disturbances

Conserving species or ecological communities that depend on recurring disturbances, such as fires or floods, requires understanding and managing those disturbances. Managing such disturbances, in turn, often will require actions at a large scale, as well as time frames that may range up to decades or longer.

Ecological Processes and Functions

Conserving ecological processes and functions requires large-scale actions. For example, if clean water is the ecological service desired from the biodiversity system, conservation action at the scale of a watershed, or significant portions of it, will probably be needed. If the priority is to minimize the transmission of diseases (such as hantaviruses) from wild rodents to people by conserving the ecological service of wild rodent control provided by hawks, owls, snakes, and other predators, action at the whole ecosystem scale would be needed. If the goal is to conserve the ecological service provided by bats that pollinate economically important crops (e.g., durian in Southeast Asia, agave in the Sonoran desert), conserving caves in which the bats roost might be an important part of a conservation strategy.

The larger the scale of action required to conserve a given element of biodiversity, the more likely it is that people will be living within the area, and the more important the human and social dimensions of conservation become. In addition, strictly protected areas inevitably assume a lesser role in conservation at larger scales, and the sustainable use and management of agricultural lands, grazing lands, and production forests take on a greater importance.

Likewise, the larger the scale, the greater the likelihood of a mismatch between political boundaries and ecological boundaries that are relevant for conservation. Because ecosystems and ecoregions often cross political boundaries, the ecosystem approach to conservation requires thinking beyond national boundaries, though these political units are critical to the planning and implementation process.

Protected areas are an appropriate approach for conserving some elements of biodiversity, but alone they cannot conserve all its aspects. Not all land can be strictly protected, and the scale of landscape needed to conserve some features or elements of biodiversity is larger than the largest possible protected area. Furthermore, protected areas are increasingly threatened by external forces—threats originating outside the protected area—so some action must be aimed at a larger scale anyway. Even for smaller sites, conservation action may need to deal with “enabling environment” issues: policies (e.g., forest policy), capacity of management agencies (e.g., training of protected area staff), or financial issues (e.g., the need to generate income in order to pay for the cost of conservation).

The interests and values of current and future stakeholders may converge and overlap most with regard to intermediate-scale elements of biodiversity, such as maintaining functional landscapes, the conservation of representative examples of ecological communities, or the maintenance of functioning watersheds (Norton & Ulanowicz, 1992). This is why conservation priorities at intermediate scales may be more likely to produce consensus in priority-setting negotiations among a range of stakeholders—including local, national, and global interests—than conservation priorities that are either very large or very small in scale.

Social Issues and Conservation Scale

Conservation at large scales requires understanding and addressing the social, economic, and policy factors that threaten biodiversity. The “ecosystem approach” or “ecosystem management” required at large scales “integrates scientific knowledge of ecological relationships within a complex sociopolitical and values framework toward the general goal of protecting native ecosystem integrity over the long term” (Grumbine, E.R., 1994).

The ecosystem management approach emphasizes understanding both the proximate (immediate) and root (underlying) causes (Stedman-Edwards, P., 1998) of threats to biodiversity, leading to policy and management interventions at appropriate levels—from site-specific projects to international trade policies. Proximate causes can include deforestation and overharvesting of plants and animals. Root causes include demographic change, poverty and inequality, public policies, markets and politics, macroeconomic policies and structures, social change, and development biases. Understanding social and biological processes and dynamics at this scale requires an integrated and multidisciplinary approach. For more information about understanding the causes of threats to biodiversity, see WWF’s discussion on “Root Causes of Biodiversity Loss”: www.panda.org/resources/programmes/mpo/rootcauses/.

IDENTIFYING THREATS AND DESIGNING ACTIVITIES

Throughout this Guide we emphasize a threats-based approach to program design. However, this approach may not be appropriate for every country's situation. Some countries may require general capacity building of government personnel, or the USAID mission may have political commitments or agreements with the host country government. Policy-based programs to strengthen national legislation for conservation, promote multilateral activities, or support national strategy formation on conservation may also be the most appropriate. In these cases, we encourage you to apply a threats-based approach to the extent possible. For example, in the case of a country needing capacity building to effectively manage and protect national parks, a goal of the program should be to build the capacity to identify and address threats to biodiversity.

Threats-Based Conservation

In many cases, conservation programs have been designed around existing staff expertise or successful experience at other sites, regardless of whether they address threats to conservation targets at the site. For example, a project might identify road building by logging companies as a serious threat to an area, yet focus the project activities on developing alternative economic opportunities for local communities because the partner is skilled in this type of activity and has little experience with logging concessions.

Key Questions

- What are the threats to the biodiversity targets at the scale and sites chosen?
- What activities are needed to address the threats?
- What threats are not being addressed?
- Do activities take advantage of existing opportunities for conservation at the site?

The core assumption of a threats approach is that direct threats to biodiversity must be mitigated to achieve conservation of biodiversity. The threats approach stresses that, although it may not be possible to address all the threats at a site, you should articulate a logical framework for which threats can be addressed and how they will be addressed. The framework should lay out the linkages between project-level activities and conservation outcomes with mitigation of direct threats being the linking factor. Threats-based conservation ensures that biodiversity conservation evolves from an *ad hoc* approach to a more strategic and effective approach and provides a framework for effective conservation action.

In a threats-based approach to the conservation of biodiversity:

- Direct threats must be mitigated in order to achieve conservation;
- To mitigate threats, the direct causes of biodiversity loss must be recognized and understood in order to choose effective interventions;

- The key to effective interventions is to understand the system that drives the direct threats and then to target interventions in a strategic and feasible way;
- It may be impossible to address all threats, but if threats are prioritized, conservation activities have the best chance of being effective; and
- Threats can best be addressed and mitigated if all stakeholders work together to develop mutually agreeable, feasible, and sustainable alternatives.

A threats-based approach should not be construed as ignoring opportunities, focusing on the negative, or being reactive instead of proactive. A threats approach simply emphasizes that opportunities, like all possible interventions, must be evaluated from a threats perspective in order to ensure that conservation actions are strategic. In a threats approach, an opportunity is considered a potential intervention that must be weighed against other possible interventions to determine its relative usefulness in mitigating threats.

There are three steps to applying threats-based conservation once the site, scale, and conservation targets have been selected:

1. Identify threats to conservation targets.
2. Prioritize threats.
3. Develop activities to abate priority threats.

Every step of the process should include participation from stakeholders (see *Creating Partnerships*).

Identifying Threats

The first step in choosing activities to develop for a conservation project is to identify the critical threats to biodiversity at the site. Site is used here to mean the area that is targeted for conservation, whether it is a small area, an ecoregion, or any size in between. Specific threats to conservation targets can be identified through existing information about the site and by involving stakeholders in the process of identifying and prioritizing threats. By identifying and prioritizing threats in a participatory manner, the best information on threats is brought to the table and all stakeholders share a common understanding of the key threats. Many partners have found that the perceived intensity of threats by local constituents is as important to initiating conservation activities as the measurable threat to biodiversity.

The four types of direct threats to biodiversity are:

- **Conversion** of natural habitat to cropland, urban areas, or other human-dominated ecosystems.
- **Overexploitation** or overharvesting of valuable species.
- Introduction of **invasive species**, including pests and pathogens.
- Climate change, pollution, desertification, and other **environmental change** coming from “outside” the area of native habitat in question.

Threats should be identified in a site-specific context and with respect to conservation targets at the site. The most useful analyses identify threats in specific terms, describe the impact on the target, and identify the source(s) of the threat. Although the threats approach emphasizes identifying and understanding direct threats, this does not mean that less attention should be focused on root causes or indirect threats. To fully understand a direct threat, the causal chain from root cause to direct threat for each threat must be understood to the extent possible. This information is critical in designing effective interventions and also in communicating the rationale behind the program design.

It is also important to identify known future threats. For example, one USAID-supported project supported the establishment of protected areas within a country where there were few existing threats to biodiversity. However, it was known that the country was going to be opening up areas to logging concessions and had no protected area system established.

Several conservation organizations have developed methodologies for threats-based conservation. These methodologies range from very simple lists or matrices of threats to complex conceptual models. In recent years, these models have become more sophisticated and better integrated into program design, implementation, and monitoring.

Prioritizing Threats

Threats can be prioritized according to several factors.

Most conservationists give highest priority to factors such as:

- The intensity of threat impact,
- The urgency of threat abatement, and
- The size of area affected by the threat.

However, other considerations are also important. These include:

- The political and social feasibility of addressing the threat,

- A community's perception of threat importance, and
- The ability of the organization to address the threat.

Linking Activities to Threats

The key point for designing activities in a threats-based approach is that there must be a sufficient understanding of the threats to identify and justify appropriate activities that will abate the threats. Similar threats occur in sites throughout the world, yet appropriate activities to abate threats are site specific and require knowledge of the social, cultural, economic, political, and ecological context. Making clear, site-specific links between threats and activities is probably the most obvious yet overlooked step in the process.

For example, poverty is often cited as a key threat to biodiversity in an area, and the development of alternative economic activities is given as the way to abate that threat. Although poverty certainly contributes to threats to biodiversity, it must be closely linked with the direct threats to conservation targets to develop effective threat abatement activities. Figure 2 provides a few examples of threats and activities that are often linked but that do not demonstrate an understanding of the specific context of the site in which the activity is taking place. Figure 3 provides a few examples of the level of detail necessary to determine whether an activity will abate a threat. It is necessary to understand, for example, the cause, or source, of the threat and the effect of the threat on biodiversity.

Figure 2. Weak link between threat and activity

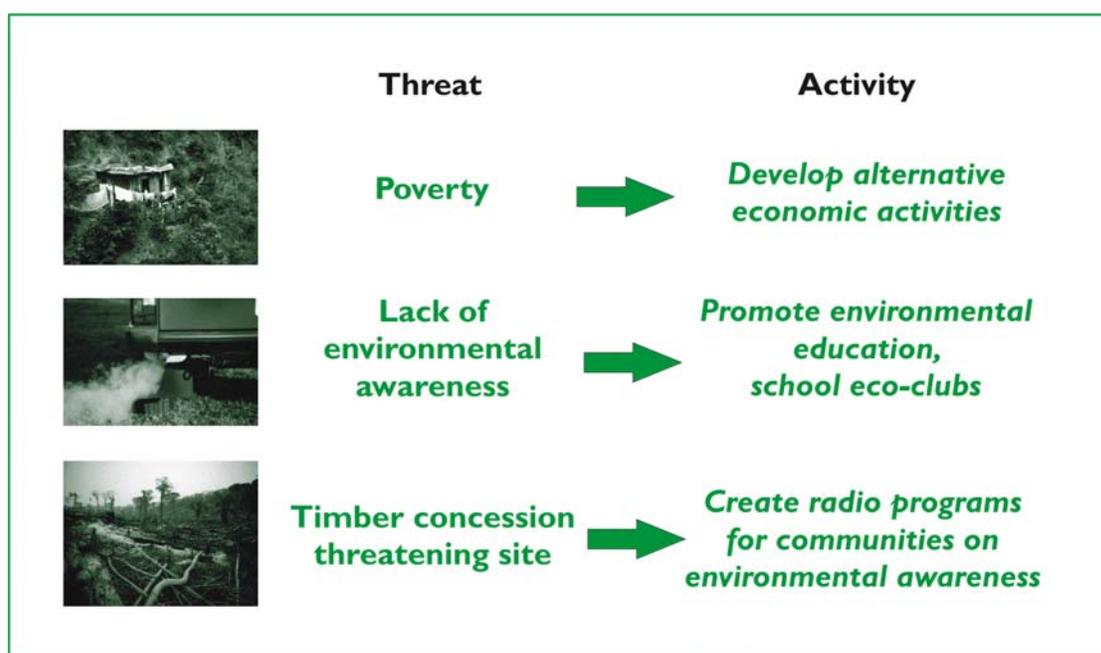
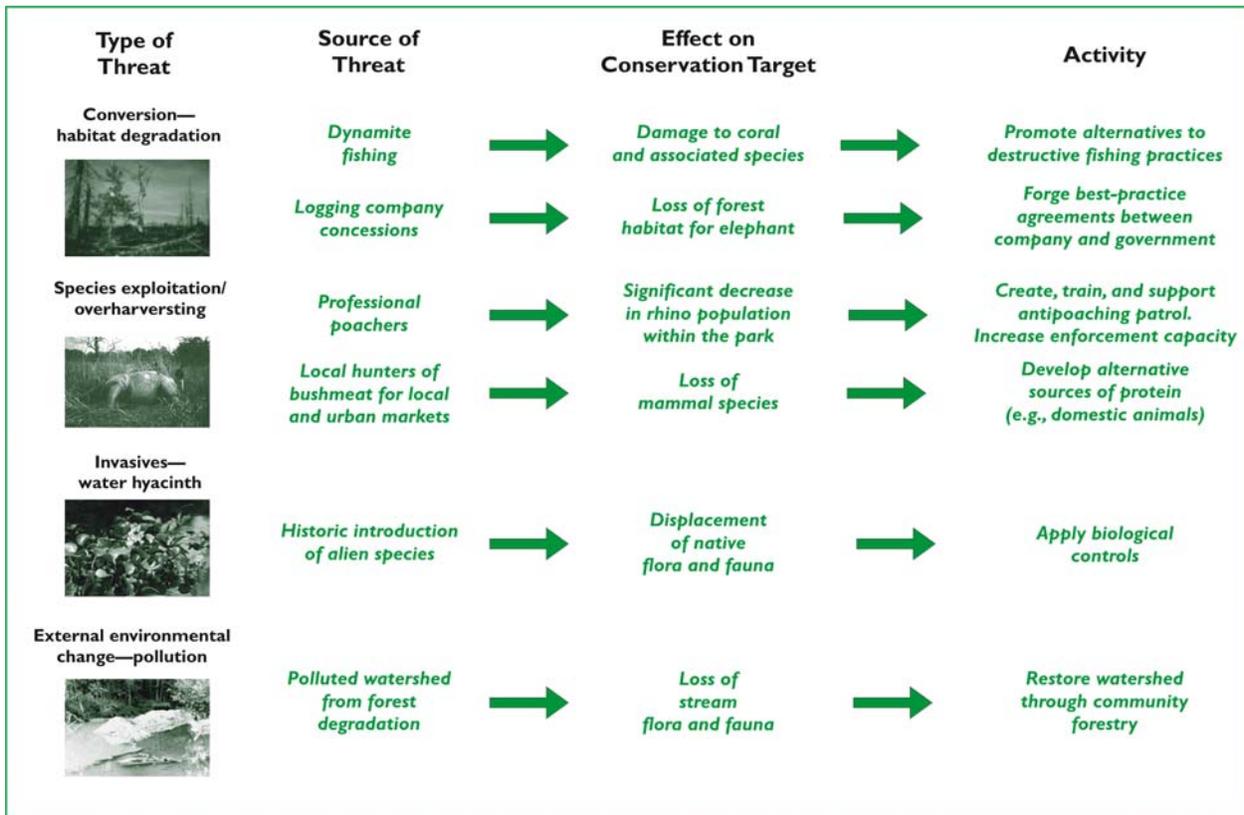


Figure 3. Improved link between threat and activity



The threats approach requires that interventions be justified by their impact on direct threats at the site level. However, the threats approach does not limit interventions to the site level. In the threats approach, every step along the causal chain from direct threat to root cause should be understood to the extent possible and considered as a possible point of intervention. The point of intervention that is chosen as the most "effective" should be justified with clear logic that describes the desired changes in the causal chain down to the point of the direct threat. The link to the direct threat must be made so that it is clear what will be gained from the intervention. Intervention points may be justified in different ways. They may be, for example, the most critical or the only feasible point to intervene.

Too much emphasis on either end of the causal chain, root causes or direct threats can cause problems. If there is too much emphasis on direct threats without an understanding of the causes behind the threat, then interventions may not succeed because they are too superficial and do not address the underlying causes. At the other end of chain, if the "root cause" of a threat is targeted, a tendency may exist to think you are getting at the "root" of a problem. However, root causes are sometimes defined in terms of conditions of human existence that may be impossible or difficult to change—for example, weak institutional structures or a lack of planning or policy. Ideally, interventions would be designed to simultaneously mitigate direct threats to biodiversity while creating the conditions for long-term conservation.

Designing Activities

As with every step of the conservation planning process, stakeholder participation in activity design is critical. Activities should be chosen and designed with the full involvement of appropriate stakeholders.

It is often necessary to have integrated activities—activities requiring expertise from more than one sector—to adequately address a threat. For example, in order to promote community-based management of natural uses, it is necessary to link sustainable use with governance activities. The “Linking with Other Sectors” section describes the different strategies that can be used to link biodiversity and other sectors at the site level, and provides examples of ways to substantively link biodiversity conservation with development activities in other sectors.

The section titled “Conservation Activities” describes the major categories of activities that are commonly implemented to conserve biodiversity. Activities include protected areas, community-based management, sustainable use, economic incentives, environmental education and communication, and policy development and reform.

Monitoring and Evaluation

Threats-based conservation provides an excellent opportunity for program monitoring and evaluation. Although monitoring biodiversity at the targeted site is important (e.g., changes in keystone species presence), it is difficult—and often expensive—to track changes over the short term. Monitoring of threat abatement (e.g., less poaching, reduced pollution) can be cost-effective and show impact over a shorter time span, allowing for adaptive management (see *Monitoring, Evaluating, and Managing Adaptively*).

USAID’s Role in Threats-Based Conservation

USAID managers can incorporate threats-based conservation at several levels of management:

- Requests for proposals or applications (RFPs and RFAs);
- Review of proposals; and
- Management and oversight, including work plan review.

USAID managers can use threats-based conservation as an integral part of requests for proposals, requests for applications, and scopes of work. For example, an evaluation criterion might grade a proposal on the degree to which identified threats to a site will be addressed by pro-

posed activities. Similarly, work plans can be evaluated on the degree to which identified threats are addressed by activities. If most of a proposed budget addresses very low-priority threats, the USAID manager should meet with the partner to negotiate more strategic activities. For example, if forest conversion to agriculture is identified as the main threat but the partner proposes a project devoted largely to research on a capstone species, the program needs to be revised or a new partner identified.

MONITORING, EVALUATING, AND MANAGING ADAPTIVELY

Adaptive management involves designing, implementing, and monitoring project activities in a way that helps people learn more about complex ecological and social systems, which in turn can help them make better choices and design more effective interventions later. “Adaptive management is fundamentally a framework to experimentally test assumptions, adapt project activities, and learn from project impacts,” according to the Biodiversity Support Program (*Adaptive Management of Conservation and Development Projects*: www.bsponline.org/conservation/3rd_level/adaptive.html).

To be effective, conservation project designers, managers, and implementers need to understand the complexity of the situations that they are trying to change. At the same time, they must beware of paralysis by complexity. Action is often urgently needed, and an adaptive management approach can allow people to start doing something—even if they don’t have all the information they know they need.

Key Questions

- Are appropriate social and ecological indicators being monitored?
- Are appropriate analyses being done and lessons being learned?
- Are activities being adapted based on the lessons being learned?

The idea of adaptive management is historically and conceptually linked to the concept of “ecosystem management.” Ecosystem management is concerned with how to manage the complex interaction of ecological and social systems in order to provide sustainable values to societies, even when scientists and managers don’t know enough to accurately predict the behavior of those systems.

Adaptive management is often described as a variation of the typical project planning cycle. It is unique because it emphasizes testing assumptions and hypotheses, continuous monitoring, learning, and adjusting activities during the course of the project. Figure 4 illustrates adaptive management in this step-wise, project-cycle form (adapted from the British Columbia Forest Service publication *An Introductory Guide to Adaptive Management*: www.for.gov.bc.ca/hfp/amhome/introgd/toc.htm). For more information relevant to adaptive management and the project planning cycle, see Margoluis and Salafsky, 1998.

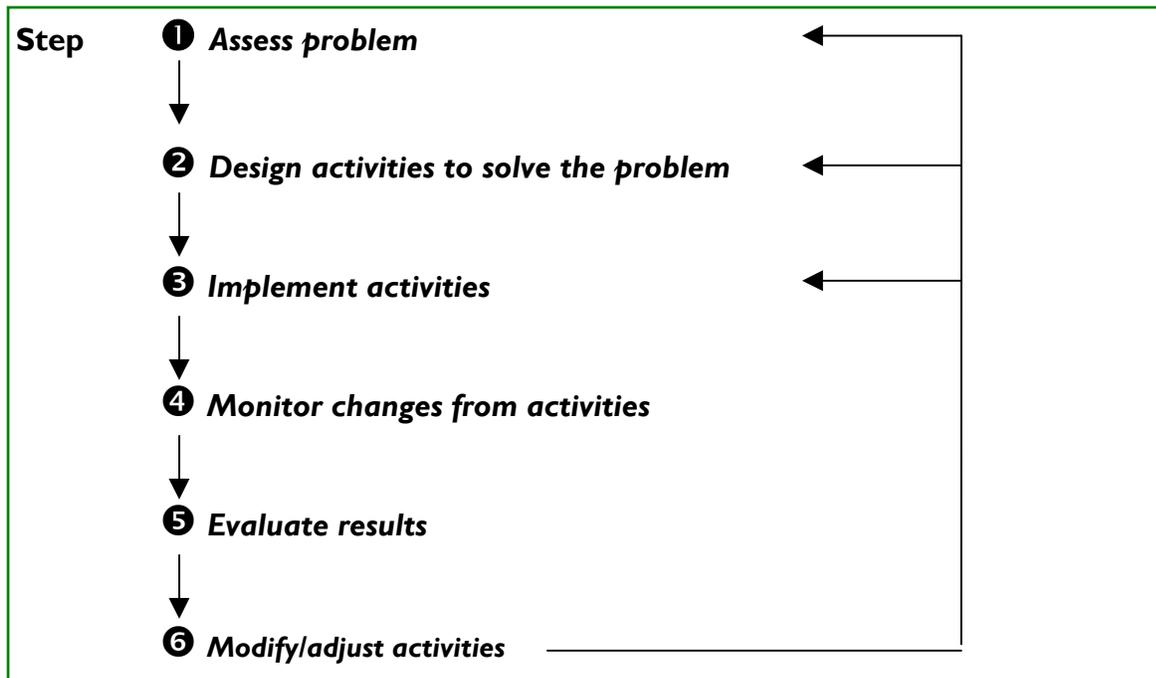
Each of the essential elements of adaptive management is discussed briefly below.

Conservation project designers and managers should assume that they do not know enough about the complex ecological and social systems they are trying to influence to predict how they will respond to a planned management action. We can never know everything. We need to begin to manage anyway, but in a way that continuously incorporates new information and understanding.

Involve All Stakeholders

Effective adaptive management requires the participation of stakeholders—all those people who use, influence, and have an interest, or “stake,” in a given resource. From the very beginning of a project, you should involve stakeholders in the “steps” of adaptive management (see Figure 4). They should help assess the problem and design activities to solve it, help implement and monitor those activities, and evaluate the results and adjust the activities. Experience has shown that involvement of all stakeholders from the very beginning increases the effectiveness and sustainability of conservation programs (see *Creating Partnerships*).

