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FROM THE AMERICAN PEOPLE

BIODIVERSITY CONSERVATION:
A GUIDE FOR USAID STAFF AND PARTNERS

SEPTEMBER 2005
This publication was produced for review by the United States Agency for International Development. It was prepared in cooperation with ARD, Inc., USAID technical staff, and partners.

ABOUT THIS GUIDE

GOAL

The goal of this Guide is to provide USAID staff and partners 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? How can activities be designed that will simultaneously meet USAID administrative and legal requirements while ensuring that development goals are addressed using best conservation practice and approaches?

Biodiversity conservation is an evolving, dynamic field, and this Guide serves as a starting point to shape and guide programs or activities that should ultimately be implemented based on local environmental and socioeconomic conditions and capacity of implementing partners, and should be managed adaptively in the field.

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

AUDIENCES

The Guide is intended for a broad audience including USAID mission and Washington staff, implementing partners, and multiple stakeholders within and across sectors.

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, and to introduce possible opportunities to foster closer donor coordination and explore joint or complimentary programs.

We would like to acknowledge all of those individuals and organizations who have assisted the EGAT Biodiversity Team in researching, writing, and reviewing this publication.

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COVER PHOTO:

The Congo River, as the fifth longest river in the world, supports both the highly biodiverse ecosystems and the livelihoods of the Congo Basin. Credit: Jeff Dupain, African Wildlife Foundation.

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DISCLAIMER

The authors' views expressed in this publication do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

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PREFACE

In the four years since the first edition of this Guide, progress has been made in conserving what my predecessor and friend, Bill Sugrue, (the former USAID Natural Resources Management Office Director), called the "biosphere…an almost incomprehensively complex phenomenon in which all species—including humans—play interactive and interdependent roles." At the World Parks Congress in Durban, South Africa in 2003, the global community acknowledged that a total of 10 percent of the Earth's surface was dedicated to protection of biological diversity. Perhaps the single most notable, recent conservation achievement was the declaration by Madagascar President Marc Ravolamanana of his firm intention to triple the area covered by protected areas over the next five years, in a country that contains an incredible wealth of biodiversity under intense threat from habitat conversion and degradation. USAID and other organizations are aiding the Malagasy in making that commitment a reality. The effort, like many of the recent biodiversity conservation activities, seeks to make the choice to conserve a rational one that *benefits both local people* and *the stability of ecosystems.*

Biodiversity conservation is a priority for USAID since healthy, biodiverse ecosystems form an important foundation for economic and social development globally (http://www.usaid.gov/our_work/environment/biodiversity/index.html). For example, through USAID's Global Conservation Program, Enterprise Works Worldwide has supported community forest user groups in biodiverse areas of Nepal, who have been able to generate over U.S. $1 million from sustainable forest-based products, while taking pressure off of local ecosystems. The Wildlife Conservation Society has been very successful in Bolivia with the establishment of functioning co-management arrangements with local indigenous communities near Madidi National Park. Further, USAID support has also seen great success in transboundary biodiversity conservation with the Central African Regional Program for the Environment (CARPE), which was endorsed in February of 2005 by 10 heads of state in the region who, through the signing of a treaty, established a new forestry commission and a subregional fund to finance the conservation of the area.

USAID is expanding its programs to conserve biodiversity and this edition of the Guide reflects that growth. USAID support for such programs increased 24 percent from Fiscal Year 2002 to 2005. Those programs focus on priority biodiversity regions, landscapes, and ecosystems. We have gone beyond this geographic and sectoral focus and expanded the vision of biodiversity conservation cross-sectorally by actively linking with other sectors to ensure that positive conservation benefits are pursued along with improvements in agriculture, aquaculture and fisheries, forestry, tourism, biotechnology, health, and governance programs, and can take advantage of cross-sectoral synergies for biodiversity conservation. This edition of the Guide includes an expanded presentation on the cross-sectoral linkages to enable users to expand their horizons in biodiversity conservation. The Guide continues to be our best effort to provide insights and a common vocabulary for readers in and beyond USAID to improve the effectiveness of future conservation programs.

The biodiversity conservation struggle is far from over and the outcome is far from assured. Bill Sugrue pointed out four years ago that "the health of the biosphere is increasingly dependent on the responsible behavior of the human species…unfortunately, we have not been behaving very well." That is still the case. Truly sustainable use of the planet's ecosystems has been elusive. We all need to redouble our commitment to achieve a sustainable future. This Guide is intended to make a modest contribution to that end.

David Hess
Director, Office of Natural Resources Management
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Summer 2005

I. INTRODUCTION

1.0 Overview of USAID and Biodiversity

2.0 The State and Importance of Biodiversity

PATRICK SMITH, USAID/NRM/B

A community fish sanctuary patrol in Hail Haor, one of Bangladesh s inland fresh water wetlands. The USAID MACH project has supported local communities in obtaining a long term lease for this no take area. In just a few years fish biodiversity and fish population size in neighboring wetlands has increased, allowing for larger sustainable harvests of valuable fish protein for the poorest members of the community.

PRINCIPLES FOR EFFECTIVE BIODIVERSITY PROGRAMS

USAID has identified several principles for effective biodiversity conservation that should be integrated into USAID programs. USAID hopes that this will be a useful checklist for program design. 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 (at all scales) to biodiversity and delineate a threat abatement plan. Programs should implement activities that reduce, eliminate or mitigate threats and their underlying root causes.
- **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 programs should conserve biodiversity of global, regional, or national priority as appropriate.
- **Programs should be results oriented**. Programs should clearly articulate their underlying assumptions, rationale, and methods for achieving planned results. They should also describe how program impacts on biodiversity will be measured and monitored. Efforts to measure habitat quantity 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, indigenous peoples, and the poorest of the poor.
- **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 levels. Institutional strengthening may be needed for both government and nongovernmental organizations (NGOs).
- **Programs should include a learning component and disseminate lessons learned**. Analysis of program results and dissemination of lessons learned should be part of program activities, particularly programs at multiple sites or larger scales.
- **Programs should either complement other conservation and development activities or fill specific crucial gaps**. In particular, programs should examine how they will complement activities of USAID, other donors, host-country governments, the private sector, non-profits, and other institutions.

1.0 OVERVIEW OF USAID AND BIODIVERSITY

WHAT IS BIODIVERSITY?

Biological diversity, or biodiversity, is the variety and variability of living organisms broadly including a wide diversity of plant and animal species, communities, and ecosystems. The Earth's biodiversity consists of *genes*, *species*, and *ecological processes* making up terrestrial, marine, and freshwater ecosystems that both support and result from this diversity. All of these elements and 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 on which every human being is dependant. Biodiversity is currently in a human-induced state of precipitous decline globally (see Chapter 2, *The State and Importance of Biodiversity*). Due to this decline and the interconnected nature of biodiversity and human well-being, the conservation of biodiversity is an international development priority for USAID.

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. Genetic diversity refers to the variation at the individual gene level and provides a mechanism for populations to adapt to their ever-changing environment. The more variation, the better the chance that individuals will be genetically equipped to survive and thrive in the local environment, eventually producing future generations with these traits, through a process called evolution.

Species are considered a fundamental unit of life and essential elements of ecosystems, and are generally an identifiable group of (potentially) interbreeding organisms that is able to produce viable offspring. Examples of species include the eastern bluebird of the Unites States, the common fruit fly, the Bengal Tiger of India, and over 5,000 orchid species worldwide. Some species play a larger role in ecosystems than others: strong interactor species are species whose disappearance would have significant repercussions on at least one other species. Keystone species are those strong interactors whose removal would have a significant effect on the entire ecosystem and that may have a dominant influence over the structure of ecosystems. African elephants are a good example of a keystone species because their feeding controls the balance of trees and grassland in many savanna ecosystems.

The diversity of *ecosystems, ecological processes,* and *communities* is another aspect of biodiversity. Populations of species interact with each other in a variety of ecological relationships to form what biologists call ecosystems. An ecosystem is the interaction of a natural community (biological life) with its physical and chemical environment and the resulting ecological processes of such interaction. Marshlands, tropical rainforests, savannas, deserts, and coral reefs are examples of ecosystems. The feeding relationships of species, in which some species eat other species, thereby allowing energy to flow through the food webs of ecosystems, as well as the pollination of plants by insects and the control of species by their predators are examples of ecological processes. The cycling of nutrients that maintain soil fertility and the cycling of water through ecosystems are also ecological processes. The diversity *within* and *among* as well as the distribution and representation of these ecosystems and processes make up biodiversity. These processes are created when species interact with each other and with the physical environment. Each species, including humans, depends on these processes for survival.

As this brief description indicates, biodiversity is not a simple concept but is complex, dynamic and multifaceted, as is its conservation.

USAID AND BIODIVERSITY CONSERVATION

Biodiversity and functioning ecosystems make up the foundation for human well-being. USAID recognizes that improving livelihoods, security, and human health depends on the conservation of biodiversity in healthy ecosystems. It is well established that conservation, economic growth and governance are interdependent. Because of this interdependence, a number of USAID programs focus on biodiversity conservation as a critical component of achieving wider development goals.