Figure 4. Adaptive management is a systematic, step-by-step project-cycle process



Test Assumptions and Hypotheses

Adaptive management has sometimes been described as “learning by doing.” Conservation involves complex ecological and social systems, whose response to project activities and management interventions are often unpredictable. The activities and interventions themselves should be designed in part to test hypotheses about both the ecological and social systems involved, through observing their responses to those activities and actions.

Monitor Ecological and Social Indicators

Continuous monitoring is a key element of adaptive management. Appropriate indicators of the conservation priorities and targets of a project (see *Choosing Conservation Priorities and Targets*) should be the focus of *ecological monitoring*. You can use *social monitoring* to track changes in the behaviors of individuals and groups toward the environment and the effects of conservation

activities on people's health and welfare. Monitoring the behaviors and social factors that cause the threats to biodiversity can be very useful, for example, by providing an indirect or "proxy" measure of the success of conservation activities. Stakeholders, including those from local communities—not just project managers—should be involved in planning and carrying out both ecological and social monitoring.

In a project designed to conserve a tropical forest site for its value as a watershed, for example, it would make sense to monitor ecological variables such as water flow and water quality. It would also make sense to monitor social variables such as legal and illegal tree cutting, fuel-wood collection, or other behaviors suspected to be a threat to the integrity of the forest as a water catchment.

The key question in choosing appropriate indicators is "what do the people guiding the project need in order to make a reasonably informed decision?" Many more things could be monitored than would be worth monitoring, and unnecessary monitoring wastes resources.

If you're a USAID manager, you can facilitate adaptive management within programs by encouraging projects to be results oriented, rather than inflexibly based on the implementation of specific activities. Indicators can also be results oriented. For example, an increase in household income based on the sustainable harvest of a non-timber forest product in an area, such as wild mushrooms, would be a better indicator of results than the number of studies and publications about non-timber forest products produced by the project.

Allow Time to Learn

Adaptive management requires patience to allow sufficient time for the experimental, learning dimension of adaptive management. Although adaptive management requires a longer time frame than most USAID funding periods will support, USAID managers can encourage projects to initiate long-term adaptive management strategies within the shorter period of USAID funding that will continue into future activities.

Incorporate Feedback

Learning by implementing activities is a key element in adaptive management. Monitoring and evaluation provides "feedback" about what works and what does not. You can then use this feedback to make adjustments and changes to the activities. For example, an environmental education program may inform the people of a town about the importance of trees and forests in the nearby mountains in providing a year-round flow of clean water in the river that flows through the town. Social monitoring may show that awareness and knowledge of the value of trees to watersheds is increasing because of this educational campaign. On the other hand, ecological monitoring may show that trees are being cut and the forest is disappearing just as fast as before, despite this increased knowledge. You can use this feedback to reassess the problem and redesign activities that will change destructive behaviors.

Make Appropriate Changes

Making appropriate, ongoing changes to project activities on the basis of feedback from continuous monitoring is a central element of adaptive management. Through this incremental adjustment, adaptive management can help you discover the most rapid route toward bringing societal demands for resources within ecological capacity—and thereby help conserve biological diversity.

In the above example of environmental education and forest conservation, ecological monitoring showed that trees were still being cut at an unsustainable rate—despite changes in awareness and knowledge of the value of trees and forests in protecting watersheds. This feedback should prompt stakeholders to revisit the first “step” in project planning: problem assessment. Maybe the problem—the cause of forest loss—was not lack of awareness and knowledge after all, but some other factor. Analyzing the problem further may show that a significant number of poor townspeople depend on firewood for their cooking and heating fuel and do not have economically viable alternatives to cutting fuelwood in the mountains. In this case, activities that provide affordable energy alternatives to these people may be more effective in conserving forests than increasing awareness and knowledge.

Adaptive management would thus suggest that you design and implement activities to provide an alternative source of cooking and heating fuel, and socially monitor their acceptance as well as continue the ecological monitoring of the forest. The hypothesis is that forest loss will decrease in parallel with decreased demand for fuelwood. If monitoring does not support this hypothesis, adaptive management requires that you return to the problem-analysis and activity-design steps once again.

CREATING PARTNERSHIPS

Conservation requires the agreement of key stakeholders, and it benefits from the formation of partnerships among stakeholder groups. Stakeholders in biodiversity conservation include any person, group, or organization with an interest in the use and management of some aspect of biodiversity in a given place, or which affects or is affected by a particular conservation action. Stakeholders include local users, government agencies, NGOs, and the private sector.

Partnerships are important from the local community scale to the national and international scale. Although this section is written primarily from a community perspective, the lessons apply at all scales.

Identifying Stakeholders and their Interests

Identifying stakeholders involves figuring out who is using and/or affecting the biodiversity of a place. Not all stakeholders have an equal claim over the biodiversity of a place, nor an equal interest in the conservation of any particular element or aspect of it. The strength of the claim and degree of interest depend on such things as geographic proximity, dependence for livelihood, historical association, recognized rights, economic interest, and institutional mandate. Clearly identifying which actors have legal and social authority and legitimacy in a situation will ensure that the most appropriate parties are involved in any partnership arrangement.

Key Questions

- Are all of the key stakeholders involved in the conservation planning process?
- Do stakeholders have a sense of ownership over the planning process and a clear sense of their role and responsibilities in the conservation planning process?
- What are the costs and benefits of participation for different stakeholders in the process?
- Do stakeholders agree on the conservation priorities?
- Are mechanisms and processes in place to deal with conflicts?

A number of techniques exist for identifying stakeholders and their interests, such as interviews, direct behavioral observation, surveys, and community meetings. For more information and examples, see:

- G. Borrini-Feyerabend, Ed. *Beyond Fences: Seeking Social Sustainability in Conservation*. Switzerland: IUCN, Gland, 1997. (www.iucn.org/themes/spg/beyond_fences/beyond_fences.html)
- *Stakeholder Collaboration: Building Bridges for Conservation*. Washington, DC: WWF, 2000.

Types of Participation

Conservation project managers must actively encourage and facilitate stakeholder participation throughout all steps of conservation planning. The text box on the following page describes the

spectrum of different levels of participation that groups of stakeholders may have in the conservation planning process. Different levels of participation may be appropriate for different situations. In general, it is better to have stakeholders more active—rather than less—in the planning process. You should encourage stakeholders with the strongest interests in the biodiversity in question, for economic or noneconomic reasons, to participate the most actively since they have the most to lose or gain. Their participation guarantees that decisions that are made reflect their interests and that they will support the outcomes of the planning process.

A Spectrum of Stakeholder Participation

Stakeholders can participate in a spectrum of different levels of conservation planning.

Self-mobilisation

- People participate by taking initiatives independently of external institutions for resources and technical advice they need, but retain control over how resources are used. Self-mobilisation can spread if governments and NGOs provide an enabling framework of support. Such self-initiated mobilisation may or may not challenge existing distributions of wealth and power.

Interactive

- People participate in joint analysis, development of action plans, and formation or strengthening of local institutions. Participation is seen as a right, not just the means to achieve project goals. The process involves interdisciplinary methodologies that seek multiple perspectives and make use of systemic and structured learning processes. As groups take over local decisions and determine how available resources are used, they have a stake in maintaining structures or practices.

Functional

- Participation seen by external agencies as a means to achieve project goals, especially reduced costs. People may participate by forming groups to meet predetermined objectives related to the project. Such involvement may be interactive and involve shared decision making, but tends to arise only after major decisions have already been made by external agents. At worst, local people may still be only coopted to serve external goals.

For material incentives

- People participate by contributing resources (e.g., labour in return for food, cash or other material incentives). Farmers may provide the fields and labour, but are involved in neither experimentation nor the process of learning. It is very common to see this called "participation," yet people have no stake in prolonging technologies or practices when incentives end.

By consultation

- People participate by being consulted and by answering questions. External agents define problems and information-gathering processes, and so control analysis. Such a consultative process does not concede any share in decision-making, and professionals are under no obligation to take on board people's views.

Passive

- People participate by being told what has been decided or has already happened. It involves unilateral announcements by an administration or project management without any listening to people's responses. The information being shared belongs only to external professionals.

Manipulative

- Participation is simply a pretence, with "people's" representatives on official boards but who are unelected and have no power.

Adapted from Table 1-A typology of participation; how people participate in development programs and projects (from J.N. Pretty. Participatory Learning For Sustainable Agriculture. In World Development, Vol. 23, No. 8, 1995, pp. 1247-126)

One of the newest and most innovative ways that USAID works with partners is through the Global Development Alliance. The Global Development Alliance serves as a catalyst to mobilize ideas, efforts, and resources of the public sector, the private sector and NGOs in support of shared objectives. A development alliance is an agreement between two or more parties to jointly define a development problem and jointly contribute to its solution. Alliance members share resources, risks, and rewards in pursuit of a development objective that is not likely to be achieved without the alliance. An alliance achieves its development objective by bringing new actors to the development challenge or significantly expands an alliance with existing partners, using new and innovative instruments or approaches, and leveraging significant resources.

Identifying the stakeholders and their interests does not ensure that they can or will participate. Certain stakeholders may either be incapable of or unwilling to become involved and support a given activity or program. Some stakeholders may have a long history of bad relations with other key stakeholders—local communities with government agencies, for example. Involving all stakeholders, including marginalized groups such as women (see Women and Biodiversity textbox below), will help ensure that conflicts are reduced and activities are appropriate given the local social and natural environment.

Women and Biodiversity

Worldwide, there are important differences in how women and men use, manage, and conserve biological resources. Integrating gender-related information and an understanding of gender-based impacts improves the effectiveness and sustainability of biodiversity conservation policies and programs. By giving women greater access to local, national, and international institutions engaged in biodiversity decision-making, USAID can ensure the social acceptability and sustainability of its conservation and management efforts. The following are ways to incorporate gender explicitly into projects:

- **Recognize** women's role in the management of biodiversity. As providers of family food, water, fuel, medicine, clothing, income, and household goods, women depend on healthy and diverse ecosystems. They are rich sources of knowledge about uses and patterns of local biodiversity.
- **Evaluate** women's and men's use and management of biological resources (both formal and informal) and address the diversity of uses in consultation with women and men. Background information and data collected throughout the activity should be gender disaggregated.
- **Seek** input from women by consulting with women's organizations or creating opportunities to meet with women separately from men. Women may not feel comfortable speaking up in the presence of men. Ensure equal participation of women in all levels of biodiversity activities—from planning to implementation to decision-making. Address barriers to women's full participation such as language, literacy, access to resources or credit, and time constraints.
- **Support** women's access to and ownership of land and resources. Women's use and management of biological resources often takes place on marginal land and common areas far from villages.
- **Recognize** the constraints that economic, family, and community responsibilities place on women's time. Build in flexibility to work around women's schedules, and design biodiversity conservation activities that save time for women rather than fill it.
- **Encourage** USAID partners to emphasize best-practice norms, such as nondiscrimination and fair compensation for women.
- **Work** with USAID partners to expand the role of women in the private sector.

Roles and Responsibilities

It is also important when collaborating to have clear and appropriate roles and responsibilities for each stakeholder group. All stakeholders should know what their role is in the conservation planning process and what their corresponding responsibilities are. Each group should participate in decisions concerning the amount of impact their participation can have on the process and their corresponding responsibilities as participants in the process.

Agreement about Conservation Priorities

You should also understand what the costs and benefits of participation in the process are for each group. For example, the cost of participation for women in local communities can be much greater than that for men because they tend to spend more hours of the day working to support the household. However, because women are often the ones directly responsible for extracting natural resources—such as fuelwood—the benefits of their participation are correspondingly great, both for them and for successful conservation.

Building collaboration and partnerships often requires that stakeholders with very different interests in the biodiversity of a given place work together and search for solutions that can fulfill their diverse interests. Stakeholders need to agree on some minimum set of conservation goals (see *Choosing Conservation Priorities and Targets*). A conservation organization may want to preserve a patch of endangered forest, whereas a social development agency may be interested in improving the standard of living of a local community. They might work together to develop economic alternatives to destructive forest use.

Developing a vision of a desirable and sustainable future can help stakeholders recognize their common interests and develop mutually agreeable strategies for managing biodiversity. “Identifying optimal futures” can help groups “think expansively and constructively” (WWF, 2000). For examples of how to help stakeholders develop a conservation vision, see Byers, 2000 (www.bsponline.org/bsp/publications/bsp/behaviors_eng/behaviorsguide_eng.pdf).

Dealing with Conflicts

Good communication among all partners is essential to maintaining the participation of stakeholders and their commitment to conservation priorities, as well as to managing disputes among stakeholders. In any long-term conservation activity or program, disputes among stakeholders are almost certain to occur. Addressing such disputes at the earliest stages is always best. To enable long-term stakeholder cooperation, managers of conservation activities must be able to address conflicts constructively.

Possible methods for resolving disputes and conflicts include the following:

- Meetings or roundtable discussions can bring opposing stakeholder groups together to discuss issues of mutual interest.

- Training in negotiation, creative problem-solving, and dispute resolution techniques can help build the capacity of stakeholders to deal with and resolve potential conflicts.
- Joint fact-finding involves stakeholders working together to investigate issues about which there are factual or scientific disagreements.
- Mediation by a third party (sometimes professionally trained for this role) can facilitate communication among stakeholders who have reached an impasse.

(modified from *Stakeholder Collaboration*, 2000)

Sources for More Information

- Stolton, S., and N. Dudley, Eds. *Partnerships for Protection: New Strategies for Planning and Management for Protected Areas*. London: WWF-International and IUCN, 1999.
- World Bank's Participation Web Page: www.worldbank.org/participation
- USAID's Internet Guide for Participatory Development: www.usaid.gov/about/part_devel
- Global Policies and Projects in Asia—Indigenous Peoples and Biodiversity Conservation: www.bsponline.org/bsp/publications/asia/marcus/marcus A.html
- Indigenous Peoples and Conservation Organizations—Experiences in Collaboration: www.bsponline.org/bsp/publications/africa/indigenous_conservation/indigenous_conservation.pdf
- In Good Company—Effective Alliances for Conservation: www.bsponline.org/bsp/publications/aam/good/Good_Co-00.pdf

FINANCIAL PLANNING

Projects need a solid financial foundation to be feasible and sustainable. As part of the conservation planning process, a financial plan should be developed that lays out how the goals and activities of the project will be achieved financially. A financial plan is not the same as a budget. A budget describes how much money is necessary for different activities. A financial plan describes the most appropriate sources of financial support for the short, medium, and long-term needs of the project. The basic steps to develop a financial plan are:

Key Questions

- What are the priorities of the financial plan?
- What financial mechanisms will support the program?
- What is the balance of short-term and long-term funding mechanisms?
- How does the financial plan account for the long-term sustainability of the program?

- Develop a management plan for the project that defines activities to be implemented.
- Quantify the project's financial needs according to the planned activities.
- Identify existing funding sources and funding gaps.
- Develop a fundraising strategy.

One key to financial sustainability is to set priorities. Financially sustainable plans strike a balance between meeting urgent needs and setting aside some income to build a contingency fund for the future. Setting priorities means that essential core functions are distinguished from activities that might be postponed or downsized. This kind of planning allows adjustments in the budget to be made without sacrificing essential needs of the project.

Another key to financial sustainability is to develop a financial plan that does not rely too heavily on short-term or unreliable sources. Some financial mechanisms are more reliable than others, some more or less difficult to raise, some can be used freely according to management priorities while others come with many strings attached. Some funding mechanisms take a long time and a lot of effort to establish, and therefore do not provide a good short-term return, but over the long term offer a possibility of steady, reliable financing for recurrent costs.

Financial plans are often designed to cover five to ten-year periods. However, some projects are expanding the idea of a financial plan to encompass large-scale planning over a long time frame. WWF, for example, has started planning for some ecoregional conservation projects over fifty-year periods with multiple partners sharing in the financial planning and responsibility.

See the Conservation Finance Alliance for more information (www.conservationfinance.org/) and the guide they have developed (guide.conservationfinance.org/).

Financial Mechanisms

Financial support for conservation has traditionally come in the form of grants and loans from private foundations and wealthy individuals, government aid agencies, and the Global Environment Facility (GEF).

In recent years, a range of sustainable conservation finance mechanisms have been used to provide reliable, long-term sources of expanded funding for on-the-ground conservation programs. These sustainable finance mechanisms include tourism user fees, bioprospecting payments, debt-for-nature swaps, conservation trust funds, carbon investment projects, and alternative economic activities for local stakeholders.

Some mechanisms are in early stages of development and testing, such as:

- Green bonds and other securitized instruments,
- Ecosystem service payment schemes (e.g., water use fees),
- Green insurance products,
- Resource extraction fees (e.g., on oil/gas exploration, logging, and mining) dedicated to conservation, and
- Environmental investment funds that support conservation-friendly enterprises.

Below are descriptions of some financial mechanisms. See the Conservation Finance Alliance’s guide (guide.conservationfinance.org/) for a more complete list of mechanisms.

Grants

Grants are gifts of funds or other resources. Although there are no payback requirements, donors may set conditions on the design and implementation of activities, and require monitoring, evaluation, and other kinds of reporting. Grants can sometimes be used to leverage other sources of funding, and therefore can be useful in contributing to larger programming efforts or in forming a “bridge” between two long-term activities. Grants are usually used to fund activities over a relatively short period of time (e.g., one to five years) and are not seen as reliable mechanisms for providing long-term inputs or support (say, over decades).

Loans

Loans are the temporary use of funds or resources with interest charges levied for their use. The donor works with the recipient organization to negotiate the terms of the loan (amount of funds, the interest rate, the payback period, etc.) and the conditions regarding how it will be used. If the lender is not satisfied with how the planned actions are being implemented, or if the

repayment schedule is not honored, the loan funds could be withdrawn or a penalty imposed on the loan recipient. Loans are generally too expensive (because of interest charges) and cumbersome for use as a tool for long-term financing of conservation activities. Like grants, but for different reasons, loans are therefore usually used to fund activities over relatively short time frames.

Bioprospecting Payments

The natural environment is a major source of new compounds that may have great medicinal value or commercial value as sources of food, fiber, or other products. Several marketable commodities or services might be sold in a bioprospecting agreement:

- The pharmaceutical or other company could purchase an option to prospect over a certain period of time. In return, the seller of the option guarantees protection of the forest at least over that time period.
- The company could purchase plant samples from local prospectors who actually do the collecting, paying per plant. Whether the forest is protected would depend on who controls the forest, who does the prospecting, and whether enough money changes hands to compete with revenue from other uses of the forest.
- Once a useful plant is identified, it could be cultivated for sale, creating an alternative source of revenue for local communities.

Although bioprospecting is intriguing, in practice it is in its infancy and taking place in a policy vacuum. Virtually no precedent exists for national policies and legislation to govern and regulate wildland biodiversity prospecting. Biodiversity prospecting conducted appropriately may contribute to environmentally sound development and return benefits to the custodians of genetic resources. However, it has often been carried out in the mold of previous resource-exploitation ventures, and has had harmful effects on biodiversity conservation and environmentally sound development.

Under the UN Convention on Biodiversity (CBD), developing countries may now pass legislation requiring the payment of access fees and the negotiation of royalty payments with suppliers of genetic resources. In turn, companies are required under the convention to obtain the prior informed consent of source countries when they seek access to biodiversity. (Countries can require that companies demonstrate they received this consent when the company files for a patent on a new product.)

Prior to the CBD, most countries considered genetic resources to be the “common heritage of mankind,” meaning that there was no law or moral obligation requiring a company that col-

lected genetic material from another country to pay for access to that material. The CBD, by asserting the sovereignty of nations over their biodiversity, explicitly recognizes the right of countries to establish legislation regulating access to genetic resources and, if they wish, require payment for that access. Moreover, it requires that any company or country collecting biodiversity obtain the prior informed consent of the source country.

For more information on bioprospecting, see:

- W.V. Reid, et al. *Biodiversity Prospecting: Using Genetic Resources for Sustainable Development*. Washington, DC: World Resources Institute, 1993. www.wri.org/biodiv/bp-home.html
- *Bioprospecting and Biodiversity Conservation*. USAID CDIE Report: www.dec.org/pdf_docs/pnaby200.pdf
- The World Resources Institute also maintains a list of companies active in plant and other natural product collection and screening: www.wri.org/biodiv/bp-home.html

Debt-for-Nature Swaps

In a debt-for-nature swap, a third party (often an NGO or bilateral donor) will arrange to purchase a portion of a country's public debt at a discount. The third party then "forgives" the debt in exchange for a negotiated level of investments in conservation on the part of the country's government. Several conservation NGOs, including The Nature Conservancy and Conservation International, have been actively involved in such international swaps for more than a decade. The U.S. government's *Tropical Forests Conservation Act*—caselaw.lp.findlaw.com/cascode/uscodes/7/chapters/41/subchapters/vi/toc.html—and the *Enterprise for the Americas Initiative*—www.usaid.gov/environment/eai.htm—are bilateral programs used to forgive developing country debts in return for investments in conservation. For more information, see Kaiser and Lambert, 1996: <http://www.biodiversityeconomics.org/finance/topics-42-00.htm>

Conservation Trust Funds

To provide more sustained, long-term funding, environmental or conservation trust funds can be employed. During the past decade or so, such funds have become a more common way to finance conservation. These funds are usually of three main types:

- *Endowments*, in which the principal is invested and income generated by that investment is used to finance activities, preserving the principal itself as a permanent asset;
- *Sinking funds*, in which the principal and any investment income over a set period of time—generally a relatively long time is used to finance activities; and

- *Revolving funds*, in which new funding is received on a regular basis (such as from grants, taxes, user fees, etc.) to replenish, or even increase, the original principal.

Many conservation funds are set up as *trusts*—a legal structure by which funds or other property is held, invested, and spent by a board of trustees or board of directors exclusively for a specific purpose, as defined in a charter or deed of trust. Trusts are usually locally created and managed, and their creation requires a considerable amount of transparency and participation.

Conservation funds may be most appropriate when:

- The issues being addressed require a sustained, long-term response;
- More than one organization is needed to implement the range of activities needed to address the problem;
- Existing agencies cannot effectively manage the amount of money and types of activities needed;
- There is active government support and broad-based participation from relevant agencies and organizations; and
- A reliable systems of contracts, banking, record keeping, and auditing, and a climate of financial transparency exists in the country where the fund will be established.

For more information on these funds, see:

- Norris, R. *The IPG Handbook on Environmental Funds: A Resource Book for the Design and Operation of Environmental Funds*. New York: Pact Publications, 2000.
- www.biodiversityeconomics.org/finance/topics-222-00.htm
- Mitkitin, K., and D. Osgood. *Issues and Options in the Design of GEF-Supported Trust Funds for Biodiversity Conservation*. Biodiversity Series No. 011. Washington, DC: World Bank, 1995.
- *Evaluation of Experience with Conservation Trust Funds*. Washington, DC: Global Environment Facility, 1999. gefweb.org/ResultsandImpact/Monitoring___Evaluation/Evaluationstudies/evaluationstudies.html.