The centrality of biodiversity conservation in achieving global development goals is recognized in the articulation of the Millennium Development Goals (MDGs), established in August of 2002 at the World Summit on Sustainable Development (WSSD). MDG Goal 7, "Achieving Environmental Sustainability," identified biodiversity conservation as foundation for the other MDGs. USAID supports the conservation of biodiversity because it bears directly on U.S. foreign assistance goals in the following contexts:

- *Promoting transformational development*. The conservation and sustainable management of biodiversity can strengthen participatory governance and enhance economic growth and human quality of life by conserving the resources and ecosystems people depend on for their well-being, therefore contributing to USAID's goal of promoting transformational development.
- *Strengthening fragile states*. The equitable and transparent conservation and management of biodiversity through capacity and institution building can improve governance systems, reduce conflict over resources, contribute to political and social stability and address the root causes of many unmet basic human needs, strengthening fragile states.
- *Supporting U.S. geostrategic interests*. The sustainable and equitable management, governance and conservation of biodiversity can contribute to increased stability and prosperity in areas of the world that the U.S. government has identified as geostrategic priorities.
- *Providing humanitarian relief*. Conserving intact ecosystems and biodiversity can play an important role in mitigating or minimizing the impacts of natural disasters (such as floods, landslides, droughts) and violent conflict, and resulting humanitarian emergencies. Additionally, taking appropriate measures during the provision of humanitarian relief can minimize the impacts of these activities on local ecosystems and lay the foundation for longer-term development.
- *Mitigating global and transnational issues*. In addition to contributing to other development goals, conserving biodiversity is a goal of U.S. foreign assistance in its own right. Biodiversity is a critical global resource for current and future generations, and USAID has a clear mandate to conserve this resource.

The U.S. has taken a leading role in preventing biodiversity loss, and is currently one of the largest bilateral supporters of biodiversity conservation of any donor. The U.S. Foreign Assistance Act (FAA) requires that USAID address biodiversity concerns. Section 119 of the FAA emphasizes the importance of biodiversity conservation and instructs USAID to give high priority to preventing biodiversity loss (please see http://www.usaid.gov/our_work/environment/compliance/faa_section_119.htm). In another important section of the Foreign Assistance Act, Section 118, Congress has instructed USAID to address the loss of tropical forests, which are among the most species-rich ecosystems on Earth (http://www.usaid.gov/our_work/environment/compliance/faa_section_118.htm).

Congressional support for USAID's biodiversity conservation efforts has grown stronger in recent years starting with directives for maintaining the Agency's investments and culminating in an earmark for $165.5 million in USAID support for biodiversity in Fiscal Year (FY) 2005.

USAID'S APPROACH TO BIODIVERSITY CONSERVATION

USAID assists developing countries in maintaining biologically diverse ecosystems and environmental services while supporting sustainable development and economic growth. USAID's major emphasis in biodiversity conservation is to help countries maintain and manage wild biodiversity *in situ*, in natural settings such as forests, grasslands, wetlands, marine, and coastal habitats. *In situ* conservation maintains not only individual species, but also functioning ecosystems and the 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 now emphasize biodiversity conservation across large landscapes. The current approach recognizes that biodiversity cannot be conserved only in isolated areas and that much of the world's biodiversity is not located in protected areas. This approach underscores that participation by local stakeholders in conservation programs is critical to their success.

USAID emphasizes developing appropriate activities to reduce key threats to biodiversity in priority landscapes. Since the threats to biodiversity are wide-ranging, from local small-scale agriculture to industrial timber production, the tools available for conservation intervention are 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 environmental education programs.

LINKING BIODIVERSITY AND DEVELOPMENT CROSS-SECTORALLY

One of USAID's strengths in biodiversity conservation is its insistence that biodiversity conservation be integrated with development activities and goals. Biodiversity is a critical local resource, providing for livelihoods, watershed protection, direct economic opportunities, and local cultural needs. It is also a national and global resource. USAID and its partners work with local citizens and decision makers in community-managed lands, private lands, and protected areas, employing a range of conservation approaches.

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

- Economic incentives for conservation (see Chapter 9),
- Protected area management (see Chapter 10),
- Community-based conservation (see Chapter 11),
- Sustainable use of natural resources (see Chapter 12),
- Environmental communication (see Chapter 13),
- Policy development and reform (see Chapter 14), and
- Cross-sectoral linkages to biodiversity conservation (see Section IV).

USAID's conservation efforts increasingly link and integrate with other sectors, such as economic growth, agriculture, democracy and governance, health, and natural resources management. Biodiversity conservation is frequently an element of a larger program focusing on economic growth, watershed

conservation, or strengthening of civil society. At other times, livelihood, governance, and health objectives are integrated as elements of a larger biodiversity conservation program.

This integration is mutually beneficial. For example, a USAID-supported program in Tanzania combines work with local women on HIV/AIDS prevention and coastal resource management activities. This program aims to improve both human and ecosystem health while empowering women and building capacity through these activities. (See Section IV, *Cross-Sectoral Linkages for Biodiversity Conservation* for more on this subject.)

In some countries, a USAID mission may support biodiversity conservation 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 biodiversity priority. USAID-supported programs work to conserve many kinds of ecosystems, including forests, grasslands, wetlands, deserts, coasts, and oceans.

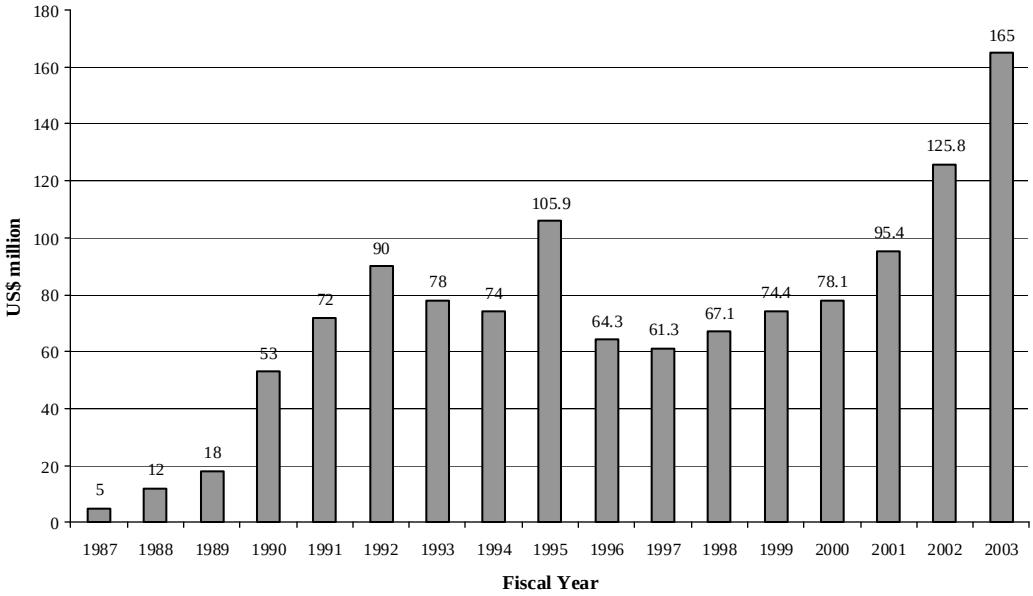
BIODIVERSITY CONSERVATION AND NATURAL RESOURCES MANAGEMENT

Biodiversity conservation and Natural Resources Management (NRM) are not interchangeable terms or concepts. Natural resources include water, minerals, and living organisms (such as plants and animals). Therefore, natural resources include the diversity and variability of life on Earth, or *biodiversity* (thus making biodiversity a subset of natural resources). But, while the conservation of biodiversity falls within the management of natural resources, not all NRM activities qualify as biodiversity conservation. As examples, a watershed management program may be designed with the objectives of conserving water for crop irrigation, providing safe drinking water, reducing siltation of a hydroelectric facility, reducing the flooding of shrimp ponds, or reducing toxins in fish to assure a safe food supply. These activities are NRM activities, but do not specifically conserve biodiversity in the watershed. On the other hand, reducing siltation that threatens a significant coral reef, maintaining threatened ecosystems and habitats in the upper watershed, and reducing water pollution that threatens endangered aquatic plants and animals can qualify as biodiversity conservation. In such cases, support for those elements of a USAID mission or bureau program that have a direct , positive benefit to biodiversity could be counted toward meeting the Agency's biodiversity earmark (please also see "Biodiversity Coding—USAID's Internal Definition" on page 8). Similar distinctions could be applied to numerous other activities involving agriculture, agroforestry, tourism, non-timber forest products (NTFPs), integrated pest management, fuel efficient wood cooking stoves, etc. In most cases, programs with a mix of biodiversity and non biodiversity objectives will not count 100% toward biodiversity. A careful application of the criteria in the Agency's biodiversity code, though, should allow for a good estimate of what portion of the program can be attributed to the biodiversity earmark.

USAID'S INVESTMENT IN BIODIVERSITY CONSERVATION

The Agency's sustained biodiversity conservation funding began with $5 million in FY 1987 and increased to $90 million in FY 1992, as shown in Figure 1. These amounts include all funding sources: Development Assistance (DA), Assistance for Eastern Europe and the Baltic States (AEEB), Economic Support Funds (ESF), and the Freedom Support Act (FSA). Levels of biodiversity funding fluctuated in subsequent years; however, since FY 1997, USAID funding for biodiversity has experienced a steady increase, reaching $165 million in FY 2003, from all sources of funding.

FIGURE 1. USAID ESTIMATED BUDGETS FOR BIODIVERSITY CONSERVATION 1987-2003 (ALL ACCOUNTS)



USAID'S DEFINITION OF BIODIVERSITY PROGRAMS

Biodiversity activities and programs have become more complex and better integrated with other Agency development programs. At the same time, the Agency has been required, due to a Congressional earmark, to program additional funds for biodiversity activities. As a result, a clear definition of what constitutes a biodiversity program has become critical. The Agency's "biodiversity code" guides the Agency in determining what programs are included in the accounting toward the biodiversity earmark. Within the Code are four key criteria, all of which must be met to be considered a biodiversity program:

- The program must have an explicit biodiversity objective, *it is not enough to have biodiversity conservation result as a positive externality from another program* (Chapters 5 and 6).
- Activities must be identified based on an analysis of threats to biodiversity (Chapter 5).
- The program must monitor associated indicators for biodiversity conservation (Chapter 8).
- Site-based programs must positively impact biologically significant areas (Chapters 3 and 6).

Each year, the country-level and centrally funded programs are reviewed in Washington for consistency with this definition and with the Code. Please note that all USAID programs and activities should strive to be "biodiversity friendly" but may not qualify as biodiversity conservation within the Agency's biodiversity code. Further, some examples and activities presented in this Guide are biodiversity friendly, but would not necessarily qualify as biodiversity conservation within the Agency's biodiversity code. (For the most up-to-date information on the biodiversity code and definition, USAID employees may access the USAID Intranet).

BIODIVERSITY CODING—USAID S INTERNAL DEFINITION

Primary Code: Activities have a primary objective of conserving biological diversity in natural and managed terrestrial and aquatic ecosystems. Activities are identified through an analysis of the threats to biodiversity and have associated indicators for biodiversity conservation, preferably at the strategic objective level. Activities may be site based or not site specific, such as policy level initiatives. Site-based work is implemented in biologically significant areas. *Ex situ* conservation of wild species, and their germplasm, may also be included when explicitly for the purpose of biodiversity conservation.

Secondary Code: Activities have biodiversity conservation as an explicit, but not primary, objective in natural and managed terrestrial and aquatic ecosystems. Activities are identified through an analysis of the threats to biodiversity and have associated indicators for biodiversity conservation. Activities may be site-based or not site specific, such as policy level initiatives. Site-based work is implemented in biologically significant areas. *Ex situ* conservation of wild species, and their germplasm, may also be included when explicitly linked to biodiversity conservation.

USAID'S BIODIVERSITY CONSERVATION CAPACITY

The majority of biodiversity conservation programs are implemented through the USAID missions, many of which have successful, long-term programs that conserve areas of global, national, and local priority. These missions may or may not have staff with expertise in environmental issues and conservation of biodiversity, depending on their strategic objectives and staff size. The USAID Biodiversity Working Group therefore plays a key role in coordinating biodiversity programs across the Agency. The group includes representatives from the regional bureaus and pillar bureaus. In order to promote the conservation of biodiversity, the USAID Biodiversity Team, located within the Natural Resources Management Office of The Bureau for Economic Growth, Agriculture, and Trade (EGAT):

- Provides technical and programmatic support to missions;
- Promotes USAID's approach to conservation, including a development focus and a threats-based approach to conservation, in global fora and the conservation community; and
- Implements a portfolio of *in situ* conservation activities to support mission programs and global initiatives, and to test cutting-edge approaches.

SOURCES FOR MORE INFORMATION

- Federal Assistance Act of 1961 as Amended (please see Sustainable Use—Forestry sections): http://www.usaid.gov/our_work/environment/compliance/laws.html
- United Nations Millennium Goals: http://www.un.org/millenniumgoals/
- USAID's Biodiversity Conservation work: http://www.usaid.gov/our_work/environment/biodiversity/index.html

2.0 THE STATE AND IMPORTANCE OF BIODIVERSITY

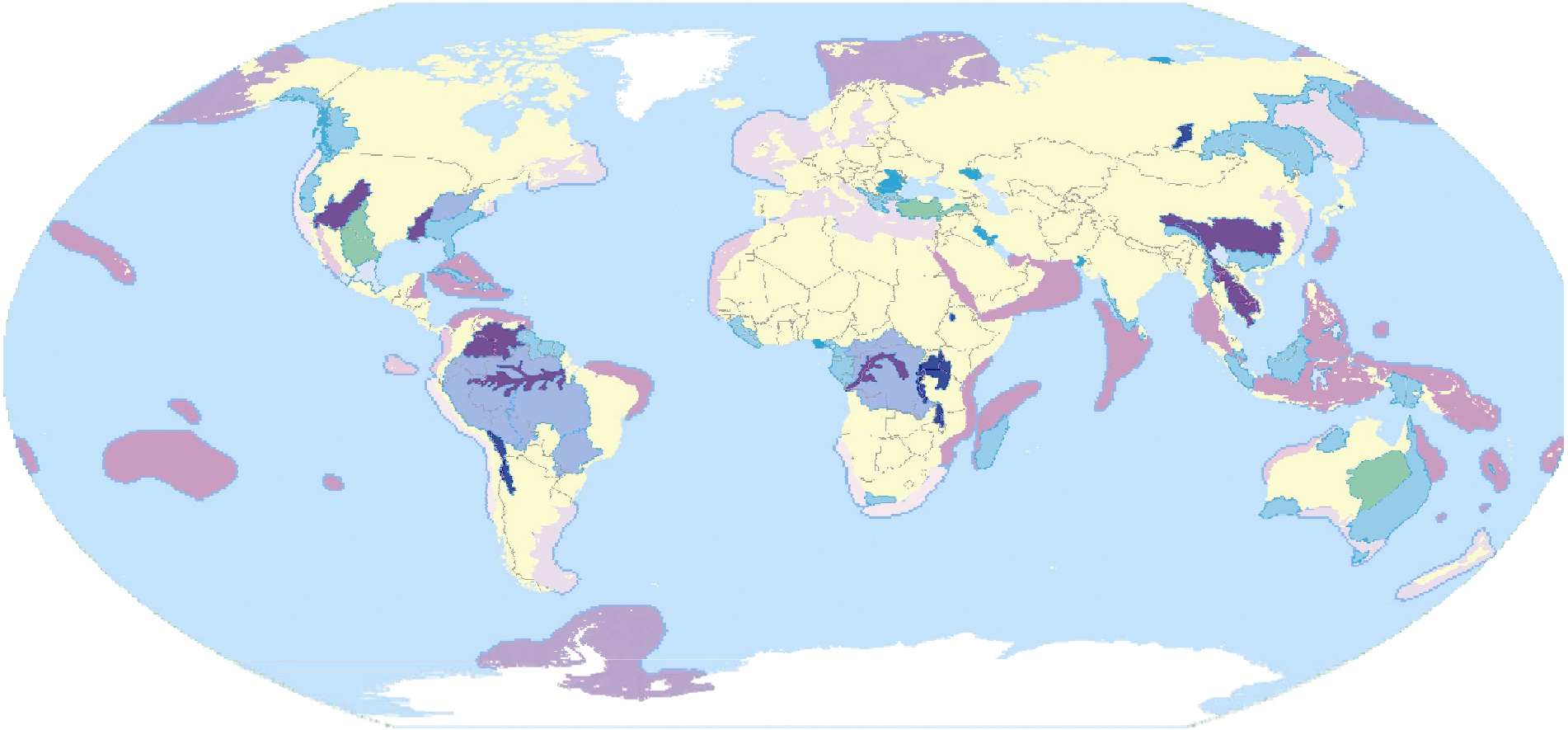
WHERE IS BIODIVERSITY?

Biodiversity, the variety and variability of life, is found on every continent and in every ocean worldwide from Arctic tundra, to deserts and grasslands of Africa, to the steppes of Central Asia, and tropical rainforests of South America, Africa, and Asia. It is certainly not the case that biodiversity only exists in tropical ecosystems, such as tropical rainforests and coral reefs, nor that its conservation is a priority only in those species-rich ecosystems. Some areas do have a higher priority for biodiversity conservation than others at the global or national level.

At the *global level*, conservation and scientific organizations have identified global priority areas for biodiversity conservation. Although there is some variability in the prioritization of these areas, they generally contain high species richness and high levels of endemism, contain ecosystems which are unique and representative, provide essential environmental goods and services, and face serious threats. USAID supports biodiversity conservation on the global level through the Global Conservation Program in some of these areas.

At the *national level*, biodiversity priority areas are being established worldwide through the National Biodiversity Strategy and Action Plan process required under the Convention on Biological Diversity (CBD). Under the Convention, national governments commit to conserve and sustainably use biodiversity, to develop national biodiversity strategies and action plans, and to integrate these into broader national plans for environment and development. These plans clearly identify priority areas for biodiversity conservation. Biodiversity conservation priorities are also identified through the Tropical Forestry and Biodiversity analyses that USAID conducts to comply with Foreign Assistance Act (FAA) Sections 118 and 119 (see Chapter 28, *U.S. Legislation*). The analyses are in part based on *CBD National Action Plan* priority areas and should incorporate other scientifically robust research and analysis on biodiversity priority areas at the national level. USAID supports biodiversity conservation at the *national level* through mission-funded programs and activities.