USAID has considerable experience with endowments, particularly ones created with U.S.-appropriated dollars that are managed as trusts (see Horkan and Jordan, 1996).

Environmental funds and trusts can be more than financial mechanisms. Ideally they are products of a broad consultative process, one that contributes to governance structures that involve people from different sectors, credible and transparent operational procedures, and sound financial practices. Their creation requires considerable time and resource inputs and a long-term commitment to establishing a new institution.

Establishing a conservation fund may not always be the best use of the money available for financing conservation. You should weigh the decision to tie up a large amount of capital to earn relatively small amounts of income over a long period of time against alternative approaches—such as giving the money away as a grant, or making a loan.

Key issues that determine whether a conservation fund is the best financing mechanism include:

- What type of conservation activities are needed, and over what period of time?
- What kinds of organizations are currently carrying out such activities, and what are their strengths and weaknesses?
- What would be the added benefit of creating a new mechanism for government and NGOs to work together through a conservation trust or endowment fund?
- Are the country's legal and financial practices and supporting institutions strong enough to support a conservation fund if one were created?

For more information, see pages 10–13 in *The IPG Handbook on Environmental Funds: "What is an environmental fund, and when is it the right tool for conservation?"*

Conservation Concessions

A conservation concession is a relatively new mechanism for conservation that involves a conservation organization acting as a resource extraction company by bidding on a development concession and, if successful, choosing not to exercise its resource extraction rights. One of the world's first conservation concessions was recently negotiated between the Government of Guyana and Conservation International, which successfully bid on the rights to an exploratory lease of 200,000 acres of pristine forest. CI plans to lease the area at market rates and protect it, rather than extract timber. For more information on conservation concessions, see:

- Conservation International's Conservation Enterprises Program: www.conservation.org/xp/CIWEB/programs/conservation_enterprises/cons_enterprise.xml
- "Financial Sustainability in Biodiversity Conservation Programs": www.biodiversityeconomics.org/finance/topics-24-00.htm
- IUCN Biodiversity Economics Site: biodiversityeconomics.org
- McNeely, J.A. *Achieving Financial Sustainability in Biodiversity Conservation Programs*. Gland, Switzerland: IUCN, 1999: www.biodiversityeconomics.org/pdf/topics-25-01.pdf
- Bayon, R., J.S. Lovink, and W.J. Veening. *Financing Biodiversity Conservation*. Technical Paper No. ENV-134. Washington, DC: IADB, 2000. 37 p.

- The EcoEnterprises Fund (private venture capital for conservation in Latin America and the Caribbean): www.ecoenterprisesfund.com/index.htm.

Alternative Economic Activities for Local Stakeholders

Economic values are only one of the many kinds of motivation for behavior, but in many situations they are a powerful factor. If economic opportunities that are compatible with conservation are profitable enough, people are more likely to switch to them. If alternatives are not profitable enough, economic incentives may not be the solution. For alternative economic activities that are compatible with conservation to succeed, people need a realistic and accurate understanding of their financial potential.

To be compatible with conservation, alternative economic activities must be ecologically sustainable (see *Sustainable Use*). Without good ecological and social information and careful planning, the promotion of a new resource use could lead to that resource being “mined” rather than used sustainably. For example, promoting the use of palm fronds for basket weaving might lead to their overexploitation unless harvest rates are controlled. To avoid this risk, it is important to do a thorough and effective analysis of the proposed activities, considering the startup costs, the scale at which the activity might be viable, nonfinancial factors that keep people from shifting activities (such as food self-sufficiency or risk aversion), the size of the market for the products, and so on. A good ecological understanding of the resource is also required to be able to set sustainable harvest levels.

The kinds of alternative economic activities discussed above may not, in fact, be viable under current market conditions. However, analysis may suggest market interventions that could make biodiversity-conserving activities financially competitive. For example, new crops that place less stress on biodiversity might require startup investments that would pay off quickly, but credit might not be available in the community. Or, new crops might be a good option if it were possible to get them to market more quickly, but transportation may not be available. In such cases, conservation projects could involve market interventions that help to remove such constraints, so that market forces can operate and provide economic incentives for communities to switch to more biodiversity-friendly practices.

LINKING WITH OTHER SECTORS

Linking Sectors in the USAID Context

Site-Level Strategies to Link Biodiversity with Other Sectors

Linkages between Biodiversity and Other Sectors

LINKING SECTORS IN THE USAID CONTEXT

Linking sectors within the USAID context can be more difficult than managing individual sectoral programs for many reasons. It can be difficult to adequately address all sectors being integrated. One sector usually has priority, while the other sector may not be given adequate attention. For USAID reporting requirements, it can be difficult to capture and share quantitative measurements of results across sectors. Integration of sectors can be more challenging and require greater creativity than traditional “stovepiping,” and there may not be an institutional tolerance for risks and failures. Strategic objectives lend themselves to stovepiping, not integration. Finally, linking sectors can be more difficult and labor-intensive than other approaches.

However, the benefits of linking biodiversity with other sectors outweigh the costs because the integration results in more effective activities on the ground. Indeed, most threats to biodiversity require these linkages far more than is often recognized. Within the USAID context, it may also be useful to link sectors during times of budget cuts and downsizing, when more needs to be done with less. Sometimes Missions are mandated to link sectors, often through a geographic focus.

SITE-LEVEL STRATEGIES TO LINK BIODIVERSITY WITH OTHER SECTORS

Within a project, different sectors can be linked either programmatically or substantively. Programmatic linkages are the mechanics of connecting sectors within a program or activity, such as coordinating activities in the field. For example, a health project and a conservation project may be working in the same geographic area and share resources, field people, and so on. Substantive linkages occur when sectors are conceptually linked. For example, people from the health sector and the conservation sector may design a project together that integrates potable water and forest biodiversity through a watershed restoration project.

When working with communities or stakeholders to conserve biodiversity, there have traditionally been four types of strategies used to link sectors within a project: barter, entry point, bridge, and symbiotic. All of these strategies entail programmatic linkages, whereas only the bridge and symbiotic strategies have substantive linkages between sectors. (Adapted from the Biodiversity Support Program's "An Ounce of Prevention: Making the Link between Health and Conservation": www.bsponline.org/bsp/publications/aam/ounce/Titlepage.htm.)

Programmatic linkages:

- *Barter strategy*: An activity is undertaken as direct compensation for conservation action taken by community members. No substantive linkage is necessary. Example: a project that provides mobile health team visits to communities.
- *Entry point strategy*: Priority community needs are addressed initially as part of building credibility and trust and increasing community capacity for collective decision making. These will then be used as a platform from which to undertake future conservation efforts. No substantive linkage is necessary. Example: a project that establishes a health clinic and promotes it as a site of community coordination.

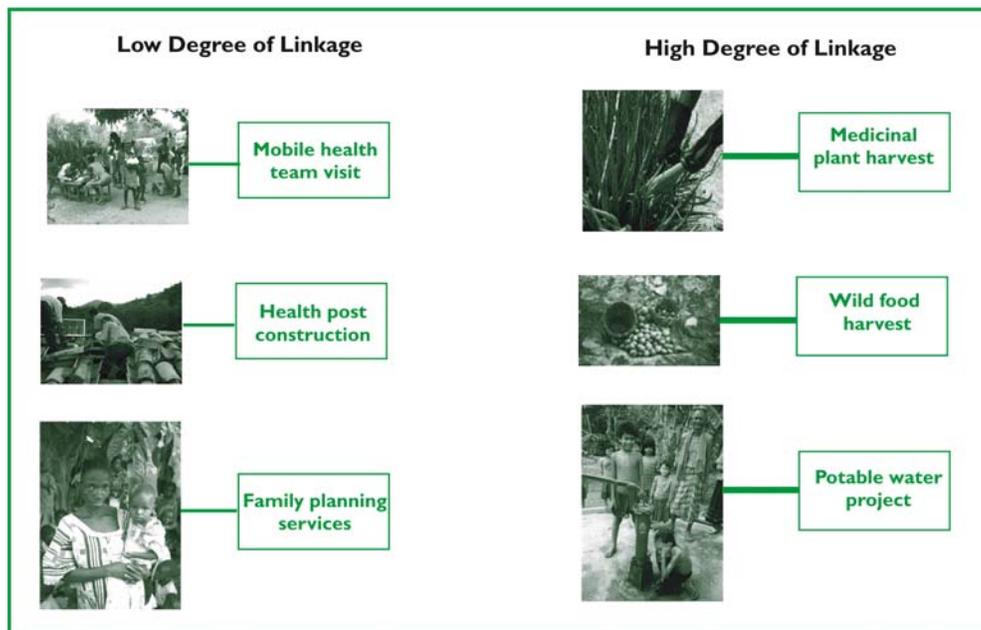
Programmatic and substantive linkages:

- *Bridge strategy*: Usually, there is a staff perception of a conceptual linkage between a priority concern of the community and biodiversity. Project staff work with community members to address the priority concern and conservation objectives while focusing on raising awareness of the community members so that they will also come to understand the substantive linkages. Example: a project focusing on providing clean drinking water that is dependent on watershed protection.
- *Symbiotic strategy*: Project staff and community members perceive the substantive linkages between a priority concern and biodiversity conservation. Community members may already be mobilized but need support and/or facilitation from project staff. Example: a proj-

ect that focuses on conserving habitat to protect wild plants required for food and traditional medicines.

These strategies lie along a spectrum from a low degree to high degree of substantive linkage between sectors. The degree to which the sectors are linked depends on the specific context within which the activity is taking place. Therefore, the example activities shown in Figure 5 are divided loosely into two categories: “low degree of linkage” and “high degree of linkage.”

Figure 5. Examples of biodiversity and health activities



Biodiversity projects have often used the entry point strategy as a way to form a relationship with a community. However, the entry point strategy, because of its lack of direct links with biodiversity, has often backfired when projects have been unable to show any benefits to conservation. The symbiotic strategy is the ideal scenario for both communities and conservation because of the shared benefits of the activity. The other strategies may be useful, however, particularly the bridge strategy, which can pave the way to a symbiotic strategy. Critical analysis of project activities in terms of these four strategies can lead to better designed activities that serve the interests of both biodiversity and people.

LINKAGES BETWEEN BIODIVERSITY AND OTHER SECTORS

The conservation of biodiversity can be promoted across many scales and many different types of activities. Each section below links biodiversity with another sector and provides:

- a short description of the substantive linkages between the sectors,
- a list of examples of activities that link the two sectors,
- examples of USAID-supported projects that have linked the two sectors,
- and web resources for more information.

The lists of activity examples, although not exhaustive, should provide ideas that will inspire new projects and activities that link biodiversity with other sectors.

Democracy and Governance

Improved management of the environment and natural resources is frequently thwarted by poor governance and institutional weaknesses. Conversely, disputes over key natural resources, such as forest and water, can hamper improved governance and decentralization. Empowering local government and communities to manage natural resources is an opportunity to promote more effective and sustainable use of these key resources. Support for the land use/control rights of indigenous people and other local resource users with commitment to sustainable practices can have direct, positive impacts on biodiversity conservation while promoting social justice.

Activities

Democracy and governance activities that can *directly conserve* biodiversity:

- Promote community-based management of natural resources.
- Involve disenfranchised or marginalized local stakeholders in resource management activities.
- Support programs that recognize and build women's capacity to participate in natural resources management.
- Improve access to biodiversity and environment information by stakeholders, which can, for example, reduce corruption.
- Promote NGO participation in policy-making that affects the environment.
- Promote the creation and clarification of land tenure laws and policies.
- Strengthen capacity of governments to enforce environmental policy.

Democracy and governance activities that *strengthen the capacity* of different groups to conserve biodiversity:

- Support media to promote environmental issues. Possible activities include establishing a newspaper or newspaper insert to provide environmental information or creating a public watchdog mindset and mobilizing citizen action.
- Support NGOs working in the environmental law and advocacy arena. Possible activities include counseling citizens and local NGOs, bringing high-profile lawsuits to uphold environmental rights, publishing material on basic environmental rights for citizens, conducting environmental stakeholder seminars, and leading trainings for law students.
- Build the capacity of environmental lawyers to help communities and indigenous groups secure rights to natural resources.

Democracy and governance activities that *support policy* to conserve biodiversity:

- Promote environmental policy on a small scale (e.g., local regulations concerning a natural resource).
- Strengthen capacity and awareness of judges to try environmental cases.

Specific USAID examples:

- In Bolivia, the Democratic Development and Citizen Participation Program is training municipalities to integrate natural resources management into the development of municipalities' annual operating plans.
- In Indonesia, where the success of decentralization hinges on the capacity of local government to carry out their new responsibilities, USAID helped lay the groundwork for improved, more effective governance, especially in the areas of administrative and fiscal policy, improved capacity to deliver effective water and other services, and increased public participation in local government decision-making.
- In the Philippines, USAID helped devolve land tenure and extraction rights from the government to local communities, improving the livelihood of local families while leading to the increased protection and improved management of 2.9 million hectares representing 50% of the Philippines' remaining forest.

Sources for more information:

- Greening Democracy and Governing the Environment:
www.bsponline.org/bsp/publications/asia/greening/greening.html

- Managing for Cross-Sectoral Results: www.bsponline.org/bsp/publications/bsp/workshop/workshop.pdf
- Environment-Democracy Governance Exchange—The EDGE Roundtable Series: Workshop Summary: www.bsponline.org/bsp/publications/asia/roundtable/roundtable.html
- Governance and Biodiversity—Weaving Resilience into the Web of Life: www.bsponline.org/bsp/publications/asia/kemala/kemala.html
- Shifting the Power: Decentralization and Biodiversity Conservation: www.bsponline.org/bsp/publications/aam/shifting/Shift_Power_00.pdf

Human Health

For people who depend on intact ecosystems for their clean water and food, their health is a good indicator of the health of the ecosystem in which they live. Population and development pressures that degrade such environments can have multiple direct and indirect impacts, including decreased crop yields; increased prevalence and distribution of pathogens and disease vectors, such as emerging viral diseases (e.g., Ebola), malaria parasites, or mosquitoes; and decreased quality and quantity of fresh water.

Transmission of disease from wild animals to humans has major health implications, with HIV/AIDS being one example. In addition, there are possible global effects, both in terms of the global ecosystem and the extinction of species from which potentially beneficial and profitable pharmaceutical compounds might otherwise have been derived.

HIV/AIDS and Biodiversity Conservation

Community-based natural resource management activities and programs offer one of the best development channels to work directly and positively with communities to address the HIV/AIDS issues affecting them. Joining HIV/AIDS activities to interventions aimed at community forestry or fisheries, civil society strengthening, local conservation efforts, or wildland management is an effective approach to reduce the impact of the epidemic on families, communities, and the environment.

Why should conservationists care about HIV/AIDS?

First, HIV/AIDS limits the ability of individuals and communities to conserve their natural resources. As illness and death occur, families and communities develop coping responses to compensate for the loss of productive members and to meet the most urgent survival needs. Families sell their assets and switch to other sources of income. Within an AIDS-affected community, there are threats to the established and traditional resource management or land tenure systems and to the local governance structures. As families and communities focus on the crisis caused by HIV/AIDS, they usually place less emphasis on sustainable management or stewardship of resources and more on meeting their pressing needs through direct exploitation of any type of harvesting—firewood, bushmeat, fish or forest products, and even herbs used as traditional medicines.

Actions that projects can take to mitigate the impact of HIV/AIDS on communities and natural resources:

- Incorporate HIV/AIDS information into the conservation planning process. Ask local HIV/AIDS experts for advice. Learn about the prevalence rate and trends in the communities where projects are based and among the natural resource professionals connected with the project.

- Analyze which programs are likely to be vulnerable to HIV/AIDS, such as those involving land reform, requiring migration of participants, aiming to build skills in local populations, requiring community financial resource contributions, requiring social cohesion and community action, or those requiring national policy attention and resource commitment.
- Incorporate HIV/AIDS realities into strategies and budgets.
- Reconsider program strategy as necessary. Can you expect to meet your original objectives in the HIV/AIDS context?
- Talk openly about HIV/AIDS with program partners (government agencies, communities, nongovernmental organizations, donors) to gain their support.
- Talk with public health colleagues to discuss collaboration in linking preventative care and support services with partner institutions and communities.
- Collaborate with local organizations to provide HIV/AIDS-related services.
- Consider how to integrate orphans and vulnerable youth into activities and skill development.

Second, biodiversity projects and activities may inadvertently contribute to the spread of HIV/AIDS through increased interaction among project participants and local communities as well as through the infusion of resources into a project area. For example, when NGOs and governments support meetings and workshops, they might facilitate situations that could contribute to the spread of HIV/AIDS among participants or local populations. Actions that projects can take include:

- Speak directly about HIV/AIDS and provide access to condoms at workshops and meetings when attendees are far from home.
- Provide insurance, counseling, and other support services to personnel.
- Include HIV/AIDS prevention and control elements in natural resources management curricula training programs.
- Provide the support and resources to help natural resource management professionals understand the implications of the epidemic for their sector.

(Adapted from *AIDS Brief for Sectoral Planners and Managers: Community-Based Natural Resource Management*, www.dai.com/publications/h-art_aids_brief.htm or www.dai.com/pdfs/aids_brief.pdf or www.afr-sd.org/Environment/AIDS%20Brief-all-150%20res.pdf)

For more information, also see:

- AIDS Toolkits—HIV/AIDS and Community-Based Natural Resources Management: www.afr-sd.org/Environment/AIDS%20Toolkit-150%20res.PDF
- The Africa Biodiversity Collaborative Group Workforce on the Implications of HIV/AIDS on Africa's Natural Resources and Conservation: www.frameweb.org/ev.php?URL_ID=6786&URL_DO=DO_TOPIC&URL_SECTION=201&reload=1056639220

Activities that *directly conserve* biodiversity and improve human health:

- Conserve/restore forests to reduce the spread of malaria.
- Promote appropriate fire management regimes to help conserve biodiversity and to decrease air pollution, which causes respiratory ailments.
- Promote alternative sources of fuel to replace wood or make wood use more efficient to decrease respiratory problems.
- Promote conservation of biodiversity (e.g., forest or coastal) to ensure supply of micronutrients (e.g., vitamins) and macronutrients (fats and proteins) to communities.
- Promote the conservation and use of medicinal plants and maintain knowledge about them.

- Promote watershed management activities to ensure potable water and conserve biodiversity.
- Promote mitigation of pollution that has negative effects on human health as well as biodiversity. For example:
 - Promote alternatives to destructive fishing practices, which use dynamite, cyanide, and other poisons, and alternatives to use of mercury in gold mining.
 - Promote organic agriculture near protected areas, which has health benefits for people and wildlife (as well as benefits to water) from reduced pesticide and fertilizer use.
 - Promote the planting of indigenous species with medicinal value near protected areas.

Sources for more information:

- An Ounce of Prevention—Making the Link between Health and Conservation: www.bsponline.org/bsp/publications/aam/ounce/Titlepage.htm
- An Ounce of Prevention Literature Review: www.bsponline.org/bsp/publications/aam/Health/Titlepage.htm

Conflict Prevention and Humanitarian Relief

Often conflicts are generated by competition over increasingly scarce, vital natural resources—especially cropland, forests, and freshwater. These environmental conflicts generate severe social and ethnic stresses inside countries, stimulating subnational insurgencies, ethnic clashes, and mass migration. Many humanitarian crises and biodiversity loss share underlying causes. The resulting dislocation of people and breakdown of support systems can themselves exacerbate environmental problems as well.

Conflict prevention and humanitarian relief activities that *directly support* biodiversity conservation:

- Promote activities that engage all stakeholders, including government officials, NGOs, and traditional authorities, in dealing with conflict-related threats to natural resources in areas under their control.
- Incorporate the role of natural resources as an element of conflict into assessments of vulnerability to conflict.
- Work with other sectors at all organizational levels to establish the importance of considering impacts on the environment.
- Promote the identification of clear roles and responsibilities and designate lead agencies in each sector in times of crisis.
- Promote use of environmental information, such as locations of protected areas and areas of high biodiversity, to advocate appropriate siting of refugee camps.

Conflict prevention and humanitarian relief activities that *strengthen the capacity* of different groups to conserve biodiversity:

- Build capacity to combat uncontrolled exploitation of natural resources before times of crisis and transition.
- Build capacity for policy formulation that takes into account biodiversity concerns.
- Promote capacity of environmentalists to communicate with the relief sector and identify areas of common ground (e.g., conserving resources and safeguarding livelihoods).

Conflict prevention and humanitarian relief activities that *support policy* to conserve biodiversity:

- Promote existing environmental guidelines for relief and development sectors, and identify common concerns and areas for potential collaboration.

Specific USAID examples:

- In the Middle East, where water rights are fundamental to political and security negotiations, the Israeli-Palestinian Joint Water Committee has issued a declaration for keeping water infrastructure out of the cycle of violence, allowing USAID's work in the water sector to proceed.
- In Nepal, helping provide incentives for rural communities to resist the Maoist insurgency, USAID has developed model community-based approaches to forest management that have increased local community participation in decision-making and promoted economic growth at the local level.

Sources for more information:

- Trampled Grass—Mitigating the Impacts of Armed Conflict on the Environment: www.bsponline.org/bsp/publications/africa/139/titlepage.htm

Economic growth

A country's economy depends on a healthy environment. Sustainably managed natural resources contribute to a country's prosperity. However, it's often difficult to get countries to look beyond the short-term benefits of rapid economic growth and recognize the long-term cost of irresponsibly consuming a natural resource. The solution to this problem lies in efforts to integrate natural resource-based industries (such as agriculture, tourism, timber, and fishing; see sections below) with sound, community-based natural resource management practices.

Sources for more information:

- The Successful Use of Economic Instruments to Foster Sustainable Use of Biodiversity—Six Case Studies from Latin America and the Caribbean: www.bsponline.org/bsp/publications/lac/white_paper_eng/whitepaper.html
- Evaluating Linkages Between Business, the Environment, and Local Communities—Final Stories from the Field: www.bsponline.org/bsp/publications/bcn/annual_report/bcn_report.pdf
- Conservation International Center for Environmental Leadership in Business: www.conservation.org/xp/CIWEB/programs/CELB/business_environment.xml

Agriculture

Agricultural expansion is one of the chief causes of species extinction. In much of the tropics and other parts of the world, agriculture is a profound threat to wild biodiversity. Millions of hectares of forests and natural vegetation have been cleared for agricultural use. The misuse of pesticides and fertilizers poisons water and soil and pollutes coastal areas. Agriculture also fragments the landscape, breaking wild species populations into smaller units that are more vulnerable to extinction. Farmers often eliminate wild species from their lands in order to reduce the negative effects of pests, predators, and weeds.