FIGURE 2. GLOBAL 200 MARINE AND FRESHWATER ECOREGIONS



Freshwater Ecoregions

- Large lakes
- Large rivers
- Large river deltas
- Large river headwaters
- Small lakes
- Small rivers
- Scenic basins

Marine Ecoregions

- Polar
- Temperate shelf & seas
- Temperate upwelling
- Tropical upwelling
- Tropical coral

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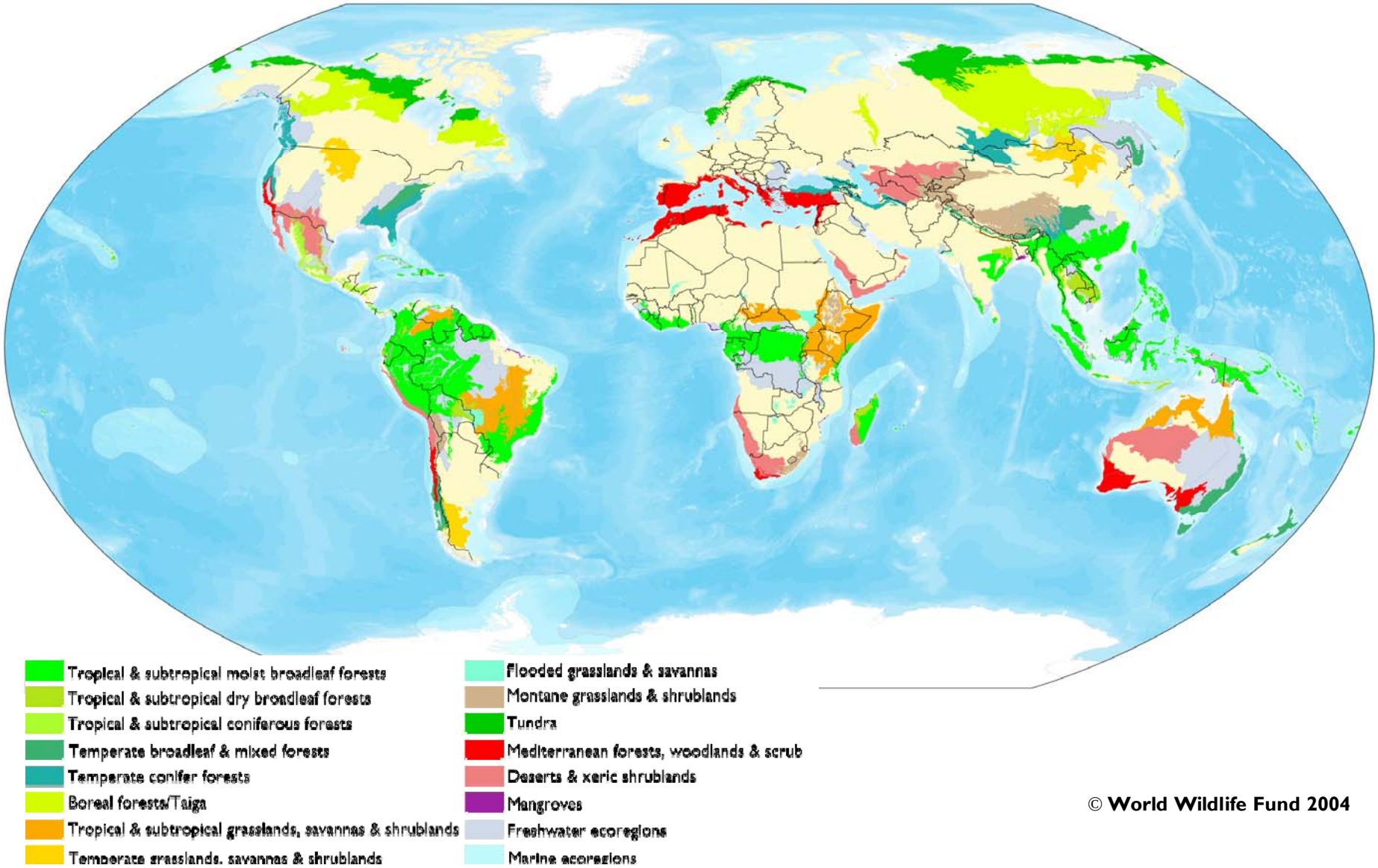
FIGURE 3. GLOBAL 200 TERRESTRIAL ECOREGIONS



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Please note: the maps presented on the previous pages offer one widely held perspective on global biodiversity priority areas, but should not be taken as a consensus of the global conservation community nor as official USAID guidance (or code). Please refer to the "Sources for More Information" section at the end of this chapter for more information on biodiversity priority areas.

WHY IS BIODIVERSITY VALUABLE?

Biodiversity has many values, both material and nonmaterial. Material values include both direct uses 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. For example, forests can soak up, store, and slowly release water, and protect watersheds and soil from erosion following the extreme winds and torrential rains of hurricanes.

THE ECONOMIC VALUE OF BIODIVERSITY

Although biodiversity can be considered a part of the larger concept of "natural resources," the following are some estimates of the direct economic or monetary values of biodiversity and ecosystem services:

- In the United States, wild species contribute around 4.5 percent of GDP (De Leo and Levin, 1997).
- Billions of people around the world still harvest wild food. Between one-fifth and one-half of the food consumed by the poor in the developing world is gathered rather than cultivated, while at the global level, 16 percent of our animal protein comes from marine fisheries (Harrison and Pearce, 2001).
- Approximately 80 percent of the developing world's people rely on traditional medicines derived from wild plants (WHO, UNEP, Harvard Medical School, 2002).
- Most food crops require a constant infusion of genes from wild relatives to maintain their resistance to ever-evolving pests. Incorporating "wild" genes is responsible for increases in crop productivity of about 1 percent a year, worth more than $1 billion (Rosenthal and Grifo, 1997).
- Seventy-five percent of the world's staple crops rely on mammal, insect, or bird species for pollination (Daily, 1997). Crops valued at over U.S. $40 billion a year are completely dependent on the free ecological service of natural pollination by insects.
- Biological pest control saves an annual revenue of U.S. $100 to 200 billion, and biological nitrogen fixation has an estimated annual worth of U.S. $50 billion (Balakrishna and Warner, 2003).
- Globally, about 40 percent of modern drugs come from the wild, worth more than $40 billion a year (Tuxill, 1999). Approximately 118 out of the top 150 prescription drugs sold in the United States are laboratory versions of chemicals first found in wild plants, fungi, bacteria, or even animals such as snakes (Shand, 1997). 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.
- Ecosystems such as forests, wetlands, and coral reefs store carbon and regulate the atmosphere's carbon balance, stabilizing Earth's climate, an ecosystem service the value of which is difficult to estimate.
- Species ranging from bacteria to plants absorb and break down pollutants in the atmosphere, water, and soil, an ecosystem service the value of which is difficult to estimate.

TABLE 1. 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 U.S. $33 trillion a year on these fundamental ecosystem services—nearly twice the value of the global gross national product of U.S. $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: Costanza, R. et al. 1997. The Value of the World's Ecosystem Services and Natural Capital, Nature, Vol. 387, Table 2, p. 256: http://www.uvm.edu/giee/publications/Nature_Paper.pdf. The U.S. $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. As of August 2002, Bamford, Bruner, Cooper, Costanza in Economic Reasons for Conserving Wild Nature, Science, Vol. 297 update these figures and estimate that the aggregated annual value of nature's services lie in the range of $18 to $61 trillion with an average of $38 trillion.

NONMATERIAL VALUES OF BIODIVERSITY

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 current and future generations. Genes from wild species help maintain the vigor of many of our crops. The extinction of each additional species brings the irreversible loss of unique genetic information, which could have contributed to the development of material benefits from biodiversity such as medicines, foods, and other valuable biotechnologies. When we overexploit living resources, we threaten our own survival and the well-being of future generations.

THE STATE OF BIODIVERSITY

Biological diversity—genetic diversity within species, species diversity, and diversity of ecosystems and ecological processes—is threatened and declining precipitously due to human activities.

Most concern about biodiversity loss has focused on the extinction of species. Nobody knows how many species there are on Earth 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 species (Hawksworth and Kalin-Arroyo, 1995). The loss of species, whether due to human activities or natural processes, is called extinction. Species extinction is known to occur naturally at "background" or "normal" rates. The current rates of extinction, mainly due to human activities, is up to 1,000 time greater than background rates typical over the planet's history, and the projected future extinction rate is more than 10 times higher than the current rate, according to the Millennium Ecosystem Assessment (*Ecosystems and Human Well-being: Synthesis*, 2005: http://www.millenniumassessment.org/en/products.aspx). This rate could result in a loss of 2 to 25 percent of all species (Heywood and Watson, 1995). This level of species

loss, and the breakdown of ecosystems and ecological processes that could result, has worrisome implications for human well-being.

Between 10% and 50% of species are threatened with extinction. For example:

- Twenty-four percent of the world's mammal species are now facing a high risk of extinction. (IUCN Species Information Service, 2000).
- Twelve percent of the world's 9,500 species of birds are at risk of extinction in the next 100 years. Another 600 to 900 species are close to being added to the threatened list (Smith et al., 1993).
- One-fourth of all reptiles and one-third of all amphibians are listed as threatened with extinction; reptiles and amphibians are often considered indicators of the overall health of ecosystems.
- Fifty percent of fishes (mainly freshwater) assessed are listed as threatened (Worldwatch Institute, 2003).
- Many insects, which play essential roles as decomposers and pollinators, are threatened: 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 to 30 species per week (Mawdsley and Stork, 1995).
- Approximately 10 percent of the world's approximately100,000 known tree species are threatened with extinction. About 1,000 species are believed to be critically endangered, with some species known only from one or a handful of individuals. Less than a quarter of these threatened tree species currently benefit from any kind of conservation measures (Oldfield, et al., 1998).

Ecosystems and habitats are also threatened and are being lost at alarming levels:

- More than two-thirds of the area of 2 of the world’s 14 major terrestrial biomes and more than half of the area of 4 other biomes had been converted, primarily to agriculture, by 1990 (Millennium Ecosystem Assessment, 2005).
- One-fifth of all tropical rain forest cover was lost between 1960 and 1990, according to the World Resources Institute (WRI).
- Fifty percent of the world’s wetlands habitat has been destroyed over the past 100 years (WRI, 2003).
- The world's coastal mangroves, a vital nursery ground for countless species, are also at risk; 50 percent have already been cleared (WRI, 2000-2001).
- Approximately 20% of the world’s coral reefs were lost and an additional 20% degraded in the last several decades of the twentieth century (Millennium Ecosystem Assessment, 2005).

Finally, the loss of species and ecosystems is leading to an unprecedented loss of valuable ecosystem services:

- Approximately 60% (15 out of 24) of the ecosystem services examined during the Millennium Ecosystem Assessment are being degraded or used unsustainably, including air purification, climate regulation, provision of clean water, pest and pathogen regulation, and pollination (Millennium Ecosystem Assessment, 2005).
- There have been large-scale changes in nutrient cycles in recent decades, mainly due to additional inputs from fertilizers, livestock waste, human waste, and biomass burning. Freshwater and coastal ecosystems have been increasingly degraded by these excess nutrients (Millennium Ecosystem Assessment, 2005).

THREATS TO BIODIVERSITY

The main direct threats to biodiversity include:

- *Conversion* of natural habitat to cropland, urban areas, or other human-dominated ecosystems;
- *Overexploitation* or overharvesting of valuable species;
- *Introduced nonnative species*, including invasive species and introduced pests and diseases;
- *Pollution* of land, water, and air; and
- *Macro-environmental change*, such as climate change, desertification, or disruption of natural disturbance regimes (such as floods or fires).

Of these threats, habitat loss is considered the most critical in many areas. The IUCN reports that habitat loss and degradation affects 89 percent of all threatened birds, 83 percent of mammals, and 91 percent of threatened plants assessed. Human activities have transformed the Earth and its ecosystems and ecological processes. For example:

- Approximately one-half of the land on Earth has been transformed for human use: around 11 percent each for farming and forestry; 26 percent for pasture; and at least another 2 to 3 percent for housing, industry, services, and transport (FAOSTAT).
- The area used for growing crops has increased almost sixfold since 1700, mainly at the expense of forests and woodland (Turner et al., 1990).
- Humans use more than half of the easily accessible freshwater and have regulated the flow of around two-thirds of all rivers on Earth, creating artificial lakes and altering the ecology of existing lakes and estuaries (Vitousek et al., 1997).
- 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 oxygen (Moffat, 1998).
- 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 preindustrial levels. We have boosted methane content by 145 percent over natural levels (WRI, 1998).

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- World Wildlife Fund. Global 200 Ecoregions: http://www.worldwildlife.org/science/ecoregions/g200.cfm

II. CONSERVATION PLANNING

3.0 Issues of Scale

4.0 Involving Stakeholders

5.0 Analyzing Conservation Opportunities and Threats

6.0 Choosing Conservation Priorities

7.0 Designing Activities

8.0 Monitoring, Evaluating, and Managing Adaptively

9.0 Financing Conservation

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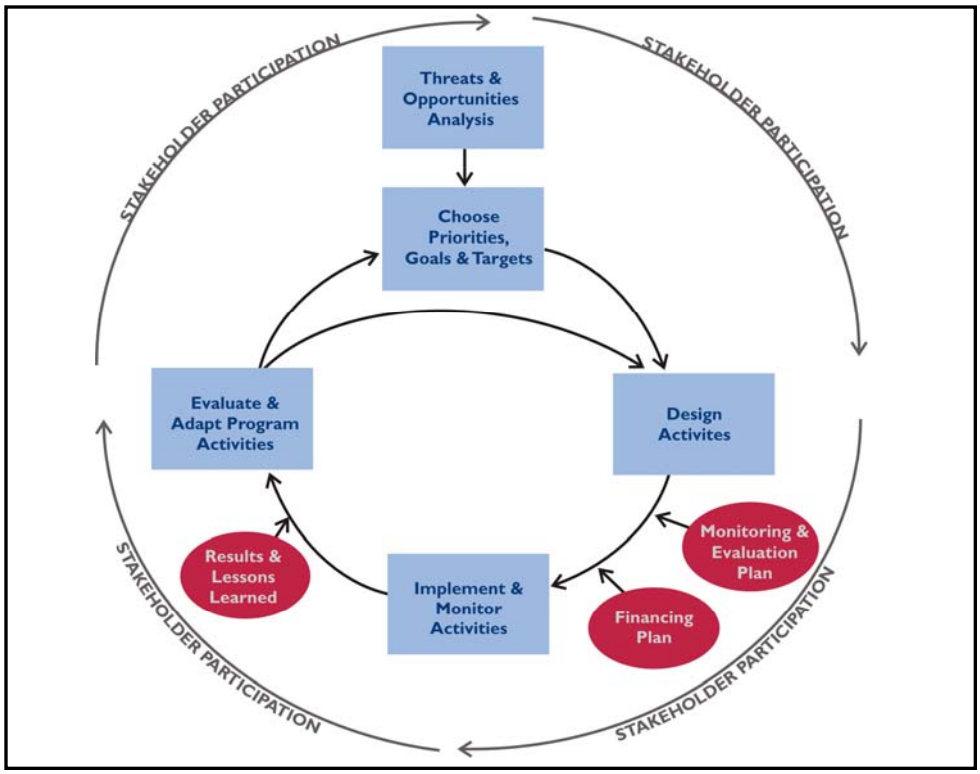
USAID support for community participation in forest and coastal resources management has improved the conservation of ecosystems while providing increased community livelihood options in the Philippines.

CONSERVATION PLANNING

Conservation planning and implementation is not linear, but rather cyclical and iterative. It is a strategic process of setting priorities and articulating specific goals, identifying important threats and opportunities, selecting appropriate activities that address these threats and opportunities, and developing systems to monitor impacts in a way that continually informs and improves program management. Figure 4 illustrates key aspects of conservation planning, as well as the iterative nature of the process involved. In the separate chapters that follow, critical aspects of conservation planning are discussed.

FIGURE 4. THE CONSERVATION PLANNING AND IMPLEMENTATION CYCLE



A robust and logical planning process is a key element of any good biodiversity conservation program. The key questions in each chapter provide guidance on *what* critical issues should be considered in planning and implementing biodiversity conservation activities, as they flag important principles of effective conservation. The intention is to provide guidance on how to identify gaps or weaknesses (as well as strengths) in proposed biodiversity conservation activities being funded by USAID and implemented by its partners in the field. This section is not a *how to* for designing and implementing conservation programs, as USAID's partners generally provide this technical expertise. However, the basic principles of strategic conservation planning and design presented here are intended to help USAID staff critically review conservation proposals and more effectively manage conservation programs.

3.0 ISSUES OF SCALE

KEY QUESTIONS

Why are issues of scale so important for biodiversity conservation planning?

What is the right balance between planning and action when planning at large scales?

How do protected areas fit within large scale conservation?

Conservation practitioners are increasingly recognizing that the most effective scale for planning conservation activities is *large*—at the scale of entire ecosystems, "ecoregions," or ecologically functioning landscapes or seascapes. The United Nations Convention on Biological Diversity (CBD) has adopted an "ecosystem approach" as its strategic framework, see below for Web link). An ecoregional, ecosystem-based, or landscape approach to biodiversity conservation aims to conserve the full range of species, natural habitats, and ecological processes of a large area, while taking into account relevant cultural, political, and economic considerations. Such an approach requires partnerships among diverse stakeholders, including communities, local and national governments, nongovernmental organizations, academia, and the private sector.

This "scaled-up" approach to conservation also tends to look across longer temporal scales, beyond traditional project funding cycles. As such, it has the potential to address the broader social, economic, and policy factors that are essential to long-term success but are often difficult to address when only working at smaller scales over shorter time frames.

An ecoregional or ecosystem-level approach to conservation provides:

- An ecologically appropriate scale to conserve the full suite of biodiversity and ecological functions;
- A geographic scale that enables a more relevant assessment of the social, political, and economic context of the threats to biodiversity and opportunities to mitigate them;
- A framework to align conservation priorities identified at the community scale with national, regional, and global conservation priorities;
- Better links between field-based activities and policy development;
- A framework for building partnerships required by the complexity of conservation; and
- A framework for intersectoral coordination and cooperation.

Projects or activities that support conservation at the ecoregional scale can be of various kinds (these are discussed in Section III of this Guide, *Conservation Activities*):

- They can have a specific geographic focus, and include working at particular *sites*.
- They can have a policy focus, working to create an appropriate enabling environment for achieving compatible conservation and sustainable development goals.

- They can have an economic focus, attempting to strengthen financial incentives for conservation and the sustainable use of natural resources.
- They can have an information and communication focus, working to educate decision makers, managers, communities, corporations, and the public as a whole about the interdependence of conservation and sustainable development.
- They can have a cross-sectoral coordination focus, working to ensure that decisions affecting one sector (e.g., agriculture, transportation, health, energy, industry, tourism) are coordinated and compatible with the need to conserve biological diversity as the foundation for sustainable development.

Conservation efforts supported by USAID often focus on particular ***sites*** within a larger conservation landscape, which are relatively small and circumscribed areas of natural habitat, whether land or water. The term "landscape" or "seascape" is more often used to describe a larger area that includes a mosaic of various habitats and land uses. "Site" is not an ecological term, however, and some conservation organizations now use the term to refer to the area in which a project works, regardless of size.