However, wild species are essential to agricultural productivity. Insects and other animals are essential for plant reproduction, contribute to soil fertility, and regulate pest populations. Many plants require pollen from other individuals to set seeds and regenerate. Wild bees, other insects, and bats are the principal pollinators of fruit trees and major staple food crops. These crops include potato, cassava, yams, sweet potato, taro, beans, coffee, and coconut. Declining populations of wild bees and other pollinators caused by pollution and habitat loss now threaten both the yields of major food crops and the survival of wild plant species. Owing to an epidemic of mites, a quarter of North America's wild and domestic honeybees have disappeared since 1988, with a cost to American farmers of \$5.7 billion per year. Many domestic animals feed on wild plants and grasses for at least part of the year. Transmission of disease between wild and domesticated plants and animals is a major concern for biodiversity conservation and for agricultural development.

Agricultural activities that can *directly conserve* biodiversity:

- Protect high-value natural areas on or near farms and ensure connectivity between sites with significant biodiversity.
- Promote management of seminatural habitats for biodiversity.
- Promote farm management practices that reduce agricultural runoff and increase habitat for wildlife (e.g., conservation buffers near streams and drainage areas, contour farming, cover crops, low-till, or no till agriculture).

- Increase cover and food for wild species on agricultural land (e.g., incorporate tree crops and perennials into the cropping system, establish windbreaks, living fences).
- Support farming populations in marginal lands near natural areas.
- Introduce sustainable land use practices around natural areas (e.g., organic gardening, low-input agriculture, integrated pest management).

Agricultural activities that *strengthen the capacity* of different groups to conserve biodiversity:

- Encourage conservation and agriculture professionals to work together to develop and implement agricultural policies that are consistent with environmental policies and protect biodiversity.
- Provide environmental training and education for farmers and agricultural extension staff.

Agricultural activities that *support policy* to conserve biodiversity:

- Enforce environmental regulations within agricultural programs.
- Promote environmental regulations that conserve biodiversity.
- Promote policy incentives for farmers to conserve biodiversity.

Specific USAID examples:

- In Indonesia, USAID, with The Nature Conservancy, is working with local fisherfolk around Komodo Island to develop environmentally friendly mariculture of abalone, sea cucumber, and grouper, providing an alternative income source for those fisherfolk who are or might engage in destructive fishing practices.
- In Nepal, USAID promoted high-value agricultural and forest products through an innovative program that benefited 1.4 million poor people through higher incomes and increased access to markets. Over \$36.4 million of forest products, livestock products, processed agribusiness goods, and high-value agricultural commodities were sold in USAID intervention areas.

Sources for more information:

- Agriculture and Biodiversity Conservation Investments by USAID in Africa—Possible Cross-Sectoral Synergies and Perverse Impacts: www.bsponline.org/bsp/publications/africa/182/titlepage.htm
- Linking Agriculture and Biodiversity Conservation—Review of USAID-Supported Efforts in Africa: www.bsponline.org/bsp/publications/africa/181/index.html
- Maximum Yield?—Sustainable Agriculture as a Tool for Conservation: www.bsponline.org/bsp/publications/aam/maximum/titlepage.htm
- Agriculture and Biodiversity/Natural Resource Management Results of Sector Interviews in USAID: www.bsponline.org/bsp/publications/africa/180/interview.htm

Trade

Examples of activities to promote the sustainable use and trade of natural products, such as non-timber forest products (NTFPs):

- Monitor and evaluate to measure the business's contribution to biodiversity conservation.
- Provide local enterprise staff with management training so they acquire the skills and capacity necessary to run a profitable business.
- Link producers to sources of finance to enable them to expand their businesses.
- Link businesses to market partners and advise them on negotiating agreements, licensing, marketing strategy, and product development to help them increase their sales and keep them informed about the latest market trends.
- Organize business structures, develop strategies, and provide on-site training in business development planning.

Sources for more information:

- The Center for International Environmental Law (CIEL) Conservation and Trade: www.ciel.org/Biodiversity/BiodiversityConservationTrade.html

Tourism

Tourism is one of the largest growth sectors of the global economy. Ecotourism is defined along a spectrum from “any travel during which the traveler views or appreciates the green environment” to “travel in which all activities are environmentally benign.” Ecotourism defined as the former can be extremely destructive of biodiversity. It is important that ecotourism, if it is to contribute to biodiversity conservation, move toward the latter definition.

Examples of activities that link biodiversity conservation and tourism:

- Promote the monitoring and mitigation of tourism impacts on biodiversity.
- Promote community ownership of tourism and fair distribution of benefits.
- Increase capacity of tourism operators to operate a sustainable business (see “Trade” section above).
- Promote communication between tour operators and resource management agencies to ensure low-impact travel and use in national parks and their surrounding lands.
- Promote the development of clear criteria for setting the limits of acceptable change caused by tourism impacts for each ecosystem.
- Promote the capacity of tour operators to understand the ecological need for restrictions and limits.

- Promote a process for local communities to take the long view in selecting a development path for their landscape and their economy.

Sources for more information:

- United Nations Environmental Program—Division of Technology, Industry and Economics: www.uneptie.org
- The International Ecotourism Society: www.ecotourism.org
- World Tourism Organization: www.world-tourism.org
- Planeta.com—Eco Travels in Latin America: www.planeta.com
- RARE Center for Tropical Conservation: www.rarecenter.org/index.cfm
- Big Volcano Ecotourism Resource Center: www.bigvolcano.com.au/ercentre/ercpage.htm
- Rainforest Alliance, Sustainable Tourist Program: www.rainforest-alliance.org/programs/sv/index.html

Energy

Energy production and its use are major causes of environmental degradation. Mining, drilling, and transportation of energy resources can have calamitous environmental impacts, especially in developing countries that lack effective environmental monitoring and enforcement. The collection of fuelwood for cooking can be a primary cause of forest degradation. Renewable sources of energy for local communities—such as solar, wind, and even small hydro—can decrease the reliance on fuelwood and can be tied in with community-based conservation projects.

Examples of activities that link biodiversity conservation and energy:

- Promote best practices (e.g., low-impact mining) in or near natural areas.
- Reduce the demand for fuelwood in buffer communities by promoting agricultural activities that provide wood as a by-product (alley-cropping, integration of tree crops, establishment of wood lots, etc.).
- Promote alternatives to wood as fuel (such as biogas) for communities near natural areas.
- Promote energy pricing policies that promote the sustainable use of natural resources, particularly forests.
- Promote proposed energy infrastructure that is compatible with biodiversity conservation.

Urban Issues

The world in which USAID works today is increasingly urban. About 50% of the families in developing countries currently reside in cities and towns. One-third of the world's population now crowds onto lands within 60 kilometers of the coastline. Although urban areas can have negative impacts on biodiversity, they also have the potential for alleviating pressure on biodi-

versity. By concentrating people in certain areas, there is the potential for improved efficiency in natural resource use and economies of scale for infrastructure such as water treatment, sanitation, and waste management. Urban areas also offer the opportunity of educating and mobilizing large numbers of people around environmental issues.

Examples of activities that link biodiversity conservation and urban issues:

- Promote alternative sources of protein to replace bushmeat consumption in urban areas.
- Promote alternative sources of fuel to replace wood in urban areas.
- Invest in sewage treatment and environmentally sound solid waste management.
- Promote urban agriculture.

Water Resources

The world's freshwater ecosystems—lakes, rivers, and wetlands—are showing signs of pollution and overexploitation, and freshwater diversity is suffering unprecedented loss as a result. Humans already use more than half of all available freshwater supplies for agriculture, industry, and domestic purposes. By 2025, human use of the planet's total available surface freshwater may exceed 70%. Other threats to aquatic biodiversity include habitat destruction, pollution, overexploitation, and the introduction of non-native species. In many areas, potable water is greatly enhanced by the presence of intact, functioning ecosystems and their biodiversity.

Examples of activities that link biodiversity conservation and water resources:

- Promote watershed management to provide habitat for biodiversity and improve potability of water.
- Promote riparian restoration to reduce erosion and provide habitat for wildlife.
- Establish “no-take” zones to protect productivity of fisheries.
- Encourage the development of integrated management plans for rivers, coastal zones, watersheds, and other water resources.

Sustainable Forest Management

The wealth of terrestrial biological diversity will not be maintained if it exists solely in protected areas. Efforts to maintain the biodiversity that exists outside of protected areas—where the vast majority of the biodiversity is located—must be an integral component of a larger, landscape-level approach to conservation and sustainable development. Thus, the linkages between sustainable forest management and biodiversity are great. However, the “empty forest” syndrome—for example, where there are trees but no mammals because of bushmeat hunting—highlights that one does not ensure the other.

Logging is perhaps the most important forestry activity, not only because of its economic impact, but because it has the most severe direct and indirect environmental impacts and is clearly linked to the maintenance or loss of biological diversity and environmental services. Depending on the intensity, logging can change the mosaic of habitat types, alter species distribution and forest turnover rates, and change soil nutrient and moisture quality and influence aquatic communities downstream. The greatest harm to biodiversity associated with forestry, however, often results from indirect effects of logging required to construct logging roads. These allow easy access for hunters, the spread of fire, and human encroachment and land conversion for agriculture. Addressing these threats acknowledges the linkages between forestry and biodiversity: more biodiversity-sensitive and environmentally sound management practices should be promoted, and policies must be coordinated across the various sectors, that recognize the broader range of forest values, including biological diversity.

Examples of activities that link biodiversity conservation and sustainable forest management:

- Promote conservation of forestry biodiversity through sustainable use of NTFPs.
- Ensure forest certification (see BOLFOR bolfor.chemonics.net/).
- Promote reduced impact logging.
- Encourage the planting of indigenous species on private land and in community timber and fuel wood plots.
- Promote sustainable management of forests outside of protected areas, and certification of wood products.

Global Climate Change

Substantial global climate change will alter natural terrestrial and aquatic ecosystems, resulting in loss of biological diversity and degradation of forests and fisheries. On the other hand, the conservation of ecosystems mitigates global climate change through the sequestration of carbon in forests and grasslands. Also, intact and functioning ecosystems and their biodiversity can help buffer against negative effects of global climate change, such as erratic weather patterns.

Examples of activities that link biodiversity conservation and global climate change:

- Promote carbon sequestration through conservation of forests and their associated biodiversity.
- Promote activities that conserve ecosystems that sequester carbon.
- Incorporate predictions of the effects of global climate change on biodiversity into conservation planning, such as planning at larger scales and incorporating multiple elevation zones in protected areas.

Biotechnology

Transgenic organisms are used to improve crop production, nutritional value, and disease resistance and prevention. Transgenic crops may be able to help preserve uncultivated habitats through increasing yields on land already under cultivation and by reducing pressure to exploit additional uncultivated land. Their use may also help reduce the amounts of pesticides and herbicides released into the environment. At the same time, transgenic crops can pose threats to biodiversity. Use of these organisms may interfere with endemic species, pollinators, and ecological processes. Transgenic crops could potentially breed with wild varieties and have harmful effects on animals that feed on them. For example, a crop with enhanced vitamin content may be targeted at alleviating certain vitamin deficiencies in humans, but the altered vitamin content may be lethal to wild fauna, including pollinators.

Note that USAID mandates a mandatory biosafety review for any activities that include the use of biotechnology (see *International Treaties*, *US Legislation*, and *USAID Regulations*).

Examples of activities that link biodiversity conservation and biotechnology:

- Support an open dialogue and consultation between stakeholder groups at the early planning stages of any activity involving transgenic organisms to identify potential environmental issues.
- Build the capacity of host-country institutions to undertake regulatory research and environmental monitoring of biotechnology.
- Promote research to identify potential risks of biotechnology on specific aspects of natural biodiversity.

CONSERVATION ACTIVITIES

Protected Areas

Community-Based Conservation

Sustainable Use

Environmental Education and Communication

Policy Development and Reform

PROTECTED AREAS

Protected areas are areas that are managed to maintain certain elements of biodiversity and the values they provide. They are “protected” from uses that are incompatible with such goals. Biodiversity is a complex, multifaceted concept, with many elements or aspects. The various elements of biodiversity provide a range of values and benefits, including direct uses, ecosystem services, and nonmaterial values (see *USAID and Biodiversity Conservation*). Protected areas can have many and varied legitimate management objectives, including outdoor recreation and nature tourism, watershed protection, sustainable forestry, hunting or fishing, scientific research, and environmental education.

Protected areas are one of the main tools in building a global, national, or local strategy for biodiversity conservation. Information about the location of protected areas around the world is available from the World Conservation Monitoring Centre at: www.unep-wcmc.org/protected_areas/index.

Elements of Effective Protected Areas

To be successful, protected areas need:

- Clear and achievable *management objectives* and plans.
- Management plans that *address threats* to the biodiversity of the area.
- Legal *management authority*.
- Financial, human, and capital *resources* to implement management plans.
- *Participation* and support from users and constituents.
- Good *conservation science*.
- A *supportive context* and enabling environment.

Each of these essential elements is discussed briefly below.

Management Objectives for Protected Areas

The World Conservation Union (IUCN) has designated six main categories of protected areas that encompass the kinds of management objectives mentioned above, such as strict nature reserves and wilderness areas, national parks and monuments, game management and hunting areas, and national forests. For more information, see the IUCN “Guidelines for Protected Areas Management Categories”: unep-wcmc.org/protected_areas/categories/ or “Protected Areas Management Categories”: www.wri.org/biodiv/b26-gbs.html.

In practice, most protected areas are managed for *multiple uses*—that is, more than one management objective is set for the same protected area. If biodiversity is to be maintained, such multiple uses must be *compatible*—in other words, one management objective cannot prevent another objective from being realized at the same time. Tourism and other so-called “noncon-

sumptive” uses may not always be compatible with some management objectives related to biodiversity. Likewise, so-called “consumptive” uses may not always be incompatible with biodiversity-friendly management objectives.

Historically, many national parks were created because their scenic and esthetic qualities, wild-life, or other natural features provided opportunities for nature tourism and outdoor recreation. These are valid reasons for establishing protected areas, of course. At the same time, because they were not necessarily established for scientific and technical reasons—not necessarily located or configured to best protect endangered species or habitats, for example—current protected areas may not be optimal for achieving some of the scientific, educational, ecological services, or sustainable use objectives that are also valid objectives of a protected area system.

Protected areas require management plans—and that requires the capacity to develop and implement such plans. Management plans must have both social components—guidelines for how to manage uses and users—as well as biological components. For more information on management plans, see the following:

- A wide variety of publications on the design and management of protected areas, including marine protected areas, from the World Commission on Protected Areas: wcpa.iucn.org/pubs/publications.html
- “Guidelines for Preparing Protected Area System Plans” from the World Resources Institute: www.wri.org/biodiv/b28-gbs.html

Developing management plans may require a great deal of time and resources, especially with optimum participation from all stakeholders and good conservation science to provide the foundation for the plan (discussed below). However, in many developing countries, where there might not be human and financial resources available to implement an elaborate and costly plan, it is probably best to develop a phased and iterative process of planning, capacity building, and implementation.

Addressing Threats to Protected Areas

To be effective, protected area management must be based on an understanding of the threats it faces. Once threats are identified, managers and stakeholders must work together to prioritize them, then address the key threats with management prescriptions and actions (see *Identifying Threats and Designing Activities to Address Them*). One major threat to biological diversity is the conversion of natural habitats to agriculture, cities, or other human-dominated ecosystems. Protected areas have a role in maintaining a minimum level of natural habitat in perpetuity. “Addressing threats” doesn’t mean a preoccupation with the negative side of the conservation equation: although causes of biodiversity loss must be clearly identified, removing those causes requires that you take advantage of opportunities and create options to motivate people to act in ways that do not reduce biodiversity.

Some threats to protected areas operate inside their boundaries. These “inside” threats arise from incompatible uses or ecological changes and imbalances due to past management actions. For example, protected populations of herbivores may grow too large for a protected area without a full complement of predators or if former movements and migrations are constrained by land use change surrounding the protected area. If this happens, the vegetation of the protected area may be changed or damaged. On the other hand, if hunting quotas are set too high in a protected area where hunting is legal, the hunted species may decline and might eventually be eliminated. Addressing such threats means actively managing the wildlife and habitat within the protected area, then managing the human uses of the area that affect it.

Management actions that change the ecological dynamics within the protected area can also cause unwanted ecological changes. In ecosystems in which fire is a natural feature, fire suppression can cause an unnatural buildup of vegetation and create an unnatural fire hazard. On the other hand, certain human uses of protected areas can increase the frequency, seasonality, or intensity of fire to unnatural levels, also creating a threat to the biodiversity of the area. Addressing such threats requires management to maintain the natural ecological dynamics of the area.

Some threats come from outside the protected area. For example, habitat could be destroyed in a protected area with a river flowing through or near it if there is flooding from a dam downstream. Or, a dam upstream could change the flow regime of the river running through a protected area, reducing the variability of water flow and destroying habitats needed by native species. Addressing these threats would require finding an alternative location for the dam, or alternative opportunities for producing hydroelectricity, controlling floods, or supporting irrigated agriculture that the dam might provide.

Introductions of invasive, alien species, including plant or animal pests and diseases, into protected areas from surrounding areas is another example of an “outside” threat. Air or water pollution or soil erosion, coming from outside the protected area, would also be an example. Yet another is coral reefs—including protected ones—under threat from siltation from soil erosion on nearby lands in many parts of the world. Forests and lakes, even those within protected areas, are threatened by acid deposition and precipitation in many countries. Finally, climate change caused by human activities at a global scale can threaten the biodiversity of protected areas from the outside. Addressing outside threats to protected areas requires different approaches than managing inside threats. Generally, you must work with the residents, owners, and managers of the lands surrounding the protected area.

Management Authority

The authority to manage a given protected area can vary across a wide spectrum of groups or organizations, including:

- National, provincial, and local government agencies, and communities;

- Private organizations, either for-profit corporations or NGOs (e.g., private lands with legal “conservation easements”);
- Public-private partnerships; and
- Indigenous groups.

Sometimes two or more groups or organizations may hold management authority jointly. A situation in which local communities and national agencies share management responsibility is often called *comanagement* (see *Community-Based Conservation*, for further discussion).

Some protected areas are globally recognized, such as UNESCO World Heritage Sites and Man and the Biosphere (MAB) Programme Biosphere Reserves. More information on the locations and situations of such areas can be found at their websites:

- The UNESCO World Heritage Committee: www.unesco.org/whc/nwhc/pages/sites/s_worldx.htm
- The Man and the Biosphere (MAB) Programme: www.unesco.org/mab/wnbr.htm

This type of international protected area may commit the managing authorities to certain actions on behalf of international stakeholders.

In developing countries, national parks and other national protected areas were often created by colonial powers, in societies that were not democratic. Indigenous people were sometimes removed from or forced out of their traditional homelands, creating a legacy of problems. In many parts of the world, returning some or most management authority to original indigenous inhabitants of protected areas is being tried (for more information, see *Indigenous and Traditional Peoples and Protected Areas: Guidelines, Principles and Case Studies*: www.iucn.org/bookstore/indig-peop.htm).

Resources for Protected Area Management

Managing protected areas requires resources—financial resources, human resources, and capital resources (infrastructure and equipment). Some protected areas are “paper parks,” where despite having legal tenure and management goals on paper, there is no capacity by the management agency to oversee and enforce those goals, so they are widely violated. However, even paper parks seem to help slow conversion of natural habitats and slow resource degradation, in the short term. In cases where parks lack adequate resources to carry out and enforce agreed-on management objectives, strengthening such capacity makes sense.

Financial Resources. Financing mechanisms range across a broad spectrum, including:

- Direct central government support through central budgets.
- Parastatal and other arrangements in which some revenue generated by user fees and other mechanisms is retained by the management agency.

- Concession fees from private concessions within protected areas.
- Extra-national funding from international donors and NGOs.
- Private funding for protected areas.

Financial mechanisms for supporting biodiversity conservation are discussed in *Economic Incentives and Conservation Finance*. Conservation endowments are an example of some of the innovative mechanisms now being developed. These endowments are created by the initial investment of a large principal amount by a donor, with the interest earned from this investment then used to help fund the ongoing operating costs of protected area management in a developing country. Such international financing mechanisms may be especially appropriate for the relatively small number of internationally recognized, elite protected areas recognized by the UNESCO World Heritage Committee and MAB.

Protected area authorities need financial planning capacity. Because resources for managing protected areas have to compete with other social needs for funding, protected area managers must know how to prioritize funding needs, explore a range of funding options, and be able to seek or develop nontraditional sources of funding, and manage budgets.

Human Resources: Staff, Skills, and Training. Effective protected area management requires staff with the skills and experience to carry out all of the tasks of successful protected areas such as planning, participation, science and research, and financial management. With adequate funding, staff capacity can eventually be built—although it may require a long process of education and human capacity-building reaching through several generations. Wildlife and forestry training colleges and institutions often play a key role. You can find more information about how to strengthen human resources and build capacity for park management in the Biodiversity Support Program publication *What's Your Role?: A Guide for Training Officers in Protected Area Management*, available at: www.bsponline.org/bsp/publications/africa/whats_your_role/role_toc.html.

Infrastructure and Equipment. Likewise, financial resources are necessary (but not sufficient) to obtain the equipment and infrastructure needed for sustainable protected area management.

Participation and Protected Areas

In democratic countries, establishing priorities for protection and management is a matter of societal choice. The Parties to the CBD have recognized this in the “Malawi Principles,” the first of which states “Management objectives are a matter of societal choice.” (For more information, see “Decisions adopted by the conference of the parties to the Convention on Biological Diversity at its 5th meeting in Nairobi, May 2000”: www.biodiv.org/doc/decisions/cop-05-dec-en.pdf.)

Establishing protected areas and developing their management plans are part of the process of making political decisions. It ultimately requires good governance, democratization, develop-

ment of civil society, rule of law, participation by all stakeholders, and conflict resolution mechanisms. Thus, the effectiveness of protected areas as a tool for biodiversity conservation is ultimately linked to the development of effective democratic governance.

To manage protected areas effectively, managers must educate users about their role in sustainable management and make them aware of the regulations that apply. Managers must engage in “outreach” to local communities surrounding the protected area in order to solve management problems. As a manager, you must also reach out to national constituencies using education and public relations methods in order to build and maintain support for protected areas at a larger scale.

NGOs sometimes function as civil-society advocates for protected areas. In the United States, “friends organizations”—organized to support national parks, monuments, wildlife refuges, state parks, and even more local protected areas—have become very important in outreach and management. In many cases, the staff of national parks, wildlife, forestry, and fisheries authorities, as well as international conservation NGOs have reoriented their thinking and now recognize the need to work with communities. In other cases, however, still more effort is needed.

Conservation Science

Effective management of protected areas requires good conservation science to provide a foundation for planning and adaptive management of biodiversity. Both biological and social information is needed, and generating such information requires practical, applied research capacity.