KEY QUESTIONS

- **Why are issues of scale so important for biodiversity conservation planning?**

  Important ecological functions, such as migrations and hydrological cycling, tend to occur over relatively large geographic areas and are affected by factors that cross geopolitical boundaries. Some large, mobile animals—including mammals, birds, and fish—may undergo seasonal or annual migrations, or require large home ranges to maintain viable populations. Entire ecosystems and ecoregions are generally too big to be able to work everywhere, however, so focusing conservation activities at specific sites within these larger areas is necessary for success. Through a strategic conservation planning process, a complementary suite of policy and site-based activities at relevant local, national, or international scales can be identified in support of specific biodiversity conservation goals.

- **What is the right balance between planning and action when planning at large scales?**

  Conservation planning with diverse stakeholders is a complex process that can take considerable time. While planning is underway, immediate actions often are needed. Delays in implementation may result in irreversible loss of biodiversity—through the extinction of a species or damage to a valuable ecological process that may be difficult to restore. The best science available, as well as a solid assessment of threats, should indicate these urgent actions. However, over the long term, careful and efficient analysis of options for conservation action (including their costs and benefits) are an essential part of effective conservation planning and ideally will mitigate the need for many *urgent* conservation actions in the future.

- **How do protected areas fit within large-scale conservation?**

  Protected areas are often an important foundation for conserving biodiversity. They rarely conserve all of its elements, however. Protected areas are affected by various forces operating outside of their boundaries, so some conservation actions must be aimed at these larger-scale factors. Protected areas are only part of an integrated strategy for biodiversity conservation. All protected area systems, whether terrestrial or marine, are more effective when embedded within a larger, integrated framework of environmental governance and sustainable economies.

BIODIVERSITY CONSERVATION AND WATERSHED MANAGEMENT

If a specific watershed activity will be attributed to the biodiversity earmark, USAID managers and staff should first consult the USAID and Biodiversity Conservation chapter of this Guide, to make sure that all minimum criteria are met. Beyond these, the following guiding questions can help assess when it is and is not appropriate to select the watershed landscape unit as a site for biodiversity conservation activity:

Is the targeted area a predominantly intact, functioning watershed or river basin that provides significant biodiversity values or ecosystem services? The watershed under consideration must be in sufficiently intact condition to possess recognized biodiversity values or provide significant ecosystem services. Selecting a watershed as the landscape unit may be especially appropriate if valued species, habitats, or the ecosystem type of concern are directly linked to the health of the freshwater aquatic or coastal features of the landscape (e.g., endangered fish species, wetland, estuarine habitats, etc.). Developing a conservation program at the watershed or river-basin scale also permits a focus on ecosystem wide processes and the life sustaining services they provide to humans as well as other species. In fact, the maintenance of ecosystem services is among the most common rationales for choosing a watershed landscape unit over some other ecosystem type, since so many critical functions are provided by intact hydrologic systems, for example: water supply provision, water quality protection from nutrients and sediments and water purification, freshwater flow regulation, wildlife habitat, chemical and nutrient cycling, protection from extreme events, and nursery functions for aquatic and marine productivity.

Are the biodiversity values or ecosystem services of the watershed of significant local, national, or international importance? The values of the intact watershed should be recognized as important, at least by the governments and citizens of the affected region itself, but preferably at the national or international level as well. While there is no specific minimum spatial area or stream size requirement for the watershed under consideration, interventions in watersheds, subwatersheds, or coastal/estuarine zones smaller than the entire river basin scale must either contain significant biodiversity values in their own right (e.g., estuaries, wetlands), or have significant influence on the health of the entire basin system (e.g., pristine upper watersheds).

better. The participation of key stakeholders helps to ensure that decisions reflect their interests, and makes it more likely that they will support the process. All stakeholders should understand their roles and responsibilities in the conservation planning process.

Certain stakeholders may be unable or unwilling to become involved and support a given activity or program. In these cases, conflict resolution techniques are a critical component of the conservation planning process. Involving the key stakeholders, including marginalized groups such as women and indigenous peoples (see *Women and Biodiversity* box on page 25), will reduce conflicts and ensure that activities are appropriate for the local social and natural environments.

A SPECTRUM OF STAKEHOLDER PARTICIPATION

Stakeholders can participate in conservation planning at many levels. Participation is not a simple, unitary concept, but rather a continuum from "passive" to "active." Activities and programs that have been called participatory span a wide range, from local people simply providing information to outsiders, who then design projects, increasingly more active forms such as co-management of externally initiated projects, to community-initiated "self-mobilization." One way of describing the continuum of participation is given below (Pretty, 1995):

- *Self-mobilization.* Stakeholders participate by making decisions taking the initiative independently of external institutions. They receive funding and technical advice from outside agencies, but retain control over the process. Self-mobilization can spread if governments and NGOs provide an enabling framework of support.
- *Interactive.* People participate in joint analysis, development of action plans, joint decision making, and formation or strengthening of local institutions.
- *Functional.* Participation is seen by external agencies as a means to achieve project goals, especially reducing costs or conflicts. People may participate by forming groups to meet objectives determined by the project. Such involvement may be interactive and involve shared decision making, but often occurs after major decisions have already been made by external agents.
- *For material incentives.* People participate by contributing resources (e.g., labor in return for food, cash, or other material incentives). Farmers may provide the fields and labor, but are involved in neither experimentation nor the process of learning. It is common to see this called "participation," yet people have no stake in continuing the activities when the direct material incentives come from the outside end.
- *Consultation.* People participate by being consulted and by answering questions. External agents define the problems and information-gathering processes, and control the analysis. Such a consultative process does not concede a share in decision making.
- *Passive.* People participate by being told what has been decided or has already happened. It involves unilateral announcements by outside project management without listening to people's responses.

WOMEN AND BIODIVERSITY

Worldwide, there are important differences in how women and men use, manage, and conserve biological resources. Gender planning should integrate the understanding of gender based differences and their implications for natural resources management and biodiversity conservation into conservation programs and policies. 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 often rich sources of knowledge about uses and patterns of local biodiversity.

Evaluate women's and men's unique 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 may 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.

DEALING WITH CONFLICTS

In any situation where diverse stakeholders are involved in using or managing natural resources, disputes are almost certain to occur. To enable long-term stakeholder cooperation, managers of conservation activities must be able to address conflicts constructively. Conflict management and good communication skills are essential to maintaining the participation of stakeholders and their commitment to conservation priorities.

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

KEY QUESTIONS

- **Why is stakeholder participation important in conservation planning?**

  Involving key stakeholders in the conservation planning process can allow for a more complete understanding of biodiversity based on local, practical knowledge of ecological systems and the forces influencing them, as well as traditional management and use practices. Stakeholder participation is important for establishing trust, identifying partnership opportunities, strengthening an advocacy base for conservation, and/or averting and managing conflicts before they threaten the stability of activities.

  It is possible that issues of equity and transparency can be overlooked in conservation planning when stakeholder participation is limited. When stakeholders feel that conservation plans are not developed in a transparent way, or that resulting strategies limit equitable access to the benefits of biodiversity (or alternatively pose unequal burdens for the management of biodiversity), they are unlikely to support activities.

- **What is the right level and kind of stakeholder participation?**

  It is both impossible and not strategic to attempt to involve *all* relevant stakeholders in *all* aspects of conservation planning. It is important to have a plan for knowing who to engage, when to engage them, and how to do so. The goal should be to ensure the greatest amount of transparency and involvement that is possible while producing a program of activities that enjoys broad support and has a high likelihood of success. Mechanisms for choosing among alternatives and making decisions should be transparent and open to multiple stakeholder groups. In addition, specific mechanisms for communicating and sharing information with relevant groups and individuals should be built into the planning process.

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5.0 ANALYZING CONSERVATION THREATS AND OPPORTUNITIES

THREATS-BASED CONSERVATION

Direct threats to a particular element of biodiversity must be mitigated in order to conserve that component of biodiversity, whether it is a species, ecological process, or whole ecosystem. A threats-based approach to conservation emphasizes the development of a logical plan for determining what the threats are, which threats will be addressed, and how. The plan must clearly identify the linkages between threats and proposed activities.

Threats must be described in specific terms, their effects on conservation priorities must be understood, and their causes or sources must be identified. Although a threats-based approach emphasizes *direct* threats, this does not mean that no attention should be paid to root causes or indirect threats. To fully understand a threat, the causal chain from root cause to direct threat must be understood to the extent possible. This information is critical in designing effective interventions, and in communicating the rationale behind the program design.

Key aspects to a threats-based approach to conservation include:

- Direct threats must be mitigated in order to achieve effective biodiversity conservation.
- Addressing all threats is impossible, so threats and actions must be prioritized.
- Effective interventions require an understanding of the context and root causes of the direct threats. Root causes, where appropriate and feasible, should be addressed through interventions.
- Threats analysis must be an iterative process, serving as the foundation for selecting priorities and setting targets, but also requiring effective monitoring over time to inform good program management.

A threats-based approach is a proactive approach to conservation. This approach ensures that important challenges that are affecting biodiversity are addressed and should also point to critical opportunities to impart change. Good threats analyses look across temporal scales, disentangling past influences while anticipating and planning for future threats and opportunities.

IDENTIFYING THREATS

Threats analysis is an iterative process tied into good program management, with the analysis often refined over time. For example, when an area of biological importance is selected as the basis for a conservation program, a biodiversity threats assessment is an important early input into the setting of priorities. However, as priorities are established, it may be appropriate to do more detailed or refined threats assessments to better target specific activities. As activities are implemented, monitoring of threats

over time is an important adaptive management process that can inform mid-course corrections for the program to maximize impacts and achievements.

An important first step in a threats analysis is to identify all potential threats, their magnitude and scale, and rank them in some order based on importance and feasibility of intervention. Conservation targets or goals are often selected based on threat rankings (see next chapter on *Choosing Conservation Priorities*). Threats can be identified through existing information, new studies, and by involving stakeholders in the process. By identifying threats through both a review of the literature and a participatory process, the best information is brought to the table and stakeholders can share a common understanding of the key threats.

The main direct threats to biodiversity include:

- *Conversion* of natural habitat to cropland, urban areas, or other human-dominated ecosystems;
- *Overexploitation* or overharvesting of valuable species;
- *Introduced nonnative species*, including invasive species and introduced pests and diseases;
- *Pollution* of land, water, and air; and
- *Macro-environmental change*, such as climate change, desertification, or disruption of natural disturbance regimes (such as floods or fires).

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Deforestation for highly lucrative soy farming in San Rafael forest region of Paraguay.

Examples of root causes of threats to biodiversity include:

- Inequality and poverty;
- Demographic change, migration, and conflict;
- Public policies and structures;
- Global and local market forces; and
- Rapid social (including public health crises) and cultural change.

Comprehensive threats-based biodiversity conservation requires an integrated, multidisciplinary approach to understand both the social and biological processes and their dynamics at an ecoregional scale. The references at the end of this chapter provide examples of how threats are identified in practice by some of the conservation organizations who are partners in USAID's Global Conservation Program. The references also explain large-scale, systemic causes of threats to biodiversity.

PRIORITIZING THREATS

Threats can be prioritized according to several factors, including:

- Urgency of addressing the threat,
- Probability of success in mitigating the threat,
- Area affected by the threat,
- Feasibility of addressing the threat (e.g., culturally, politically, economically), and
- Level of agreement among stakeholders about the threat.

It is not clear in all cases whether 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 to conserve an example of a unique forest type, some conservationists would give the highest priority to working in remote areas with few people, where the costs of management and enforcement are now low. Others conservationists argue that such remote areas are "self-protecting" in the short term. They argue that conservation investments are needed most urgently where there are now the greatest threats of conversion of natural areas to human-dominated ones—typically in areas much closer to roads, cities, and farms. 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 threatened species that may have a better chance of long-term survival than a species already on the brink. There are no right or wrong answers in such debates, but the tradeoffs among urgency, cost, and probability of success need to be considered carefully. USAID has funded both kinds of conservation activities—those focusing on immediate, urgent threats, and those which address long-term, future threats to biodiversity.

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6.0 CHOOSING CONSERVATION PRIORITIES

KEY QUESTION

With so many different approaches to setting conservation priorities, what is the key to using any one successfully?

This chapter summarizes some general principles for setting conservation priorities of all kinds, whether those are the types of activities chosen to address threats, the geographic scale and sites at which to work, or the elements of biodiversity to target. For examples of specific approaches and methods that are being used by U.S. government, international agencies, and conservation NGOs, see the Web-based references at the end of the chapter.

AGREEMENT ABOUT CONSERVATION PRIORITIES

Conservation priorities of all kinds should be set through a participatory process that involves well-informed key stakeholders. A transparent process that is based on the best science available, coupled with a realistic assessment of the potential tradeoffs associated with different sets of priorities, has the greatest potential for producing a set of goals and associated activities that enjoy broad stakeholder support. Scientific analysis of the status and threats to biodiversity is a critical starting point for setting conservation goals and targets. However, achieving agreement on specific goals and targets among a broad suite of stakeholders is based on much more than just science.

Information stemming from the Foreign Assistance Act's Section 118 and 119 (see Chapter 28, *U.S. Legislation*) reviews, analysis, and country strategic plans may be useful background for choosing conservation priorities as well as selecting the scale and sites at which to work (See Chapter 3, *Issues of Scale*). They can also help to identify threats (see Chapter 5, *Analyzing Conservation Threats and Opportunities*), stakeholders, and potential partners (see Chapter 4, *Involving Stakeholders*). Because of their usefulness in planning biodiversity conservation activities (and activities related to agriculture, democracy and governance, conflict), these reviews and related information are an important element of USAID priority setting for biodiversity conservation at the country and USAID mission level.

The Conference of Parties of the Convention on Biological Diversity (CBD), states as its first principle for ecosystem conservation 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. Ultimately, all

ecosystems should be managed for the benefit of humans—whether that benefit is consumptive or nonconsumptive" (http://www.biodiv.org/doc/ref/ecs-principles-draft.pdf).

HANNAH FAIRBANK, USAID/EGAT/NRMB, 2000.

Community based environmental education in the Philippines (Rebecca Timonel and fruit bat, Rene).

Arriving at such "societal choices" regarding which elements of biodiversity to emphasize requires that key stakeholders, often with very different values and interests (*some of which may not prioritize biodiversity conservation*), work together to set priorities. For example, a conservation organization may want to preserve and connect patches of endangered forest, whereas a local community living in or near the area may be more interested in raising household incomes. Identifying and articulating these different interests of key stakeholders is an important early step in priority setting. In this way, opportunities that achieve multiple objectives can be identified. Without such explicit communication of interests and underlying value systems early on, conflicts are likely to emerge later, weakening the conservation program.

Selecting among alternative conservation priorities is a negotiation process requiring a solid understanding of potential tradeoffs. It often involves compromises, but ideally should seek "win-win" solutions in which each stakeholder benefits without having to give up the things that are most important to them. As with the case above, the exact amount of forest to be protected, managed, and/or rehabilitated will likely be determined through the development of a forest zoning system that includes both strictly protected areas of critical remaining patches of forest as well as multiple use zones that could include ecotourism and other conservation enterprises that bring income to local populations.

Developing a vision of a future that is both desirable *and* sustainable can help stakeholders recognize their common interests, and go on to develop mutually agreeable strategies for managing biodiversity. The references listed at the end of this chapter give examples of how stakeholders can work together to develop a common conservation vision.

WHAT WILL THE PROGRAM CONSERVE?

Biological diversity includes the variety and variability of genes, species, ecosystems, and ecological processes. What elements of biodiversity will a particular project or program conserve, and why? Each of the diverse elements of biodiversity can be valuable—for direct material uses such as food and medicines; for ecosystem services such as clean water, pollination, or the control of pests; and for nonmaterial uses such as recreation and education (see Chapter 2, *The State and Importance of Biodiversity*).

In order to maintain the full suite of benefits associated with biodiversity, explicit conservation targets need to be established. These explicit targets are not only critical for gauging success over time, but are also important to ensure a common understanding among conservation stakeholders. Characteristics of effective conservation targets include:

- They are clear, specifying quantitative levels and time frames, when appropriate.
- They are ambitious, and sufficient to ensure ecological stability.
- They cover all relevant elements of biodiversity (species, representation of habitats and ecosystems, ecological processes, etc.).
- They are realistic within present constraints and available resources.

KEY QUESTIONS

- **With so many different approaches to setting conservation priorities, what is the key to using any one successfully?**

Conservation NGOs each have their own approaches to setting priorities, determined by the values of their members and the scientists on their staffs. Each of these approaches has its specific merits and is designed to produce specific conservation outcomes. Many of the international conservation NGOs are involved in establishing a set of common standards for conservation planning following basic principles of good program design (see Web link for Conservation Measures Partnership below). For any of these approaches, it is important to remember that conservation NGOs are one of the many conservation stakeholders. The values and priorities of these organizations may differ from other international, national, and local stakeholders. As such, the priority-setting process should be transparent and clear regarding how these alternative values are reflected in the final priorities that are decided upon.

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- BirdLife International: http://www.birdlife.net/
- Convention on Biological Diversity: http://www.biodiv.org/decisions/default.asp
- Convention on International Trade in Endangered Species of Wild Fauna and Flora: http://www.cites.org/
- Conservation International: http://www.conservation.org/xp/CIWEB/regions/priorityareas/hotspots.xml and http://www.cabs.conservation.org/xp/CABS/home
- Conservation Measures Partnership: http://www.conservationmeasures.org
- Ecological Society of America: http://www.esa.org/ecoservices
- Food and Agriculture Organization: http://www.fao.org/waicent/ois/press_ne/presseng/h8f.htm
- Millennium Ecosystem Assessment: http://www.millenniumassessment.org/en/
- The Nature Conservancy: http://nature.org/aboutus/howwework
- United Nations Educational, Scientific, and Cultural Organization (UNESCO) Man and the Biosphere Program (MAB): http://www.unesco.org/mab/brfaq.htm
- U.S. Geological Survey: http://www.gap.uidaho.edu/
- Wildlife Conservation Society: http://wcs.org/12318 or http://wcs.org/12311
- World Conservation Union Species Survival Commission: http://www.iucn.org/themes/ssc/aboutssc/whatisssc.htm
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7.0 DESIGNING ACTIVITIES

KEY QUESTIONS

Why is a threats and opportunities analysis important?