Information needs to be made available to planners and managers in a form that is readily useable to them for making decisions—that is, in a straightforward, nontechnical form that makes it clear how the information applies to management choices. Spatially referenced, or “geographical,” information is often needed, and computer-based geographical information systems (GIS) can be a useful tool. High-tech tools are useless, however, without a good understanding of the information needs of planners and managers, because they can provide far more information than is needed or can be used in making decisions. In fact, they can confuse rather than help their intended users. Good, easily readable maps remain an essential tool.

Biological Science and Conservation. The developing field of conservation biology underpins the biological side of managing protected areas. Although usually defined as an interdisciplinary field (see Meffe and Carroll, 1994; Primack, 2000), most of its practitioners are biologists, not social scientists. Some important biological issues related to conservation include the optimum size of protected areas, the need for corridors of natural habitat connecting natural areas, and issues of ecological management within protected areas.

Social Sciences and Conservation. The importance of good social sciences research by anthropologists, economists, political scientists, and sociologists is increasingly recognized as a tool for planning and adaptively managing protected areas. Management objectives for protected areas

almost always include some kinds of human uses. Understanding the behavior of users and monitoring the levels and impacts of various uses require the use of methods from the social sciences. Protected areas face many more challenges resulting more from the need to influence and manage human actions than from the need for biological management. Even many of the issues listed above as aspects of biological management have a human dimension—land uses in the matrix surrounding protected areas, including buffer zones, is a good example. Understanding the motivations of people who are using either a protected area itself or surrounding lands requires social research and analysis. The information gained from such study can then be used to design strategies for influencing that behavior in order to make it more compatible with conservation and to make conservation plans as compatible as possible with the needs of traditional resource users. For more information, see the Biodiversity Support Program publication *Understanding and Influencing Behaviors: A Guide*: www.bsponline.org/bsp/publications/bsp/behaviors_eng/behaviorsguide_eng.pdf.

A Supportive Context for Protected Areas

The IUCN has suggested that countries should aim to set aside 10% of national territories as protected areas; in some countries, this level has been reached. Other scientists have recently pointed out that, given the available arable land base and projected populations of Asia, Africa, and Oceania, it will be very difficult to protect even 1% against conversion to agriculture without dramatic improvements in agricultural yields and production efficiency (Musters et al., 2000). Specific numerical targets may be less important than the commitment and political will within a country to retain some significant portion of its land permanently in a more or less natural state—such as a national forest system, national park system, or system of extractive reserves.

Developing countries in which USAID works differ greatly in population and population growth rates, area of land still in a natural state and pressure to convert such land to other uses, and level of economic and political development. Establishing new protected areas may be possible in some of these countries, and completely out of the question in others. In some countries, current protected areas are at risk of being “de-gazetted” for various reasons—that is, of having their legal status or management goals changed such that they no longer conserve some of the elements of biodiversity that they were originally designed to conserve.

Planning protected area “networks” and developing management plans for each area ideally would be a part of overall land-use planning capacity within a country, province, state, or local area. Such integrated land-use planning requires intersectoral communication and coordination: planning is needed for pipelines, mines, roads, agricultural expansion, and the like. The importance of large-scale planning for conservation is gaining increasing recognition (see *Selecting Scale and Sites*). National Environmental Action Plans and National Biodiversity Strategies and Action Plans can help “mainstream” protected areas and other biodiversity conservation methods into national development plans.

Some measure of international and national stability is also a component of the enabling environment for effective protected areas. Civil wars and the refugee movements they stimulate threaten protected areas in many parts of the world. In some cases, protected areas, because of their relatively rich natural resources and minimal infrastructure, may even be a magnet for refugees during periods of civil conflict. Civil unrest and insecurity cause serious economic effects in cases where international tourism to protected areas provides important revenue to a country. Economic stagnation and decline can also compromise the effectiveness of protected area management for several reasons. For example, resources for protected areas, often minimal under the best of circumstances, may be further reduced, or protected area managers may be under considerable economic pressure not to enforce regulations if bribed by poachers or timber thieves, for example.

Sources for More Information

Good sources of general information on protected areas and their management include:

- The World Commission on Protected Areas and the IUCN Program on Protected Areas: wcpa.iucn.org/
- The Convention on Biological Diversity: www.biodiv.org/programmes/cross-cutting/protected/default.asp
- The World Resources Institute's publication "Strengthening Protected Areas": www.wri.org/biodiv/gbs-viii.html
- Meffe, G.K., and C.R. Carroll, editors. *Principles of Conservation Biology*. Sunderland, Mass.: Sinauer Associates, 1994.
- Primack, Richard B. *A Primer of Conservation Biology*. 2nd Ed. Sunderland, Mass.: Sinauer Associates, 2000.

Other organizations/websites relevant to protected areas:

- UNEP World Conservation Monitoring Centre: www.unep-wcmc.org
- UNESCO Man and the Biosphere (MAB) Programme: www.unesco.org/mab
- UNESCO World Heritage Committee: whc.unesco.org/toc/toc_index.htm
- World Commission on Protected Areas: wcpa.iucn.org
- U.S. National Parks Service: www.nps.gov/planning/tools.html

COMMUNITY-BASED CONSERVATION

Community-based conservation (CBC) and *community-based natural resources management* (CBNRM) will be used interchangeably in this section, and can be defined as “natural resources or biodiversity protection by, for, and with local communities” (see Western, Wright, and Strum, 1994). The conservation and management of biotic resources and biodiversity by local residents—like the establishment of protected areas—is one of the central elements of any global, national, or local strategy for biodiversity conservation.

Elements of Effective Community-Based Conservation

To be successful, community-based conservation depends on:

- A *community of local residents*.
- An *understanding of community heterogeneity*.
- Active *participation* from local communities.
- A supportive *national and international context* and enabling environment.
- *Community management agreements* that *address threats* to biodiversity.
- Secure *land or resource tenure*.
- Respect for *indigenous management systems and institutions*.
- *Adaptive management*.

Communities

Each of these essential elements is discussed briefly below.

A *community* can be defined as a relatively small group of people living in the same area, generally having similar values and interests and capable of making decisions and resolving disputes without outside intervention.

Authority to manage land and its biotic resources can range across a spectrum from full control by a national government authority to full local-community authority. According to the definition of CBC given above, local residents—the members of the local community— must have a strong role in managing the biodiversity resources in question in order to be called “community-based.” “Clearly, community-based conservation is essentially about the locus of action ... Community-based conservation reverses top-down, center-driven conservation by focusing on the people who bear the costs of conservation.” (*Natural Connections*, 1994).

Sometimes local communities and national agencies share management responsibility more or less equally. This middle region of the spectrum of management authority is a situation called *comanagement*. It is a subset of the possible arrangements for CBNRM. Comanagement is in some cases a step along the road to full devolution of management authority to local communities. In many other situations, however, comanagement can be viewed as an endpoint in the at-

tempt to balance the interests of stakeholders at both national and local levels. Comanagement is sometimes called joint management or collaborative management. For more information, see *Co-management of Natural Resources: Organising, Negotiating and Learning-by-Doing*: nrm.massey.ac.nz/changlinks/cmnr.html.

CBC and CBNRM are based on a view that human development is fundamentally compatible with the sustainable use and management of biodiversity and biotic resources. “The coexistence of people and nature, as distinct from protectionism and the segregation of people and nature, is its [CBC’s] central precept” (ibid.).

CBC can work in many areas:

- Community-managed protected areas:
 - Traditional sacred sites and other sites protected by traditional beliefs and norms
 - Community-managed protected areas of all categories
- Buffer-zones of nationally managed protected areas of all categories
- Nationally managed protected areas with resident indigenous groups
- Indigenous reserves
- Extractive reserves (IUCN Categories IV and VI)—such as those managed for rubber tapers and Brazil nut harvesters in Brazil.

Understanding Community Heterogeneity

Anyone attempting to develop CBC and natural resources management programs must understand and respect community heterogeneity. This is as true for leaders within the community who would do so as it is for outsiders seeking to facilitate or fund such programs. Local perspectives about the values of the many different elements of biodiversity may differ greatly from those of stakeholders at the national or global level. Community views may also differ from those of USAID and its development partners, including NGOs and the private sector.

Even though the terms *community-based conservation* and *community-based natural resources management* have caught on—and are popular buzzwords in conservation—many social scientists have problems with the terms because *communities* are never homogenous entities. Instead, they are made up of individuals who differ in age, gender, economic and political power, source of livelihood, and other dimensions. Despite the ever-present diversity within communities, however, they can and do often function as defined above—as relatively small groups of local residents generally having similar values and interests and capable of making decisions and resolving disputes without outside intervention. Because of the diversity within local communities, there can be stakeholder groups with different interests even at the local level. “As development professionals have discovered, even traditional communities are rife with internal conflicts and divergent interests and often split along economic, gender, and social lines” (ibid.).

A common pitfall in efforts to develop CBC is for one of the stakeholders to assume the role of facilitator and broker in negotiating resource-sharing agreements. National government agencies such as parks and wildlife departments, bilateral development agencies, or international organizations often fall into this trap because they have the resources and motivation to take action, whereas local communities may be lacking one or both of those things. These organizations are inevitably stakeholders, however, with their own values and interests in the situation. They may recognize that negotiating a comanagement agreement with local people can help resolve conflicts and promote sustainable environmental management, but they may need help from a relatively independent, neutral third-party organization to successfully negotiate an agreement with other stakeholders.

“Stakeholders include any people or organizations with an interest in the use and management of natural resources in any particular place. Local residents, who usually depend on natural resources for their livelihoods, have a primary stake in local resources. Local residents are not the only stakeholders, however. Stakeholders can also include national and international groups such as government departments and international conservation organizations.” (*Understanding and Influencing Behaviors: A Guide*)

For more tools for identifying stakeholders and initiating a dialogue among them, see the Biodiversity Support Program publication *Understanding and Influencing Behaviors: A Guide*: www.bsponline.org/bsp/publications/bsp/behaviors_eng/behaviorsguide_eng.pdf.

Because CBC is defined by a fundamental shift in the locus of control over biodiversity and the responsibility for conserving it from the international or national to the local level, CBNRM requires true and active *participation* from local communities. Sometimes this participation must be patiently cultivated. A long history of mistrust and bad relations between national wildlife authorities and local communities will require some time to overcome. In many cases, the staff of national parks, wildlife, forestry, and fisheries authorities, and of international conservation NGOs, need to reorient their thinking, recognize the need to work with communities, and learn how to do it. Building the capacity to work with local communities in the staff of these organizations may be a necessary first step toward CBC. Within communities, reciprocal skills for working with national and international counterparts are needed, including planning, organizational, business, financial management, and language and other communications skills.

Authentic participation requires full community involvement in setting conservation priorities (see *Choosing Priorities and Targets*). The community must have the power to set priorities according to its values and needs. The challenge, though, is to reconcile community priorities with those of stakeholders at national and international levels, if possible, and find “win-win” solutions to conservation problems. Measuring and judging progress and success also require participatory monitoring and evaluation (see *Monitoring, Evaluating, and Managing Adaptively*).

A Supportive National and International Context

CBC requires an often delicate balancing of interests at local, national, and international levels. Careful consideration of all stakeholders and their interests is critical to the success of CBNRM. National governments cannot abdicate all authority for conservation and sustainable use of natural resources. If they do, conservation attributes of national or global importance may be lost, and the legitimate pluralism of values and interests of all stakeholders may not be respected. Although local stakeholders must have an equitable voice and role in conservation, stakeholders at other levels do have legitimate interests also, and these should be respected.

Globalization is rapidly increasing the influences from outside the community that can overwhelm and undo community decisions, further complicating CBNRM. Communities cannot act alone in today's world; for CBC to work, local people need allies at both the national and international level. Communities do not exist in a political or economic vacuum, but are linked in numerous, significant ways with the world that surrounds them.

For successful CBNRM, the credibility, authority, transparency, and professionalism of "intermediate organizations" are very important if large numbers of local stakeholders are to be empowered to manage resources. Such organizations bridge the gap between local and national and international interests and stakeholders, and can range from local NGOs to decentralized, autonomous government bodies. Donors such as USAID can foster comanagement in some situations by supporting such intermediate organizations and helping to build their capacity.

At the national level, a legal and policy framework is needed for CBC, because it usually means either devolution of use and management rights to resources that were formerly held by agencies at the national level, or formal recognition of de facto or indigenous rights over natural resources. National policies that recognize local rights and responsibilities may also be needed to enable the true participation that is at the heart of CBNRM. An essential role for national governments is to provide a legal framework that recognizes the rights and responsibilities of local groups in resource management and guarantees and enforces them.

Because of the pluralism of values and interests in natural resources, conflicts of interest between stakeholders are inevitable. These conflicts usually can be managed and moderated, however. One useful role for national governments is often to provide formal conflict resolution mechanisms to be used when disputes between contending user groups cannot be settled and must be adjudicated.

Community Management Agreements

Not too long ago, local people in developing countries were often seen as the main threat to biodiversity because they use and depend on natural resources for their livelihoods. This outmoded view has changed, and it is now commonly recognized that communities around the world have often managed natural resources sustainably and conserved the biodiversity around

them. But communities are dynamic, not static. As politics and economics have changed, some communities, or individuals within them, have sometimes been motivated to use the biodiversity around them in unsustainable ways. Thus, some threats to the sustainable management of biodiversity come from the behaviors of communities or individuals within them. In such cases, CBNRM can be a powerful technique for motivating communities to conserve rather than overuse their natural resources.

Pressure to convert natural habitats to cropland can occur as communities grow in population and require more food, or as new markets provide incentives to clear more land for cash crops. Agricultural intensification—increasing crop yields rather than the area planted—is one strategy for reducing the pressure for land conversion. Technical assistance to communities in methods to increase crop yields is often needed. The success of this approach depends on a variety of factors, including international demand for particular cash crops, labor availability, technology, and others. Reducing losses to pests or wild animals—which can be significant in communities living near protected areas or other lands with substantially intact natural systems—can also make more food available without increasing the area of cultivated land.

Successful CBC requires a process by which even heterogeneous communities can agree about the boundaries and management objectives of the area they control. Both habitat conversion and overexploitation of certain species can occur if some members of the community dispute either boundaries or management objectives.

Overexploitation or overharvesting of local natural resources may be carried out by a subset of the community, or by outsiders, without the community's consent. In such cases, reducing the harvest to sustainable levels requires strengthening the community's ability to enforce its resource and land authority. A valued species may be overexploited because of a lack of understanding of sustainable rates of offtake or harvest, or lack of adequate monitoring of offtake to make sure it is within a sustainable range. Sometimes technical assistance from the outside is needed to help communities control overexploitation and sustainable use. Building capacity within the community to enable local managers to determine ecologically sustainable quotas, monitor harvesting, and enforce limits may be needed.

Biodiversity on community-managed lands may suffer from invasive, alien species, including introduced pests and pathogens. Technical assistance may be needed to develop methods for controlling such species and for building local capacity to monitor and manage invasions and outbreaks of pests and diseases.

Secure Land or Resource Tenure

Successful CBNRM usually requires secure land or resource tenure at the community level—that is, community rights to land and/or the biodiversity resources found there must be made formal and legal, so that local communities will have the possibility of long-term incentives for sustainable resource management. Secure tenure is probably a necessary condition for sustain-

able management, but not a sufficient one. The values of the resources to be managed, social complexity, and community heterogeneity are also factors that must be addressed to provide incentives for sustainable management.

Indigenous Management Systems and Institutions

Traditional ways of using and managing biodiversity are often found to be based on deep ecological knowledge when studied by scientists and to be grounded in principles of sustainability. In a dynamic and changing modern world, however, traditional management systems are often confronted with the need to adapt to new conditions, such as increased population density, restrictions on former nomadic movements, and shifting cultural values.

Adaptive Management

CBC is “a complex, often lengthy and sometimes confused process, involving frequent changes, surprises, sometimes contradictory information, and the need to retrace one’s own steps” (*Co-management of Natural Resources: Organising, Negotiating and Learning-by-Doing*: nrm.massey.ac.nz/changlinks/cmnr.html). Every case is different, and although there are some general principles, each situation will require experimentation, trial and error, participatory action research, and “learning-by-doing” —adaptive management, in other words (see *Monitoring, Evaluating, and Managing Adaptively*). In many situations, CBC often requires:

- Incorporating hypothesis-testing and other experimental design components into projects.
- Adopting flexible, process-oriented indicators and measures of success.
- Using participatory methods of monitoring and evaluation.
- Extending project timelines to allow more cumbersome, but ultimately more effective, collaboration with a wide range of stakeholders.

One view of adaptive management is expressed as follows:

“In our vision of sustainable forest management the key stakeholders in forest management would be able to respond to dynamic complexity by adapting their management systems. We expect that disadvantaged local communities would be empowered and that local governance systems would be sufficient to enable fair negotiations among stakeholders. The stakeholders would confidently seek to anticipate the future based on improved abilities to learn as a group from their shared experiences. Their disposition to treat management as a series of experiments to be consciously observed, evaluated and acted upon would catalyze their ability to learn, adjust and improve the information, technical options, organizational forms, incentives and social institutions upon which successful management depends.” (CIFOR Local People, Devolution & Adaptive Collaborative Management Programme: www.cifor.cgiar.org/scripts/default.asp?ref=research/acm/index.htm)

Sources for More Information

- The Local People, Devolution, and Adaptive Collaborative Management Program of the International Center for Forestry Research (CIFOR): www.cifor.cgiar.org/scripts/default.asp?ref=research/acm/index.htm
- The Community-Based Natural Resource Management Network: www.cbnrm.net/
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SUSTAINABLE USE

Sustainable use refers to the uses of the biological products and ecological services of ecosystems in a manner and at a rate that does not reduce the system's ability to provide those products and services to future generations.

Many conservationists would agree with the IUCN that “use of wild living resources, if sustainable, is an important conservation tool because the social and economic benefits derived from such use provide incentives for people to conserve them” (IUCN 1990 Policy Resolution on Sustainable Use: iucn.org/themes/ssc/susg/docs/susgw-en.pdf).

Elements of Effective Sustainable Use of Biotic Resources

To be successful, actions and programs promoting the sustainable use of biotic resources depend on:

- *A broad understanding of the values and uses* of biodiversity.
- *Conservation science* to determine sustainable levels of use.
- *Criteria of sustainability*, certification mechanisms, and monitoring.
- *Positive incentives* and markets.
- *Negative sanctions and enforcement* mechanisms.
- *Equitable distribution of benefits*.
- *A supportive context* and enabling environment.

Each of these essential elements is discussed briefly below.

A Broad Understanding of the Values and Uses of Biodiversity

The term *sustainable use* is sometimes used to refer only to the direct material harvest of individuals of a given, valuable species. In southern Africa, for example, people talk about the sustainable use of elephant or impala; in Latin America they may be concerned with the sustainable use of mahogany. While this narrow concept of sustainable use is important in many cases, it also has limitations. Focusing only on what could be called *biological products*—the direct, material harvest of the most valuable species—can distract natural resource managers from taking a broader view of the many values and uses of biodiversity. Biodiversity includes many different elements or aspects (see *Choosing Priorities and Targets*), and provides a cornucopia of products, services, benefits, and values.

Many conservationists are now realizing that the indirect, ecological services provided by biodiversity are its most valuable “use” or benefit (see *USAID and Biodiversity Conservation*). These include maintaining water flows and quality, soil formation and nutrient cycling, degradation of wastes and pollution, pest and pathogen control, pollination, and climate regulation. The value of ecological services is often unknown or unmeasured, however. Ecological services

are not often marketed or traded, and so are usually unpriced. The result is that the ecological services provided by biodiverse ecosystems are often ignored or undervalued. The use of methods to estimate, measure, and even price the value of ecological services is growing. In many situations it is the nonmaterial values of biodiversity, such as its esthetic, scientific, educational, and recreational potential, that attract tourists to an area and that therefore may have tremendous untapped economic value.

Ignoring or undervaluing the ecological services and nonmaterial values of biodiversity can increase pressure for land conversion, because of the mistaken perception that agriculture would be a more valuable land use. Therefore, a broad understanding of the values, uses, and benefits of biodiversity can help to justify its conservation.

Conservation Science to Determine Sustainable Levels of Use

The supply of biological products and ecological services available for use is limited by the biological characteristics of both species and ecosystems. Ecological research is needed to determine the level of use or harvest that will be sustainable. On the basis of this ecological research, quotas can be set for populations of harvested species to help ensure sustainability. Because dynamic ecological systems can never be understood, modeled, and predicted perfectly, ongoing monitoring of harvested populations is essential to allow adaptive reductions or increases in offtake levels.

Criteria, Certification, and Monitoring

The Convention on International Trade in Endangered Species (CITES) (see *International Treaties, US Legislation, and USAID Regulations*) is the main international mechanism for monitoring and “certifying” the sustainable use of species that enter into international trade, such as for food, medicine, timber, skins, or pets. If a traded species becomes threatened or endangered, CITES can limit or ban the trade. As a Party to CITES, the U.S. government is committed to upholding the treaty. Technical and financial assistance to help developing countries uphold their responsibilities to CITES is an important approach toward promoting the sustainable use of wild species.

Sustainable forest management (SFM) is a developing concept that refers to the sustainable uses of natural forests. A number of international organizations are working to develop criteria and indicators for SFM, and some are attempting to set up global “certification” programs to audit and certify to consumers that wood and other forest products are produced in forests managed in responsible or sustainable ways. An “Overview of Forest Management Certification Systems” currently being used, proposed, and developed can be found at: www.biodiversityeconomics.org/business/topics-101-04.htm.

One such certification program is that of the Forest Stewardship Council (www.fscus.org), which has developed a list of 10 principles and criteria of responsible forestry

(www.fscus.org/standards_policies/principles_criteria/index.html). These principles and criteria “address ecological, social and economic aspects of forest management.” To be certified, a company must:

- Meet all applicable laws
- Have legally established rights to harvest
- Respect indigenous rights
- Maintain community well-being
- Conserve economic resources
- Protect biological diversity
- Have a written management plan
- Engage in regular monitoring
- Maintain high conservation value forests
- Manage plantations to alleviate pressures on natural forests.

Other certification programs have similar lists of criteria.

Some people are willing to pay more for goods whose production was sustainable or contributed to conserving biodiversity than for conventional goods. However, they must be certain that production was sustainable. This is the origin of certification: internationally recognized standards for reviewing agricultural systems and certifying that products are being grown and harvested in sustainable ways. Such systems now exist for organic produce, shade-grown coffee, and sustainably harvested timber. Certification has some potential to create a market niche in which sustainable products are financially viable. USAID projects can help producers compete in that niche market by supporting the development and use of certification systems and helping to remove market constraints.

Whether for species or entire ecological communities such as forests, monitoring is needed to ensure sustainability. Because both the supply and demand sides of the equation are important for sustainability, both need monitoring. If monitoring detects unsustainable trends, adaptive responses can be developed.

Who sets the criteria used to determine “sustainability”? Sustainability has both an objective dimension derived from ecological science and a subjective dimension. For the latter, the “limits of acceptable change” has been proposed as a criterion of sustainability. That is, although ecosystems are always dynamic and changing even in the absence of strong human pressures, societies must decide how much human-caused change is acceptable. The “Malawi Principles” developed through the CBD are relevant here, as they are in land management in general. In particular, the principle that “management objectives are a matter of societal choice” suggests that the criteria used to define “sustainable use” require debate and negotiation among stakeholders (Convention on Biological Diversity, 2000: www.biodiv.org/doc/decisions/cop-05-dec-en.pdf).

Positive Incentives and Markets

Using biotic resources sustainably can be a positive force for conservation because it can provide positive incentives to maintain wild species and habitats.

In some situations where wild products and services are traded or sold, there is a need to link the “producers” of those biotic products and services—that is, those people with tenure and authority to manage the resources—with markets for them. For example, the beneficiaries of clean and reliable water flowing from a forested catchment may be people in cities far downstream. In this case, payments from water users may provide an incentive for the owners and managers of the catchment forest to maintain it in a more natural state rather than clearing it for agriculture. Or, as another example, harvesters of a wild plant product from the rainforest might increase their incentive to sustainably manage the supply of that plant product if they could develop market links with distant buyers of products made from it.

Sometimes the “producers” of the biotic product or service are local communities, which already may be poor and marginalized in the national development process. In such cases, these communities may need assistance in linking with distant urban markets, or even international markets for their products. CBNRM (see *Community-Based Conservation*) usually involves some kind of sustainable use of biodiversity.

Negative Sanctions and Enforcement Mechanisms

Achieving sustainable use can be very challenging, in part because in certain situations unsustainable exploitation of biodiversity can be in the short-term self-interest of a person, community, or country. If sustainable use is to be rewarding and motivating because the benefits exceed the costs, the other side of the coin is that unsustainable use should be discouraged and penalized by seeking to make the costs exceed the benefits. Fines, seizures, and other sanctions can be used for this purpose. If local communities are the resource managers, community members may take on the role of monitoring resource use and enforcing the agreed-on limits of offtake to ensure sustainability. Such community game guards, wildlife rangers, and resource monitors have been successful in many countries. At a larger scale, national laws and policies can also provide for the negative sanctions and enforcement mechanisms that help make sustainable use work. Finally, at the international level, agreements like CITES involve penalties and sanctions to help ensure compliance by member countries.

Equitable Distribution of Benefits

Many biotic resources are found on “public” lands, managed either by national agencies or local communities. If individuals can “privatize” these public resources through corruption or rent-seeking practices, they are much less likely to be managed sustainably. Accountability, transparency, democracy, and the equitable distribution of benefits all help to prevent the privatization of public resources, and therefore help to provide the positive incentives that encourage

sustainable use of biodiversity. All of these are components of good governance, and the IUCN Policy Statement on Sustainable Use of Wild Living Resources (1990) says that “good governance” is an important component of an enabling environment for sustainable use. The *Community-Based Conservation* section discusses the importance of governance to the sustainable management of resources by communities.

A Supportive Context for Sustainable Use

Sustainable use, like any other approach to biodiversity conservation, requires a supportive enabling environment. At the local and national scales, this means good governance, secure land tenure, access to national markets, and other factors discussed above. At the international scale, a supportive context for the sustainable use of biodiversity must include agreements (such as CITES) that regulate trade in biotic products and help maintain incentives for conservation, such as the provisions on rights to genetic resources in the Convention on Biological Diversity. Linking buyers with producers of sustainably managed biotic products in international markets can increase the economic incentives for sustainable use. In such cases, international certification programs that audit producers and assure buyers that the products they are buying are produced sustainably will help. Such certification programs are developing quickly.

Sources for More Information

- USAID Global Environment Center. Forest Certification in an Era of Globalization. *Environment Notes*, May 2001.
- Government of Australia, “Sustainable Forest Management in Australia”: <http://www.affa.gov.au/content/output.cfm?&OBJECTID=6C25C7D8-2E0A-4350-9C3AE7E68DA9963B>
- World Conservation Union (IUCN) Sustainable Use Initiative homepage: www.iucn.org/themes/sustainableuse/
- IUCN Biodiversity Economics Site: biodiversityeconomics.org
- Forest Stewardship Council: www.fscus.org
- A joint effort by the International Union of Forestry Research Organizations (IUFRO), FAO, and CIFOR: <http://iufro.boku.ac.at/iufro/taskforce/tfsfm/resolutions.htm>

ENVIRONMENTAL EDUCATION AND COMMUNICATION

In a broad sense, environmental education and communication include any activity that can provide people with the information and motivation to enable them to conserve biodiversity.

Elements of Effective Environmental Education and Communication

The success of environmental education and communication activities and programs depends on:

- *Clear objectives,*
- *Stakeholder involvement,*
- *An identified target audience,*
- *An understanding of the motivations underlying environmental behavior, and*
- *Activities designed to influence motivations.*

Each of these essential elements is discussed briefly below.

Objectives

In 1978, UNESCO held the world's first intergovernmental conference on environmental education and framed three broad objectives:

- To foster clear awareness and concern about economic, social, political, and ecological interdependence;
- To provide every person with opportunities to acquire the knowledge, values, attitudes, commitment, and skills needed to protect and improve the environment; and
- To create new patterns of behavior of individuals, groups, and society as a whole toward the environment.

These objectives make it clear that environmental education is more than providing information about the environment. The ultimate objective is to foster societies with more environmentally sustainable behaviors. The two general goals of environmental education and communication, then, are (1) to change human behavior so it becomes more environmentally sustainable right away, and (2) to give people the background knowledge, awareness, and motivation to make environmentally sustainable choices later (see Day and Monroe, 2000. www.greencom.org/).

Stakeholders are people or organizations with an interest, or a "stake," in the use and management of the biodiversity of a particular place. They include local people who may depend on

natural resources for their livelihoods, government agencies, and NGOs. Different stakeholders may have very different views of the threats to biodiversity in a given situation and very different ideas about acceptable solutions.

Stakeholder Involvement

All stakeholders should be involved in the design of environmental education and communication activities from the very beginning of the process because all are needed to help identify the actions and practices that threaten biodiversity and to learn about the motivations for those critical behaviors. Involving stakeholders is also a way to communicate with them and increase their capacity over the long term.

Another reason for involving all stakeholders is that in many societies there is a vast amount of local, indigenous knowledge about biodiversity and its sustainable use and management that can be tapped. This knowledge, the basis of generations of living in a place, can sometimes be much more sophisticated than the best available scientific knowledge brought in by outsiders.

- For more information on identifying and involving stakeholders, see Byers, B.A., *Understanding and Influencing Behaviors: A Guide*. Washington, DC: Biodiversity Support Program, 2000 (www.bsponline.org/bsp/publications/bsp/behaviors_eng/behaviorsguide_eng).

Target Audience

The appropriate target audience for activities that aim to influence behavior is usually one or more subgroups within the community or population. Whose behavior is unsustainable or harmful to biodiversity? Why are they doing what they are doing? Do they know that their behavior is damaging to the environment? You should answer these and other questions with the stakeholders—since, as just discussed, stakeholders may disagree on the answer to these questions. Once target behaviors have been agreed on, identifying the people or groups who engage in that behavior identifies the target audience for activities that aim to change behavior.

The target audience for activities designed only to raise awareness and provide knowledge, rather than to change behavior directly, is also usually a subset of the population or community. It can be adults, but traditional or formal environmental education is often aimed at children or young adults in school settings. In this case, the goal is to build an informed future citizenry that will be more likely to make biodiversity-friendly choices. In general, this is a relatively slow process, taking place over a generation or more. In some cases, however, environmental education in schools provides an avenue for communicating messages immediately to adults—the students' parents.

In addition to activities that aim to provide knowledge or change behavior, training programs are needed to provide a supply of conservation professionals, technicians, and practitioners. Wildlife management, forestry, and conservation biology programs at the college level contribute to the capacity to do conservation. Simpler training initiatives, for game guards, protected area guides and interpreters, or plant collectors involved in biodiversity prospecting also play a role. Training teachers in how to incorporate environmental and biodiversity conservation lessons in their classrooms is another important kind of activity.

Understanding Motivations

Before you can develop activities to influence environmental behaviors, you need to understand what motivates both sustainable and unsustainable behaviors. What are the barriers to the adoption of more sustainable practices? Key factors that determine the behaviors of target audiences can include:

- Knowledge,
- Values,
- Social norms,
- Cultural factors,
- Options,
- Skills,
- Economics,
- Policies, and
- Laws.

One way to identify important factors that motivate biodiversity-threatening behaviors is to compare people who do the behavior (“doers”) with those who don’t (“non-doers”). This may reveal differences in knowledge, values, options, skills, wealth, gender, access to resources, and other factors that influence behavior. To learn more about the factors that influence behavior, see publications from the Biodiversity Support Program (Byers, 1996, 2000) and the USAID GreenCOM Project (Day and Monroe, 2000) cited below and available on the Web.

Activities Designed to Influence Motivations

Once you have the key factors that motivate behaviors affecting biodiversity, you can design activities to influence those motivations. For example, if the people doing something that threatens biodiversity do not know that the behavior is damaging or unsustainable, providing information may be enough to change the behavior. Knowledge and awareness are relatively simple to address through education and communication programs, but these will only be ef-

fective if lack of awareness and knowledge is the critical barrier to the adoption of new, biodiversity-friendly practices.

Unfortunately, lack of knowledge is often *not* the reason that people do things that threaten biodiversity. For example, they may know that a behavior threatens biodiversity but do not care. They may lack viable options and alternatives that otherwise would not harm biodiversity, or they may lack the skills or means to take advantage of options that do exist.

One explanation for a wide range of biodiversity-threatening practices common in most societies today may be a lack of general knowledge and understanding about what biodiversity is and why it is valuable. As discussed elsewhere in this Guide, biodiversity is complex, a system with many interdependent elements (see *Overview*). In the past, it sometimes has been presented in a simplistic way, and equated only with species diversity. Without public education and communication about biodiversity, it is not surprising that people do not understand exactly what it is. Likewise, biodiversity is valuable for many reasons, some of which are not immediately apparent—such as some of its ecological services and nonmaterial values. Raising public awareness of the many values of biodiversity is critical.

Types of Activities

Several kinds of activities that build on and extend more traditional education and communication in support of conservation are listed below:

Social marketing is the application of models and techniques derived from commercial marketing and from behavioral psychology to promote new behaviors that have positive social values (Day and Monroe, 2000). Social marketing has been used to promote healthier lifestyles—to encourage less tobacco use, better diets, or less risky sexual behavior, for example—and is being applied in some cases to promote changes in behaviors that threaten biodiversity.

Outreach is a term that encompasses several kinds of education and communication objectives and activities. It usually refers to efforts by government agencies or NGOs to “reach out” to and enlist the support of other stakeholders. Outreach can include:

- Educational activities designed to increase knowledge and skills about biodiversity, its needs, and the threats it faces.
- Communication and social marketing activities designed to change behavior and reduce threats to biodiversity.
- Public relations activities designed to inform the public about an agency’s program and generate public acceptance and support.

Public relations can be thought of as a special dimension of environmental education and communication, in which government agencies or other organizations with environmental management responsibilities communicate with the public to encourage their support and cooperation. This might involve informing the public about laws and regulations governing use of ecological resources and explaining the need for such laws.

In its most participatory form, environmental education and communication grades into *participatory learning* and *participatory action research*. For more information, see Wadsworth, Y., 1998 (www.scu.edu.au/schools/gcm/ar/ari/p-ywadsworth98.html).

As is the case with any conservation activity and program, environmental education and communication activities will be most effective when managed adaptively (see *Monitoring, Evaluating, and Managing Adaptively*). Factors that are relevant to influencing motivations and changing behavior should be monitored periodically as indicators of success. Depending on the objectives of the educational or communication activities and the target audiences, these could be any of the factors that can influence behaviors, such as awareness and knowledge, values, availability of options, skills, or economic incentives. Or, monitoring changes in the biodiversity-relevant target behaviors themselves—such as the level of poaching or illegal logging, or, on the positive side, maintenance of sustainable levels of use of wild resources—could show that program activities were having an influence. Incorporating feedback from this monitoring and making appropriate incremental changes to the program complete the adaptive management cycle.

Sources for More Information

An easily accessible source for help in developing and implementing an environmental education activity is the GreenCOM IQC (see *Implementing Mechanisms and Partners*).

- Booth, Elizabeth Mills. *Starting with Behavior: A Participatory Process for Selecting Target Behaviors in Environmental Programs*. Washington, DC: GreenCOM, 1966: www.greencom.org/greencom/papers.asp?page=17
- Byers, Bruce A. *Understanding and Influencing Behaviors in Conservation and Natural Resources Management*. Washington, DC: Biodiversity Support Program, 1996.
- Byers, Bruce A. *Understanding and Influencing Behaviors: A Guide*. Washington, DC: Biodiversity Support Program, 2000: www.bsponline.org/bsp/publications/bsp/behaviors_eng/behaviorsguide_eng.pdf
- Day, Brian A., and Martha C. Monroe, Eds. *Environmental Education & Communication for a Sustainable World: Handbook for International Practitioners*. Washington, DC: Academy for Educational Development, 2000: www.usaid.gov/environment/greencom/handbook.htm

Websites:

Biodiversity Education Network: www.bioednet.org

Conservation International, Conservation Programs, Education and Awareness: www.conservation.org/xp/CIWEB/programs/environmental_education/environmental_education.xml

Ecological Society of America: www.esa.org/education/education_section/

EPA (U.S. Environmental Protection Agency), Office of Environmental Education Home Page: www.epa.gov/enviroed/

GreenCOM, USAID Environmental Education and Communication Project: www.greencom.org

IUCN, The World Conservation Union, Commission on Education and Communication: www.iucn.org/cec/

NAAEE (North American Association for Environmental Education), International Program: naaee.org/index.php

National Association for Interpretation: www.interpnet.org

EE-Link—“Your Link to Environmental Education Resources on the Internet”: www.eelink.net/

U.S. Fish & Wildlife Service, Educating for Conservation: www.fws.gov/educon.html

World Resources Institute: www.wri.org

WWF, Windows on the Wild: www.worldwildlife.org/windows/material.html

POLICY DEVELOPMENT AND REFORM

Conserving biodiversity requires a supportive policy environment. Policies, laws, and regulations provide the context in which people make decisions and take actions that affect biodiversity both positively and negatively. To support conservation, policies must exist or be developed that link resource users and other stakeholders with incentives to manage biodiversity sustainably.

Elements of Effective Conservation Policy

To be successful, conservation policies should:

- Reflect stakeholder values and interests.
- Create a political and legal context and enabling environment to support conservation.
- Comply with international treaties.
- Clarify management authority and responsibility.
- Resolve conflicts between traditional and modern management systems.
- Have effective implementation and enforcement mechanisms.
- Link with economic policies through environmental accounting mechanisms.

Each of these essential elements is discussed briefly below.

Policies that Reflect Stakeholder Values and Interests

Policymakers need to involve stakeholders in the development of policies that will create an enabling environment for biodiversity conservation. Conditions can vary widely even within a single country. Policies—and the laws, rules, and regulations that define them in practice—should be adjusted to fit local conditions. Otherwise, they may be poorly adapted to some specific local contexts and may even work against biodiversity conservation. Effective policies require participatory development. If stakeholders participate in an open and accountable process to develop policies, and the laws and rules to implement them, they are more likely to support them. If some stakeholders do not have a role, or if some stakeholders can dominate the process at the expense of others, disputes are likely to result.

A Political and Legal Context for Conservation

Many of the tools and methods of conservation need a political and legal context, set by policies, to work. For example, appropriate policies are needed to support:

- Protected areas
- Community-based conservation
- Sustainable use of natural resources
- Land and resource tenure

- Conservation of threatened and endangered species
- Protection of watersheds, streams, rivers, and wetlands
- Management of coastal zones
- Pollution prevention.

Policies in other sectors, such as transportation, urban and industrial development, taxation, national and international trade, population, education, and health, also have major effects on and implications for the conservation of biodiversity.

How can international assistance and aid support the development of biodiversity-friendly policies or the reform of policies that threaten biodiversity? Sometimes, international agencies can foster and support partnerships for policy development and reform among relevant stakeholders within a given country or region (see *Creating Partnerships*). Aid agencies can also help establish trial or “pilot” regimes for managing and conserving biodiversity. If these experimental regimes are successful in a given local situation, they may show the way to a political and legal framework that can be scaled up in the development of national policies.

Compliance with International Treaties

National policies should support a country’s international obligations under the conventions and treaties to which the country is a party (see *International Treaties, US Legislation, and USAID Regulations*). CITES requires policies and laws regarding hunting, land use, export control and customs, and biological monitoring, for example. The CBD obligates countries to:

- Develop national programs for the conservation and sustainable use of biological diversity.
- Establish a system of protected areas.
- Integrate biodiversity conservation into the relevant sectoral and cross-sectoral plans, programs, and policies.
- Establish mechanisms to respect, preserve, and maintain the knowledge, innovations, and practices of indigenous and local communities embodying traditional lifestyles relevant to the conservation and sustainable use of biodiversity.

The Convention on Wetlands of International Importance, the so-called Ramsar Convention, requires signatories to designate at least one national wetland for conservation, develop programs for the management of migratory waterfowl and establish wetland nature reserves, cooperate in the exchange of information, and train personnel for wetland management. The Climate Change Convention, Desertification Convention and a number of others are also relevant to biodiversity and its sustainable management. Countries need to have policies and the accompanying legal instruments that implement these treaties within their territory. Either policy development or policy reform may be needed depending on circumstances.

Management Authority

Knowing who has the authority for managing biodiversity and natural resources in a given situation is a key to creating policies and laws that support conservation. Clarifying management authority may be a prerequisite for policy development or reform in some cases. Issues such as land tenure, tenure over specific resources (e.g., water, fish, trees, wild animals, grazing), common property resources, privatization, and decentralization and devolution are all relevant to this question of management authority.

Tenure refers to the rights and responsibilities of using and managing property or resources. The individual or group with tenure over some aspect of biodiversity is the owner or manager of that resource, whether it is a forest, river, coastal zone, or species. Depending on the situation, tenure over biodiversity can be held by national or local government agencies, traditional or indigenous communities, individuals or private corporations, or other kinds of NGOs. Tenure can be complicated. Land may be owned, used, and managed by private individuals, but the wild animals inhabiting that land may be “owned” and managed by a state wildlife agency, for example.

Resources owned and managed in common, by a group, are sometimes called *common property resources*. This term is generally reserved for resources managed by traditional communities of local users. Common property resources can be uniquely difficult to manage sustainably in some situations, but with appropriate rules to control use and access, or with a strong community consensus about use, they are not necessarily more likely to be used unsustainably than resources under private tenure.

For more information, see Murphree, M., 1997 (www.iucn.org/themes/spg/beyond_fences/beyond_fences.html).

Natural resources can also be owned and managed privately, by individuals or corporations. *Privatization* of biodiversity resources that were formerly managed as common property or by public agencies may improve incentives to conserve them under some circumstances—when, for example, private owners are willing to make investments in managing natural resources that groups are unwilling to make, in order to realize sustainable benefits for themselves over the long term. Privatization, however, does not automatically lead to conservation and sustainable use—some private resource managers may have a short-term economic interest in “mining” a potentially renewable natural resource, converting it to private wealth, and destroying its option value for future generations.

In all cases, whether a resource is managed as common property, by a public agency, or by private owners, appropriate policies, laws, and enforcement mechanisms are needed to promote conservation.

Concessions and leases are mechanisms for temporarily granting some level of private control over publicly owned land or biodiversity resources. Leases could allow for exclusive use of part of a national park for ecotourism, for example. Concessions for logging, sport hunting, fishing, tourist lodges, or river rafting are other examples. Concessions are a kind of temporary privatization, but they can also be viewed as public–private partnerships, designed to provide economic incentives for long-term conservation.

Policies regarding such concessions are critical for making them serve the purpose of biodiversity conservation. Sustainable use, whether of direct material or nonmaterial values of biodiversity, must be the bottom line. Lease length can have a major influence on incentive structures. If leases are too short, private investors may conclude that they cannot recover their costs. For example, a logging concessionaire may be reluctant to build a network of roads if the lease is too short to allow costs to be recovered from harvesting timber, or a tourism concessionaire may be reluctant to build a lodge unless the lease is long enough to allow cost recovery.

For more information on privatization as a potential tool for biodiversity conservation, see Brown and Mitchell, 1999.

In many developing countries, local people depend on the biodiversity of their immediate environment for livelihoods. Their day-to-day decisions and actions may have a profound impact on local biodiversity, yet they may not have tenure over the resources on which their lives depend. In the past they may have developed and used traditional management systems to conserve their natural resources, but modern national states may have supplanted these traditional systems. To correct this mismatch between management authority and “stake” in biodiversity, governments are more and more frequently experimenting with *decentralization* or *devolution* of management authority over natural resources. Such devolution allows those stakeholders with strong, immediate interests in certain aspects of biodiversity to make and enforce appropriate rules. As in the case of privatization, the rationale for decentralization is to improve incentives for conservation by putting the management authority and responsibility into the hands of stakeholders at the most relevant level.

National government agencies are one kind of stakeholder, and their interests in biodiversity conservation may not be the same as other stakeholders at more local levels. Because of this, they may not favor decentralization of management authority. Comanagement (see *Community-Based Conservation*), in which a central government agency shares management authority with a local group, is an example of limited decentralization and may provide a solution in some cases. If subnational government agencies or community groups control the funding for their management operations, they will be in a stronger position relative to a central government agency. To the extent that they depend on higher levels of government for funding, their real authority may be reduced accordingly.

For more information on decentralization, see:

- Ostrom, E., Local Institutions for Resource Management, in *Beyond Fences: Seeking Social Sustainability in Conservation*, G. Borrini-Feyerabend, Ed., Gland, Switzerland: IUCN, 1997: www.iucn.org/themes/spg/beyond_fences/beyond_fences.html
- B. Wyckoff-Baird, B., A. Kaus, C. Christen, and M. Keck., *Shifting the Power: Decentralization and Biodiversity Conservation*. Washington, DC: BSP, 2001: www.bsponline.org/bsp/publications/aam/shifting/Shift_Power_00.pdf

Conflicts between Traditional and Modern Management Systems

Traditional land and resource tenure systems exist alongside more recent legal- and state-based systems in many developing countries. Different stakeholders accord these management systems more or less legitimacy. The existence of more than one system does not necessarily imply conflict between them. The two systems could operate in different places: for example, the state-based system might be dominant in urban areas, whereas indigenous systems operate in rural areas. Traditional and modern management systems sometimes conflict. When they do, uncertainty about which system of tenure applies can open the door to unsustainable exploitation.

Local residents, whether fishers, hunters, farmers, irrigators, or pastoralists, may have developed their own management systems (e.g., authorities, “laws,” rules, taboos, etc.) governing natural resources. These can be important building blocks in conserving biodiversity. Traditional and locally crafted management systems are not likely to be uniform across even small areas, much less a whole country. They represent the outcome of processes that reflect local scarcities, power relationships, personalities, and other factors. Attempts to build on them will thus often involve legitimizing a mosaic of local legal systems, thereby complicating the development of general national legislation. However, locally developed rules are indicators of local conservation values that deserve respect and recognition in policies and legislation.

National governments can support efforts by self-governing user groups and communities by incorporating local management rules into national systems (e.g., community “by-laws”). The knowledge that modern legal systems will back up traditional decisions greatly strengthens the authority of traditional resource managers.

For more information see:

- Beltran, J. Ed., Indigenous and Traditional Peoples and Protected Areas: Principles, Guidelines and Case Studies, in *Best Practice Protected Area Guidelines*, Series No. 4, Gland, Switzerland: IUCN, 2000: www.wcpa.iucn.org/pubs/publications.html
- Alcorn, J.B., Indigenous Resource Management Systems, in *Beyond Fences: Seeking Social Sustainability in Conservation*, G. Borrini-Feyerabend, Ed., Gland, Switzerland: IUCN, 1997: www.iucn.org/themes/spg/beyond_fences/beyond_fences.html
- Alcorn, J.B., *Indigenous Peoples and Biodiversity Governance: The Hundestad Recommendations for Donor Best Practice*. Washington, DC: BSP, 2001: www.bsponline.org/bsp/publications/asia/hundested/hundested.html

- Weber, R., J. Butler, and P. Larson, Eds., *Indigenous People and Conservation Organizations: Experiences in Collaboration*. Washington, DC: BSP, 2000: www.bsponline.org/bsp/publications/africa_indigenous_conservation/indigenous_conservation.pdf

Effective Implementation and Enforcement Mechanisms

Changes in management authority through policy reform, new laws, or enforcement of laws not previously enforced may require education and communication campaigns (see *Environmental Education and Communication*). If people do not know about policies and laws, nor understand the reasons behind them, the laws and policies may generate conflict and be especially difficult to implement and enforce. New policies, laws, and rules should be translated into local languages and disseminated through diverse media, including those that do not require literacy (as do print media like newspapers) or access to certain technologies (such as computers). Radio or TV can deliver messages to illiterate target audiences.

In many developing countries, state capacity to implement policies and enforce laws and regulations is limited. Disgruntled stakeholders can very often find ways to ignore or subvert laws. On the other hand, stakeholders who understand and support laws can contribute greatly to their application and enforcement, as well as to improving them over the long term. Co-enforcement systems that involve local stakeholders, such as the use of community forest or wildlife guards, can be quite effective.

Link with Economic Policies

Linking conservation and economic policy through the use of environmental accounting mechanisms could contribute to sustainable natural resources management and biodiversity conservation. Environmental accounting is the effort to modify a country's national income accounts, from which the gross domestic product (GDP) and gross national product (GNP) are calculated, to take into account the value and the depletion of natural resources and environmental services. The use of environmental accounts allows for the tracking of both physical resources and their monetary value in a system that is compatible with the traditional national income accounts. This enables the environment to be integrated into economic analysis and decision-making, making it easier to readily monitor, analyze, and evaluate the links and tradeoffs between economic goals and environmental ones.

Many developing countries have started to establish national income and environmental accounts. These efforts have received extensive technical and financial support from both the United Nations and USAID. The United Nations has assumed the overall responsibility for developing rules and structure for environmental accounting. The methods proposed cover stocks and flows of renewable and nonrenewable natural resources, pollutant emissions, expenditures on environmental protection, and other topics. For the most part, the methods covered do not include valuation of nonmarketed ecological services or the impacts of environmental degradation. The components of the accounts that may be useful in a given country depend on its envi-

ronmental concerns and the extent to which its economy depends on natural resources. In sub-Saharan Africa, for example, accounts that cover stocks and flows of natural resources are likely to be crucial, whereas in Eastern Europe, pollution accounting will be more important. In Southeast Asia, both components of the accounts will be relevant.

For more information, see:

- *Environmental Accounting: What's It All About?* Washington, DC: IUCN/The World Conservation Union, 1998 (www.iucn.org/places/usa/literature.html#envact).
- Hecht, J. E., *Lessons Learned from Environmental Accounting: Findings from Nine Case Studies*. Washington, DC: IUCN/The World Conservation Union, 2000 (www.iucn.org/places/usa/literature.html#envact).
- *Integrated Environmental and Economic Accounting—An Operational Manual (Handbook of National Accounting; Studies in Methods, Series F, No. 78)*, New York: United Nations and United Nations Environment Programme, 2000.

USAID PROGRAM INFORMATION

Principles for Effective Programs

Implementing Mechanisms and Partnerships

International Treaties

US Legislation

USAID Regulations, Policies, and Procedures

PRINCIPLES FOR EFFECTIVE BIODIVERSITY PROGRAMS

We have identified several principles for effective biodiversity conservation that should be integrated into USAID programs. We hope this will be a useful checklist for program design. Many of these principles are discussed in the key steps for conservation programs. Information on how to implement these concepts is found throughout the guide.

- **Programs should apply threats-based conservation.** Conservation programs should clearly identify the threats to biodiversity in a site-specific context and delineate a threat abatement plan.
- **Programs should be adaptive.** While the initial design of program activities should be sound, conservation needs are complex and constantly evolving. Programs should be structured in such a way that they monitor their progress, generate timely information for management, and adapt the program as needed.
- **Programs should focus on priority sites for biodiversity conservation.** USAID managers should conserve biodiversity of global, regional or national priority as appropriate.
- **Programs should be results oriented.** Programs should articulate how they plan to assess program impacts on biodiversity. Efforts to measure habitat quantity and/or quality are encouraged where appropriate.
- **Programs should foster sustainability.** Programs should (1) focus on how conservation achievements will be sustainable beyond the end of the activity lifetime; and (2) seek to identify continued financing for ongoing activities. For programs that include resource extraction activities, managers should examine the likelihood that extractive activities will be ecologically, socially, and economically sustainable; how overharvesting will be controlled; and how extractive use will contribute directly to biodiversity conservation.
- **Programs should be participatory.** Programs should incorporate the equitable and active involvement of stakeholders in all stages of program design and implementation. Particular consideration should be given to the inclusion of traditionally marginalized stakeholders, such as women and indigenous peoples.
- **Programs should strengthen in-country capacity.** To increase the sustainability of conservation interventions, strengthening in-country capacity is key at both the human and institutional level. Institutional strengthening may be needed for both government and non governmental organizations.
- **Programs should integrate analysis into program design.** Substantive analysis and efforts to disseminate lessons learned should be integrated into programs, particularly programs at multiple sites or larger scales.
- **Programs should complement other conservation and development activities.** In particular, programs should examine how they will complement activities of USAID, other donors, host-country governments, the private sector, and other institutions.

Implementing Mechanisms and Partners

USAID programs and activities are implemented through three main kinds of *mechanisms*: acquisitions, assistance, and interagency agreements.

Acquisitions

Acquisition involves buying or contracting for goods, services, or “results.” In most cases, USAID contracts for-profit, private-sector organizations to provide services and goods to further mission objectives. Contracts must be competitively bid and do not require cost sharing. For example, a company could be hired to conduct a media campaign to raise national awareness of forest loss or threats to an endangered species. A consulting firm could be contracted to design and manage a watershed conservation project.

A special type of contract is an *Indefinite Quantity Contract* (IQC). An IQC is a mechanism for contracting both short- and long-term technical assistance within a specific area of expertise (e.g., biodiversity and forestry, energy, environmental education). IQCs have been developed to provide a simplified and timely contracting mechanism for USAID bureaus and missions to use in response to emerging needs. Advantages to using this kind of contract include (1) flexibility with respect to delivery scheduling, (2) services need be ordered only after actual needs have materialized, and (3) the obligation of the agency is limited (an IQC has a low minimum of services that must be contracted over a given time).

IQC prime contractors are competitively chosen through a Request for Proposals (RFP) process. Each prime contractor is affiliated with a group of subcontractors whose expertise can be used in response to delivery order needs. Delivery orders under a certain ceiling may draw on one prime without competition if sole-sourcing can be shown to be warranted. Above a certain ceiling, and where sole-sourcing is not obvious, delivery orders must be available for bidding by all IQC primes. Delivery orders may not specify which subcontractors should carry out the work. Delivery orders should specify distinct products or “deliverables.”

Assistance

Assistance is a grant to an organization, usually an NGO, private voluntary organization (PVO), or community-based organization (CBO), to support their activities that contribute to USAID’s strategic objectives. For example, USAID could fund a national environmental NGO that is working with local communities on sustainable utilization of wild animal or plant products. Or, the Agency could contribute funds for an international NGO to carry out its programs in a given country or region. A *Cooperative Agreement* is a special kind of assistance instrument with some features that distinguish it from a pure grant (see below). Grants may be awarded competitively or noncompetitively to unsolicited proposals under certain circumstances (see description below of Leader with Associates grants for exceptions), and usually require some cost sharing from the grantee.

Leader with Associates grants and cooperative agreements are assistance mechanisms managed from a Pillar Bureau. Leader Awards are made in response to a competitive request for applications (RFA) issued at the request of a Pillar Bureau. The Leader Awards are given to cover a specified worldwide activity. Associate Awards (grant or cooperative agreement) are separate activities that fit within the broader program description of a Leader Award. Associate Awards have separate budgets and reporting requirements, but are otherwise covered by the terms and conditions of the Leader Award. The anticipated benefits of this mechanism include (1) no competition required for Mission awards under the Leader/Associate grant, (2) simplified Mission award documents, (3) simplified certification by the recipients, and (4) reporting directly to the missions on the use of mission funds.

Interagency Agreements

Interagency Agreements (IAAs) are agreements with other U.S. government agencies to share staff and expertise and to collaborate on joint programs. IAAs can also allow USAID to carry out a program through other U.S. government agencies. For example, a USAID mission could work with the U.S. Fish and Wildlife Service to monitor the trade in endangered species products in a given country, or with the Centers for Disease Control to monitor emerging viral diseases related to forest clearance or the bushmeat trade. It could collaborate with the U.S. Forest Service on a forest management project, with the National Park Service on training for park managers or interpreters, or with the U.S. Peace Corps on environmental education in schools.

USAID policies do not favor one or the other of these mechanisms, but do recognize that each has unique advantages and constraints, some of which are described in Table 4 (see USAID, 2001a: www.usaid.gov/pubs/ads/300). In selecting which mechanism to use, USAID program managers should carefully assess what role the Agency wants to play in implementation. With acquisition, USAID states what services, goods, or “results” it wants to buy, then manages, monitors, and evaluates the contractor’s performance in providing these. USAID decides the requirements and standards and, frequently, provides technical direction during contract implementation. With assistance, USAID has more limited involvement in the design and management of the activity. The program is largely the grantee’s, with USAID ensuring—prior to awarding the grant—that the proposed program supports a given strategic objective. The *Cooperative Agreement* creates a situation where “substantial involvement is anticipated between USAID and the recipient during the performance of the proposed activity” (ibid.), but “substantial involvement” is statutorily limited and does not allow the Agency to exercise a high level of control over the cooperating organization. In some instances, such as in politically sensitive situations, it may be necessary or desirable for USAID to have more oversight and control. In such a case, acquisition might be a better mechanism than assistance. On the other hand, assistance mechanisms are appropriate where a long-term organizational commitment to a site is desirable beyond the anticipated USAID support. The Agency’s experience has shown that a given strategic objective is often best achieved through the use of a combination of acquisition (contracts) and assistance (grants or cooperative agreements).

TABLE 4

Mechanism	USAID’s Role	USAID’s Level of Involvement
Acquisition	“buy”	Sets requirements and standards
▪ Contracts	“manage”	Provides technical direction during contract period
▪ Purchase Orders	“approve”	Evaluates deliverables
▪ Delivery Orders		
▪ Task Orders		
Assistance— Grants	“sponsor” “monitor”	Has no formal authority to direct the activity Assesses grantee qualifications and capabilities prior to award
Assistance— Cooperative Agreements (e.g., Leader with Associates)	“substantial” involvement “partnership”	Negotiates and approves activities through some mechanism (e.g., an annual work plan)
Interagency Agreements	“partner” “collaborate”	

The centrally established (i.e., USAID/Washington) contract mechanism most explicitly focused on promotion of biodiversity conservation is the:

- *Biodiversity and Forestry (BIOFOR) Indefinite Quantity Contract (IQC).*
Prime contractors: ARD, Inc. and Chemonics International, Inc.
www.ard-biofor.com
www.biofor.com/

Other centrally established contract mechanisms that address different facets of biodiversity conservation include:

- *Environmental Education and Communication (GreenCOM) Project.*
Contractor: The Academy for Educational Development
www.greencom.org
- *Integrated Water and Coastal Resources Management IQC.*
Contractors: Development Alternatives, Inc.
ARD, Inc.: www.ard-water.com
and PA Consulting: www.paconsulting.com/
- *Rural and Agricultural Incomes with a Sustainable Environment (RAISE) IQC.*
Contractors: ARD, Inc., Chemonics International, Inc., and Development Alternatives, Inc.
www.RAISE.org
- *Environmental Policy and Institutional Strengthening IQC (EPIQ 2).*
Contractor: To be awarded

Examples of grant and Cooperative Agreement mechanisms established by USAID/Washington to promote biodiversity conservation include:

- *The Global Conservation Program* involves six Leader with Associates Cooperative Agreements with large NGOs: African Wildlife Foundation, Conservation International, Enterprise Works Worldwide, The Nature Conservancy, Wildlife Conservation Society, and World Wildlife Fund.
- *Coastal Resources Management II Cooperative Agreement* Cooperator. Grantee: the University of Rhode Island’s Coastal Resources Center.
- *Parks in Peril: A Cooperative Agreement* with The Nature Conservancy.

Interagency Agreements used to support biodiversity conservation include:

- *International Forestry Program*. Collaborating agency: the U.S. Forest Service.

Implementing Partners

Private civil organizations—such as conservation, development, and community NGOs—are often uniquely qualified to deliver services and project management on the ground, since they have the necessary local knowledge and resources. These organizations are also playing an increasingly influential role in monitoring both business and government activity, rewarding good performance and criticizing bad performance. However, organizations have different sets of skills and experiences that may or may not be appropriate for the threats at a particular site and for particular conservation targets.

It is important to choose partners who can:

- Effectively address threats at the appropriate scale and sites.
- Ensure the long-term sustainability of the conservation achievements in terms of financing (see *Economic Incentives and Conservation Finance*) and human capacity (see *Creating Partnerships*).
- Disseminate lessons learned.

Types of Partnerships

Alliances between the public and private sectors can take several different forms. *Contractual relationships* involve the contracting of a private entity by a public agency to provide goods or a service to the public—for example, a municipal government hiring a private engineering firm to clean up a polluted river. In these cases, the contracted organization usually does not have any decision-making ability or any liability for the success or failure of the project. In a *partnership*, the public and private entities jointly provide the service and share in all decision-making, liability, and information exchange. An example of such an arrangement might involve a country’s wildlife department working cooperatively with an international conservation organization to develop, implement, and enforce the management plan for a national park. A *consortium* has the same characteristics as a partnership but generally involves three or more parties—for

example, a national wildlife department, an international conservation organization, and a local university's biology department.

Within the alliance, collaboration may be *horizontal*, involving agencies or organizations at the same level (local, state, national). Such collaboration expands the ability of entities to address various aspects of a particular problem or project. For example, a local hospital, an international relief organization, and a science-based conservation organization might team up to address the health, poverty, and biological factors behind conservation failures. A *vertical* alliance involves entities at different levels, enabling the partners to contribute different assets and perspectives to similar aspects of a problem. For example, a national development organization and a local community development group might be an ideal match to fully understand the implications and interactions of the international, national, and local dimensions of a threat to biodiversity. Finally, a *transnational* alliance includes international agencies that often provide the funding for local-level activities.

Benefits of Partnerships

Public-private partnerships “add private-sector creativity and flexibility to public-sector accountability and credibility” (Ingerson, 2000: www.icls.harvard.edu/PPP/key.htm). Benefits of partnerships include:

- *Increased efficiency and innovation.* Private-sector organizations are often able to work more quickly and flexibly than public-sector agencies, which are bound by internal regulations and public approval processes. This flexibility allows more opportunities for innovation. On the other hand, governments have access to public funding and regulatory enforcement authority and often have a more solid mandate from the public. This combination of assets can be extremely effective in providing quick, effective, and long-term biodiversity conservation benefits on the ground.
- *Increased access to resources without having to actually expand capacity.* By partnering with private NGOs or community-based groups to complete projects on the ground, the public sector can access additional resources, information, knowledge, people, capacity, and money without having to directly increase the size or capacity of its staff. This can increase government's ability to achieve multiple and concurrent objectives. For example, in a project designed to improve protected area enforcement, working with local law enforcement agencies and NGOs that have expertise in community development, poverty alleviation, and biological management will greatly expand the capacity of the project to cover all aspects of encroachment into a protected area.
- *Increased representation of interests.* At the same time, these partnerships can enable participants to expand their points of view, more effectively representing a multitude of ownerships, interests, and stakeholder needs. This broader perspective allows them to cover all potential aspects of an issue or threat and minimize the chance of conflicts (see *Creating Partnerships*).

- *Increased legitimacy, credibility, and support.* Often, government agencies have little or no presence in an area and thus may have little basis for support or trust among local communities. Partnering with a private organization that has a history in a local area can increase the legitimacy of government involvement and improve the likelihood of local acceptance and support of a project.

INTERNATIONAL TREATIES

A treaty is a legally binding international agreement between two or more states that is governed by the principles and practices of international law. USAID is subject to all international environmental treaties ratified by the United States and must comply with the requirements outlined in the treaties.

Although the State Department is primarily responsible for negotiating environmental treaties, USAID plays a vital role in the treaty negotiation process by ensuring that developing country perspectives are taken into consideration within U.S. position statements. USAID has been active in helping to shape U.S. positions at major negotiation rounds for many international treaties, including the Convention to Combat Desertification and the Framework Convention on Climate Change. In addition, the Agency provides key technical assistance to its developing country partners, helping to build their capacity to participate effectively in treaty negotiation and implementation.

This section provides a brief overview of some of the more significant international treaties that affect USAID programming related to the conservation of biodiversity, natural resources, and the environment. For each of these conventions, USAID mission environmental staff should determine whether the country in which they serve is party to the convention and review the status of its implementation in the country. Some of these treaties require national action plans of some kind, and these plans can be very helpful to USAID staff in a given mission in determining priority sites and actions for biodiversity and natural resource programs.

Convention on Biological Diversity (CBD)

The CBD provides an internationally recognized framework within which countries can work together to conserve biological diversity. By virtue of its near universal ratification, it codifies approaches and principles that guide current biodiversity conservation programs around the world, and it is arguably the most important international agreement for biodiversity conservation. Although a signatory, the United States is one of the few countries in the world that has not ratified the convention.

The CBD seeks to promote the conservation of biodiversity, encourage the sustainable use of its components, and achieve the equitable sharing of the benefits arising from the use of genetic resources. These objectives are to be implemented through a comprehensive approach that includes ecosystems, species, and genetic resources. The convention promotes partnerships among nations through scientific and technical cooperation, access to financial resources, and the transfer of environmentally sound technology.

Specific obligations of Parties to the CBD

- Development of national strategies, plans, or programs for the conservation and sustainable use of biological diversity.
- Integration of the conservation and sustainable use of biological diversity into the relevant sectoral and cross-sectoral plans, programs, and policies.
- Identification of components of biological diversity important for conservation and sustainable use.
- Identification of processes and activities that have, or are likely to have, significant adverse impacts on the conservation and sustainable use of biodiversity.
- Establishment of a system of protected areas to conserve biological diversity.
- Establishment of mechanisms to respect, preserve, and maintain the knowledge, innovations, and practices of indigenous and local communities embodying traditional lifestyles relevant to the conservation and sustainable use of biodiversity.

Some Key Points about the CBD

- Every USAID-presence country is a party to the CBD, so USAID staff can use the CBD and the guidance from its Conference of Parties (COP) to encourage conservation action in the country in which they serve.
- The Global Environment Facility, to which the United States contributes, is the interim financing mechanism to implement the CBD.

The *Cartagena Protocol on Biosafety* is a legally binding protocol within the CBD that addresses potential environmental impacts of living modified organisms (LMOs) derived from biotechnology that cross international borders. It requires parties to abide by specific procedures for advanced informed agreement to shipment of biotech products destined for release into the environment, such as biotech-derived seeds. There are other, less stringent provisions related to food, animal feed, and fiber for processing. More than 130 countries have signed the protocol, though it has not yet come into force.

- CBD Website: www.biodiv.org
- WRI summary and links: www.wri.org/biodiv/biodconv.html

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)

CITES entered into force in 1975. As of September 2000, 152 countries were Parties to CITES. The fundamental goal of this treaty is to protect species from overexploitation due to international trade.

CITES requires governments to regulate the international trade in endangered species on the basis of a system of permits, corresponding to varying degrees of protection that depend on the biological status of the species. The treaty calls for species to be listed on one of three appendices. Appendix I lists species threatened with extinction, and international commercial trade in these species is banned by CITES. Approximately 900 species have been placed on Appendix I. Trade in these species is tightly controlled and generally limited to scientific purposes. Appendix II lists species that might become threatened if trade is not sufficiently controlled. Appendix III lists species that are not currently threatened by trade but that require international cooperation for adequate trade regulation within individual countries that are parties to the treaty. The approximately 29,000 species on Appendices II and III may be traded under certain conditions.

Specific Obligations of Parties to CITES

- Designate management and scientific authorities to carry out certain functions specified in the treaty.
- Prohibit trade in violation of the Convention.
- Penalize trade in violation of the Convention.
- Confiscate specimens illegally traded or possessed.

Countries continue to put in place institutional, legal, regulatory, and scientific structures to implement CITES. Awareness of CITES is still limited at the subnational or local level in many of the countries where species listed by CITES occur and where illegal trade may originate.

Some Key Points about CITES

- USAID may not implement any activity or program that violates CITES.
- USAID should ensure that factors associated with biological and ecological sustainability are incorporated into activities that use wild fauna or flora.
- USAID staff should determine whether the host country has signed and ratified CITES and to what degree they are effectively implementing the convention.
- The U.S. Fish and Wildlife Service is the agency delegated with CITES management authority and responsibility within the U.S. government, so interagency cooperation is required.

- CITES website: www.cites.org/

The United Nations Framework Convention on Climate Change (UNFCCC).

The UNFCCC provides a legal and institutional framework for international action to address climate change that may be caused by greenhouse gas emissions from human activities. It was adopted at the UN Conference on Environment and Development in 1992 by 153 nations and ratified by the United States in the same year.

Parties to the Climate Change Convention agreed in principle to:

- Limit emissions of greenhouse gases.
- Gather relevant information.
- Develop strategies for adapting to climate change.
- Cooperate on research and technology transfer.

This “framework” convention also established a process for future negotiations, which have been held annually since 1995.

The Convention sets an “ultimate objective” of stabilizing atmospheric concentrations of greenhouse gases at safe levels. Such levels, which the Convention does not quantify, should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened, and to enable economic development to proceed in a sustainable manner. To achieve this objective, all countries have a general commitment to address climate change, adapt to its effects, and report on the action they are taking to implement the Convention. The Convention divides countries into two groups: those listed in its Annex 1 (industrialized nations) and those that are not listed (so-called “non-Annex 1 Parties”).

The *Kyoto Protocol* (unfccc.int/resource/protintr.html)—an agreement adopted in principle by the parties to the UNFCCC in Kyoto, Japan, in 1997—identified emissions targets and timetables for industrialized nations and proposed market-based mechanisms for meeting those targets. To date, 50 countries have ratified the Kyoto Protocol. The Protocol must be ratified by 55 parties to the Convention, representing at least 55% of global 1990 CO₂ emissions, to enter into force.

The Kyoto Protocol establishes legally binding commitments for developed countries to reduce collective emissions by at least 5% below 1990 levels by 2008–2012. In addition to meeting emission reductions domestically, the Protocol includes market mechanisms such as:

- *Joint Implementation*, which would allow countries with explicit emissions targets to obtain credit for project-based greenhouse gas emission reductions in other countries.
- *International Emissions Trading*, which would allow countries with explicit emissions reduction targets to trade greenhouse gas allowances among themselves.
- *The Clean Development Mechanism*, which would allow countries with explicit emissions targets to receive credit for certified emissions reductions from project activities undertaken in developing countries, and allow private and public sector entities worldwide to enter into cooperative projects to reduce emissions in the developing world.

Some Key Points about the UNFCCC

- The UNFCCC entered into force in 1994 in the United States, which opposes the Kyoto Protocol and will not seek ratification.
- USAID's *Climate Change Initiative (CCI)*, a 5-year, \$1 billion program launched in 1998, focuses on energy efficiency (to reduce emissions), land use (for carbon sequestration), increasing participation of developing countries in the UNFCCC process, and reducing vulnerability to the impacts of climate change.
- In February 2002, President Bush announced a new U.S. Climate Change Strategy. This plan calls for \$155 million in USAID support, which will continue to be a major source of climate technical assistance to developing countries.
- UNFCCC website: unfccc.int/ and www.iisd.ca/climate/index.html
- U.S. Department of State Climate Change site: usinfo.state.gov/gi/global_issues/climate_change.html
- U.S. Dept. of State on the Kyoto Protocol: www.state.gov/www/global/oes/fs_kyoto_climate_980115.html
- U.S. Environmental Protection Agency's climate change site: www.epa.gov/globalwarming

United Nations Convention to Combat Desertification (CCD)

Desertification is a global issue, affecting food security and poverty alleviation efforts in many parts of the world. Unsustainable agriculture, deforestation, and changes to settlement patterns can cause soil erosion, compaction, and salinization, resulting in the loss of productivity. The central emphasis of the CCD, which the United States ratified in October 2000, is the development of national and subregional action programs by national governments in cooperation with donors, local populations, and NGOs. The CCD uses an innovative "bottom-up" approach, involving people who are affected by desertification in decision-making, to facilitate effective implementation of the Convention. The CCD has the potential to address needs of indigenous and small farmers and landholders throughout the developing world and to coordinate their efforts on a subregional, regional, and international level.

Every two to three years, under the Desertification Convention:

- Developing countries must develop and implement National Action Plans to combat desertification if they are affected by serious drought and/or desertification.
- Developed countries must report on their activities to combat desertification if they are affected by serious drought and/or desertification.
- Donor countries must report on their activities to support the Convention.

Some Key Points about the CCD

- The treaty is targeted at halting and reversing the effects of desertification and severe drought in arid, semi-arid, and dry subhumid areas—it does not target true deserts.
- The CCD is the only multilateral environmental convention that legally mandates a participatory process in implementation, and this mandate will facilitate USAID collaboration with NGOs and community groups.
- USAID has a long history in supporting activities to combat desertification, particularly in Africa, including community-based natural resources management (CBNRM) for both agricultural and wildlife objectives, food security initiatives, improved farming methods, and famine early warning systems (FEWS).
- UNCCD website:
www.unccd.int/main.php
www.iisd.ca/linkages/desert.html
www.unep.org/unep/secretar/desert/home.htm
www.undp.org/seed/unso/

Ramsar Convention on Wetlands

The Convention on Wetlands, signed in Ramsar, Iran, in 1971, provides the framework for national action and international cooperation for the conservation and wise use of wetlands and their resources. The purpose of the Convention is to stem progressive encroachment and loss of wetlands, recognizing their fundamental ecological functions and their economic, cultural, scientific, and recreational values. Currently, 123 countries are parties to the Ramsar Convention. The United States ratified this treaty in 1976. Treaty membership is open for signature indefinitely, and the Convention urges all countries to join the agreement if they have not already done so.

Specific Obligations of Parties to the Ramsar Convention

- Designate at least one national wetland for inclusion in a List of Wetlands of International Importance.
- Accept the responsibility for conservation, management, and wise use of migratory birds—waterfowl in particular.
- Establish wetland nature reserves, cooperate in the exchange of information, and train personnel for wetlands management.
- Convene wetlands and waterfowl conferences as the need arises.

The treaty currently lists 1,050 wetland sites, totaling 78.7 million hectares, identified as Wetlands of International Importance. Seventeen of these are in the United States.

Some Key Points about the Ramsar Convention

- It provides a forum for information exchange among countries.
 - It is *not* preservationist in approach, but maintains a focus on sustainable use, which is usually a more acceptable approach from a developing country's perspective.
 - Private as well as public lands can be designated as Ramsar sites, providing a mechanism for public-private cooperation.
 - It may provide links to other conventions or USAID activities, such as the CBD, International Coral Reef Initiative, Convention on Migratory Species, and Tropical Forestry Conservation Act (TFCA).
-
- Ramsar Convention website: www.ramsar.org
 - For the Convention on Migratory Species:
www.wcmc.org.uk/cms/index2.htm
www.wcmc.org.uk/cms/cms_conv.htm

The Convention on Persistent Organic Pollutants (POPs)

The POPs Convention defines control measures that cover the production, import, export, disposal, and use of POPs—chemicals that do not break down easily once they enter the ecosystem. They tend to accumulate and become concentrated through ecological food chains, posing serious threats to the environment and human health. POPs have been linked to cancer, allergies, nervous system damage, immune disorders, and birth defects. POPs have been found in areas of the world where they were never manufactured or used, underscoring their threat to the global environment.

Most of the chemicals initially implicated by the POPs Convention are pesticides; the remainder are industrial chemicals or by-products. The list includes aldrin, chlordane, DDT, dieldrin, dioxins, endrin, furans, heptachlor, hexachlorobenzene, mirex, polychlorinated biphenyls, and toxaphene. Once the Convention goes into force, eight of these chemicals may no longer be produced or used. Exceptions have been granted for DDT, PCBs, dioxins, and furans.

Specific Obligations of Parties to the POPs Convention

- Promote the “best available technologies and practices” for replacing existing POPs.
- Control POPs on the initial list of 12 such chemicals, most of which are subject to an immediate ban. (The treaty allows a health-related exemption for DDT, however, because of its use in controlling malarial mosquitoes, until such time as cost-effective and environmentally acceptable alternatives can be developed.)

Some Key Points about the POPs

- The United States signed the Convention on POPs in May 2001.
- Examples of stockpiles of obsolete pesticides in storage in Africa include:
 - Ethiopia (2,400 tonnes)
 - Morocco (2,265 tonnes)
 - Tunisia (882 tonnes)
 - Sudan (657 tonnes)
 - Eritrea (223 tonnes)
 - Central Africa Republic (238 tonnes)
- There is an acknowledgement of how important it will be to the Convention's success to have the developed countries provide "timely and appropriate" assistance to the developing countries and to countries with economies in transition. Thus, capacity-building assistance will be focused on the needs of the recipient countries.
- Convention on POPs website:
www.pops.int/
www.worldwildlife.org/toxics/progareas/pop/
www.ciel.org/POPs/programpops.html

US LEGISLATION

The Foreign Assistance Act (FAA)

The FAA mandates that U.S. foreign aid shall not be used in ways that damage the environment, either globally or locally, or that deplete the natural resource base necessary for sustainable development. Section 117 indicates that “Special efforts shall be made to maintain, and where possible, restore the land, vegetation, water, wildlife, and other resources upon which depend economic growth and human well-being, especially of the poor.” Section 118 requires that every country development strategy or country plan prepared by USAID include an analysis of:

- “The actions necessary in that country to achieve conservation and sustainable management of tropical forests, and
- The extent to which the actions proposed for support by the agency meet the needs thus identified.”

Section 119 dictates that every country strategic plan developed by USAID shall include:

- “The actions necessary in that country to conserve biological diversity, and
- The extent to which the actions proposed for support by that Agency meet the needs thus identified.”

FAA Sections 118 and 119 are also subject to annual reporting requirements according to FAA Section 634(a). Both Sections 118 and 119 specify that USAID work with NGOs whenever feasible. Section 119 also provides guidance regarding consultation with local people and organizations.

Compliance with FAA Sections 118 and 119 can be assessed using a variety of mechanisms (see *Implementing Mechanisms and Partners*). Information on which to base these assessments might be plentiful or very sketchy in quantity and quality. Some countries may have a great deal of information contained within their ministries, universities, and NGOs. A country’s national reports and action plans under the CBD are a good place to start. These reports and plans outline the country’s priorities in terms of biodiversity conservation. You should also consult the action plans for the CCD as well as National Poverty Alleviation Plans to determine concerns for land degradation and human needs. One or more of the large international NGOs may have information on biodiversity and tropical forests in a given country.

Information from reviews carried out to satisfy Sections 118 and 119 may be useful background for choosing conservation priorities and targets (see *Choosing Conservation Priorities and Targets*) and selecting the scale and sites at which to work (*Selecting Scale and Sites*). They can also help to identify threats (*Identifying Threats and Designing Activities to Address Them*) and stakeholders and potential partners (*Creating Partnerships*). Because of their potential usefulness both in planning biodiversity conservation activities and activities related to agriculture, democracy and governance, and conflict, you should carry out Sections 118 and 119 analyses at an early stage in the strategic planning process for USAID programs. Environment Officers should plan ahead and push for the early start of these reviews.

The FAA also provides USAID with the authority to supply funding for biodiversity conservation. Congress authorized the use of FAA appropriations for assistance to countries for “protecting and maintaining wildlife habitats and ... developing sound wildlife management and plant conservation programs.” In providing such assistance, the legislation directs USAID to make special efforts to:

- Establish and maintain wildlife sanctuaries, reserves, and parks.
- Enact and enforce antipoaching measures.
- Identify, study, and catalog animal and plant species, especially in tropical environments.

Although not required, given the interrelated character of environmental issues, it can save time and be more efficient to include all aspects of environment (e.g., energy and urban issues) when undertaking the mandatory biodiversity and tropical forestry work. See 201.3.6.3 paragraph b, Environmental Review of the automated directives system (ADS).

USAID REGULATIONS, POLICIES, AND PROCEDURES

In addition to compliance with relevant international treaties and with the FAA, USAID is legally required to comply with several key environmental statutes and regulations to ensure that its programs and projects are environmentally sound. In this section, we won't provide the information necessary to address compliance with these regulations. Rather, we briefly describe some of the regulations of special importance to biodiversity conservation activities and programs.

If you are working on compliance with any of the regulations, refer directly to ADS 200 series and consult with your Mission or Bureau Environmental Officer. USAID has included specific language in the ADS 200 chapters, which identifies the objectives, authorities, and responsibilities of all Agency personnel and describes all aspects of the planning and reviewing process for environmental compliance. Chapter 204 maps out the policies, procedures, and staff roles and responsibilities. Chapters 201, 202, and 203 lay out the ways environment is integrated into the planning, achieving, and evaluating dimensions of USAID programming.

Under 22 CFR 216, the Agency is required to conduct rigorous and comprehensive environmental reviews for all programs, projects and activities, and substantive amendments to existing programs. In addition, Sections 118 and 119 of the FAA require USAID to conduct environmental reviews on tropical forest cover or species loss.

Regulation 216

USAID's environmental procedures are embodied in 22 CFR 216—commonly referred to as “Reg. 216,” which has three basic goals:

- To ensure that environmental factors and values are integrated into the USAID decision-making process.
- To assign responsibility within the Agency for assessing the environmental effects of USAID's actions by the Agency since 1979.
- To implement the requirements of the U.S. National Environmental Policy Act (NEPA) as they affect USAID programs.

Today, Reg. 216 is regarded as USAID's principal directive for designing development activities that are environmentally sustainable. All USAID-funded or -managed activities must be reviewed for their environmental impacts through an *initial environmental examination* (IEE) (see the ADS for rare exceptions to this). This provision includes all new activities and substantial amendments to ongoing activities, such as extensions in time, increases in funding, or modifications to activities.

The IEE provides a brief statement of factual basis for a yes-or-no, “threshold” decision about whether an environmental assessment (EA) or an environmental impact statement (EIS) will be required. A positive threshold decision means an EA or an EIS is required. A negative threshold decision means that further analysis is not required. A negative declaration, on the other hand, means that even though an action may have significant effects on the environment, the following apply:

- A substantial number of EAs or EISs relating to similar activities have been prepared in the past.
- The Agency has previously prepared a programmatic statement or assessment covering the activity in question and has considered the development of such activity.
- The Agency has developed design criteria for such an activity, which, if applied in the design of the activity in question, will avoid a significant negative impact on the environment.

A number of biodiversity conservation activities could have impacts that would warrant EAs or EISs—for example, the introduction of non-native species as an alternative food sources. If a native fish species is endangered because of overfishing, introducing an alien, quick-growing species of fish to provide an alternative food source might be proposed. However, an IEE would likely require an EIS, because of the potential for the introduced species to become an invasive that would threaten native biodiversity.

When you plan activities that involve mariculture, aquaculture, apiculture, hunting, harvesting—along with the regular infrastructure improvement—it is important to think of all the possible ramifications and ask yourself “how might this backfire and ultimately be more destructive?” This question should also be raised when reviewing annual work plans.

Biosafety Review

Biosafety review is another mandatory, pre-obligation requirement that is considered to be a subcomponent of the environmental review. Biosafety deals with the risk or hazard of using genetically modified organisms in research; field trials; or agricultural, medical, industrial, or other technologies. Biosafety is a very sensitive issue requiring the highest levels of review and compliance. Although genetically modified organisms can be exceptionally valuable solutions to a developing country’s needs and problems, they also have the potential for severe environmental impacts. USAID program managers must ensure that they comply fully with Agency procedures and obtain all necessary clearances and approvals. The biosafety review cannot be waived or delegated to the field. From Reg. 216:

“Biosafety. If an activity will potentially involve the use of genetically modified organisms in research, field trials, or dissemination, the activity must be reviewed and approved for compliance with applicable U.S. requirements by the Agency Biosafety Officer in Washington prior to obligation of

funds and prior to the transfer, testing, or release of biotechnology products into the environment. This review and approval is limited to the safety aspects of the proposed activity and may involve external peer review or demonstration of comparable safety oversight by other expert U.S. federal agencies. Therefore, adequate time should be budgeted for this approval process. This biosafety determination is separate from, and precedes and informs, the 22 CFR 216 environmental impact assessment determination. ...”

sedac.ciesin.org

- United Nations Environment Programme *Register of International Treaties and Other Agreements in the Field of Environment*. The summaries describe the objectives, major provisions, dates and contracting parties of each agreement.

ACRONYMS AND ABBREVIATIONS

ADS	Automated Directives System
ANE	Asia and Near East Bureau (USAID)
AWF	African Wildlife Foundation
BIOFOR	Biodiversity and Forestry Indefinite Quantity Contract
BOLFOR	Bolivia Sustainable Forest Management Project
BSP	Biodiversity Support Program
CBC	Community-Based Conservation
CBD	United Nations Convention on Biodiversity
CBNRM	Community-Based Natural Resources Management
CBO	Community-Based Organization
CCD	United Nations Convention to Combat Desertification
CCI	Climate Change Initiative
CDIE	Center for Development of Information and Evaluation
CI	Conservation International
CIFOR	Center for International Forestry Research
CITES	United Nations Convention on International Trade in Endangered Species
COP	Conference of Parties
EA	Environmental Assessment
EE&C	Environmental Education and Communication
EGAT	(Bureau of) Economic Growth, Agriculture, and Trade (USAID)
EIS	Environmental Impact Statement
EPIQ	Environmental Policy and Institutional Strengthening IQC
FAA	Foreign Assistance Act
FAO	Food and Agriculture Organization of the U.N.
FCCC	United Nations Framework Convention on Climate Change
FEWS	Famine Early Warning System
FS	U.S. Forest Service
FWS	U.S. Fish & Wildlife Service
GDP	Gross Domestic Product
GEF	Global Environment Facility
GIS	Geographic information system
GNP	Gross National Product
GreenCOM	Environmental Education and Communication Project

HIV/AIDS	Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome
IAA	Interagency Agreements
IADB	Inter-American Development Bank
IEE	Initial Environmental Examination
IPG	Interagency Planning Group on Environmental Funds
IQC	Indefinite Quantity Contract
IUCN	International Union for the Conservation of Nature and Natural Resources (now the World Conservation Union)
IUFRO	International Union of Forestry Research Organizations
LMO	Living Modified Organisms
MAB	Man and the Biosphere Programme
NEPA	National Environmental Policy Act
NTFP	Non-Timber Forest Products
NGO	Non-governmental Organization
NPS	National Park Service
POP	Persistent Organic Pollutant
PVO	Private Voluntary Organization
RAISE	Rural and Agricultural Incomes with a Sustainable Environment IQC
RFA	Request for Applications
RFP	Request For Proposals
SFM	Sustainable Forest Management
TFCA	Tropical Forest Conservation Act
TNC	The Nature Conservancy
UNESCO	United Nations Educational, Scientific and Cultural Organization
USAID	United States Agency for International Development
WCS	Wildlife Conservation Society
WWF	U.S. World Wildlife Fund

GLOSSARY

Adaptive management: management that includes testing assumptions and hypotheses, continuous monitoring, learning, and adjusting activities during the course of the project.

Biodiversity: short for biological diversity, it is the variety and variability of life, including the diversity of genes within species, the diversity of species, the diversity of communities and ecosystems, and the diversity of ecological processes.

Ecosystem services: the services provided by ecosystems and ecological processes, including regulation of water flows and maintenance of water quality; the formation of soil, prevention of soil erosion, and nutrient cycling that maintains soil fertility; degradation of wastes and pollution; pest and pathogen control; pollination; and climate regulation through carbon storage and sequestration.

Ecotourism: recreational activities that draw paying tourists to a conservation site because they are dependent on the values provided by aspects of biodiversity at the site; activities can range from wildlife viewing and photography, scuba diving, fishing, and sport hunting; at least some emphasis is often given to ecologically benign, minimum impact activities and infrastructure.

Element of biodiversity: an aspect or component of biodiversity, such as an ecosystem, ecological community, species, genetic variation within a species, or ecological process.

Endemic species: species found only in a relatively small geographic area and nowhere else, such as Galapagos finches.

Environmental accounting: modifying a country's national income accounting system, from which GDP and GNP are calculated, to incorporate the use and depletion of natural resources and environmental services.

Environmental assessment (EA): an analysis to determine whether a proposed action will have a harmful effect on the environment; an environmental impact assessment.

Environmental impact assessment (EIA): an analysis to determine whether a proposed action will have a harmful impact on the environment, often comparing the impact of this proposed action with that of other alternatives and options.

Flagship species: species, usually charismatic ones, that can serve as a symbol of nature and conservation, and be used as a logo or otherwise in fundraising and education by conservation organizations, such as the panda.

Forest certification: programs to audit and certify to consumers that wood and other forest products are produced in forests managed in responsible or sustainable ways.

Indicators: variables that are influenced by project interventions or management activities and that can be monitored to provide evidence of progress or success.

Indicator species: species that are particularly sensitive to ecological changes, such as pollution or the loss of natural ecological disturbances such as fire, whose presence indicates the overall integrity, resilience, or "health" of a community, landscape, or ecosystem (e.g., some lichens).

Indefinite quantity contract: a contracting mechanism for both short- and long-term technical assistance within a specific area of expertise (e.g., biodiversity and forestry, energy, environmental education), developed to be simpler and faster than normal contracts.

Initial environmental examination (IEE): a brief statement of factual basis for a threshold decision as to whether an EA or an EIS will be required.

In situ conservation: conservation of biodiversity in place, in natural settings.

Interagency agreement: an agreement with other U.S. government agencies to share staff, expertise, and collaborate on joint programs.

Invasive species: a species, often introduced inadvertently or deliberately by human activities from another continent or ecosystem, which can crowd out native species and take over habitats, thereby threatening native biodiversity.

Keystone species: species that have a dominant influence over the structure of ecosystems.

Nonmaterial values: the benefits other than direct material uses or ecosystem services that people derive from the natural world and its resources, including spiritual, esthetic, educational, recreational, historical, and scientific benefits.

Participation: the involvement of stakeholders in planning, priority-setting, implementation, monitoring, and evaluation of activities and programs.

Privatization: converting land or resources formerly under public or communal tenure into private property or private concession or lease.

Protected areas: areas managed to maintain certain elements of biodiversity and the values they provide.

Site: relatively small and circumscribed areas of natural habitat, whether land or water, and/or the area in which a conservation project works, regardless of size.

Social marketing: the application of models and techniques derived from commercial marketing and from behavioral psychology to promote new behaviors that have positive social values, such as biodiversity conservation.

Social monitoring: monitoring of social (economic, cultural, demographic, political) variables, including the behaviors of individuals and groups toward the environment and the effects of conservation activities on people's health and welfare.

Stakeholders: any person, group, or organization with an interest in the use and management of some aspect of biodiversity in a given place, or which affects or is affected by a particular conservation action, ranging from local users, to government agencies, NGOs, and the private sector, and including local, national, and international levels.

Sustainable forest management: management of natural forests for sustainable uses.

Sustainable use: the uses of the biological products and ecological services of ecosystems in a manner and at a rate that does not reduce the system's ability to provide those products and services to future generations.

Tenure: recognized rights and responsibilities (e.g., formal and legal authority) to use and manage an area of land or water and/or the biodiversity resources found there.

Threats: [to biodiversity] processes and actions that may diminish biological diversity, including conversion of natural habitats, overharvesting of valuable species, introduction of invasive species, and pollution.

Umbrella species: wide-ranging species whose conservation requires a large area of natural habitat in which many other species can survive, such as elephants or tigers.

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