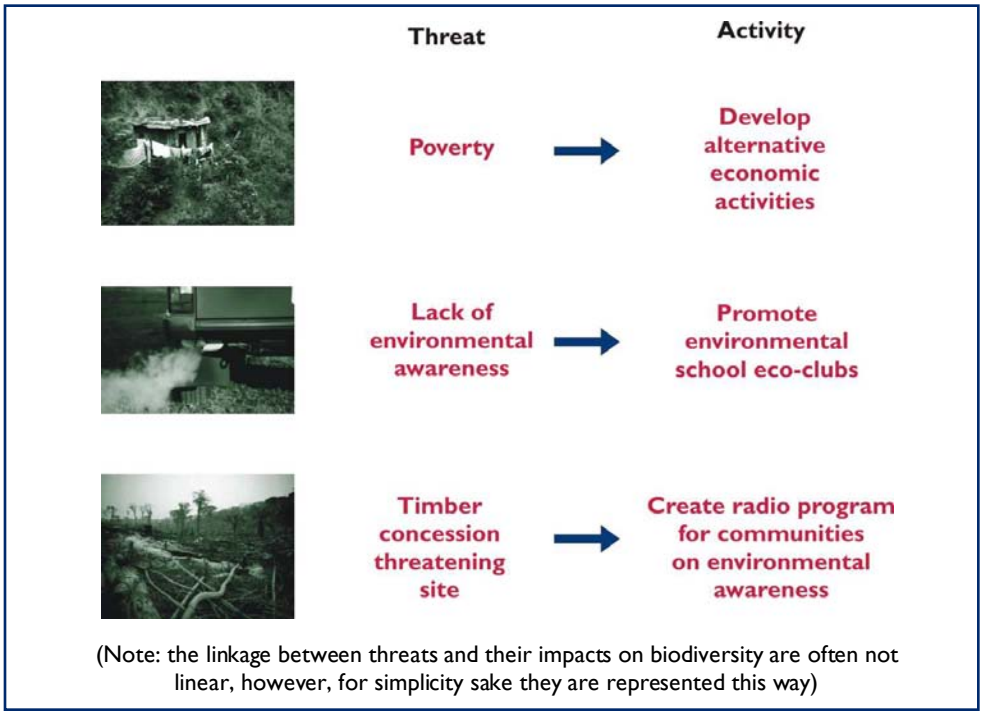
What are the characteristics of well designed conservation activities?

DESIGNING ACTIVITIES TO ADDRESS THREATS

The threats-based approach to conservation seeks to link threats to specific elements of biodiversity with conservation actions in a logical and direct way. With conservation targets agreed upon, a careful analysis of threats and opportunities should provide some indication of relevant activities that can be undertaken to move toward achievement of stated goals.

Lasting conservation impacts can only be achieved when priority threats are mitigated. Figure 5 shows three examples in which the logical links between the threat and the conservation activity are weak, suggesting a dubious likelihood of success. In the first two examples, the threats identified are very general—probably too general to be of good use in designing targeted conservation interventions.

FIGURE 5. WEAK LINK BETWEEN THREAT AND ACTIVITY



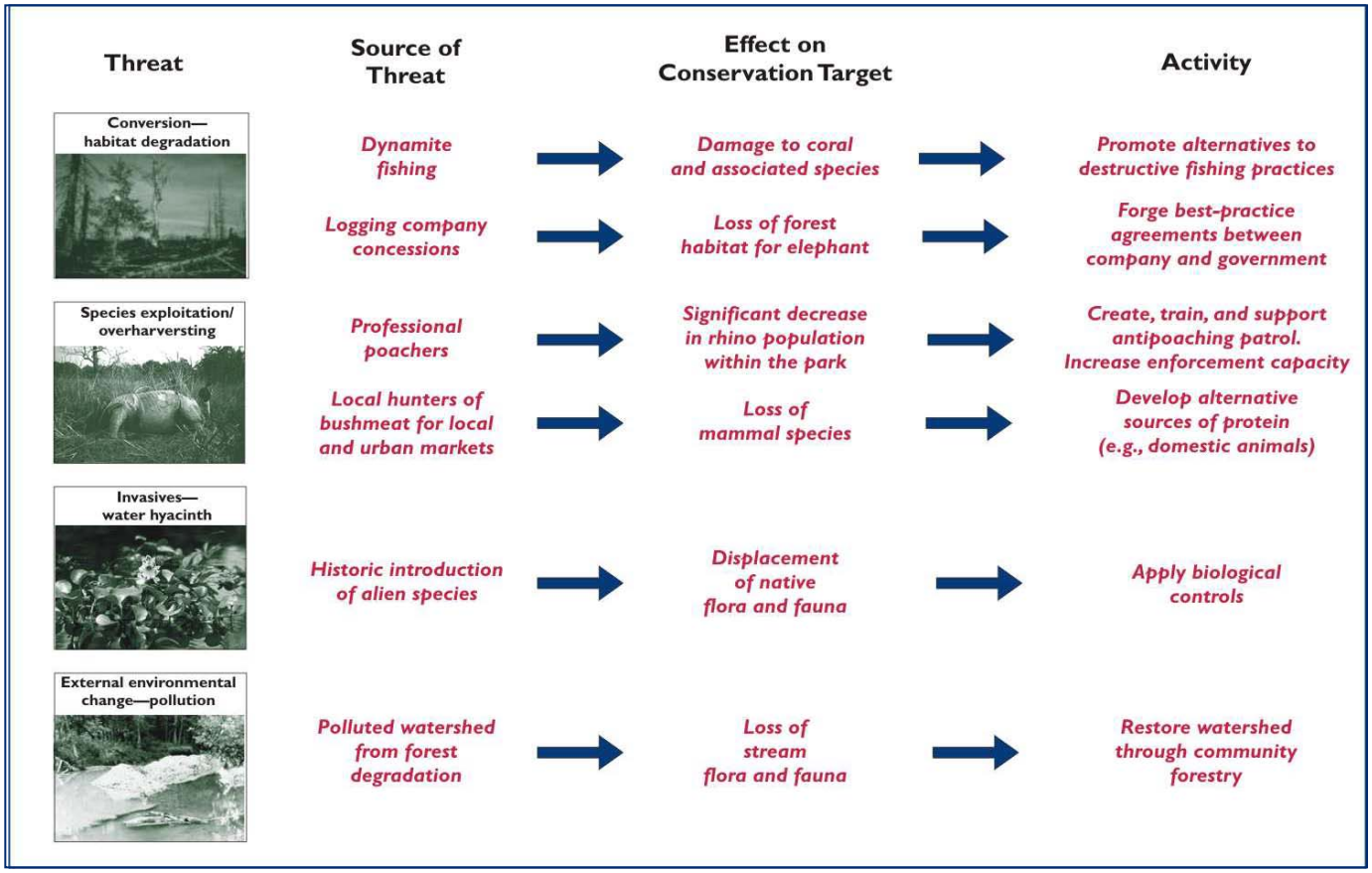
In the first case, while poverty may indeed be a root cause of biodiversity loss, a better understanding of how poverty is having direct effects on biodiversity is needed to develop appropriate interventions. For

example, poor coastal populations may be fishing in or near protected areas in order to meet their household food security needs (women in some cases) while also trying to generate cash from the sale of fish and other marine products (men in some cases). Both the rate of off-take and the specific techniques used to gather resources may be negatively impacting local fish populations. In this case, appropriately designed conservation interventions might focus on limiting the rate of off-take, improving the specific fishing techniques used by men and/or women, developing non-marine based alternative livelihood options, improving the processing of products to generate more cash per unit sold, or some combination of the above.

In the third example in Figure 5, although a logging concession may be a direct threat, the logic linking the threat and the activity is weak—in this case, "environmental awareness" in communities, developed primarily through radio programs, will probably not be the most effective way to change the behavior of a logging company holding a concession to cut timber in a nearby forest.

Figure 6 provides examples of specific, direct threats to some element of biological diversity, and activities logically designed to address the threats.

FIGURE 6. IMPROVED LINK BETWEEN THREAT AND ACTIVITY



Please note: while the examples in the above figure are overly simplified, they are intended to highlight the point that more specific knowledge on causal linkages and how threats actually impact biodiversity are necessary for designing appropriate interventions. If the causal context is understood, it should be possible to describe clearly how a proposed intervention will bring about desired changes in the causal chain leading to mitigation of threats and achievement of conservation targets and goals.

For example, in the case of overharvesting of species for the bushmeat trade, the proposed activity is based on the assumption that domesticated food animals can be substituted for bushmeat. This may or may not be an appropriate activity depending on cultural traditions (men hunting in the forest versus farming at home), vocational backgrounds (people may not have the necessary knowledge to raise domesticated animals), land tenure issues (the people may not own sufficient land to raise domesticated animals), and economic issues (bushmeat may provide more income for less effort), or cultural preferences (preference for bushmeat).

The threats-based approach requires that interventions focus on direct threats. This approach does not *limit* interventions to either direct threats or the site level, however. Ideally, a good understanding of the full causal chain from root cause to direct threat should be understood, if possible, and each linkage should be considered as a possible point of intervention.

An unbalanced emphasis on either end of the causal chain—either root causes or direct threats—can reduce the effectiveness of conservation programs. For example, too much emphasis on direct threats, without sufficient effort to understand and address their root causes, may produce localized conservation successes that may not be sustainable. On the other hand, programs that target only root causes and indirect threats may take a long time to produce results, and in the meantime, immediate direct threats may lead to an irreversible loss of biodiversity at some sites. Ideally, conservation programs should simultaneously mitigate direct threats while fostering the enabling conditions for long-term conservation.

Lastly, while threats analysis is a *critical* element of good conservation planning, it is not *sufficient* for effective program design. There are other important aspects to be considered when making programmatic design decisions. In particular, for any specific conservation activity, it is important to identify who is the most appropriate party to implement it. Appropriateness is a factor of established presence in a region, historical relationships with relevant stakeholders, technical capacity and skills, additional resources or leverage that can be applied, and so on. By asking these types of questions early on in the activity design stage it is possible to identify and refine conservation activities to capitalize on the specific value-added traits of certain groups. At the same time, necessary actions to strengthen institutional capacities and build complementary partnerships can be developed.

KEY QUESTIONS

- **Why is a threats and opportunities analysis important?**

  A thorough understanding of threats helps set realistic conservation goals and targets. A robust threats and opportunities analysis identifies the factors that have the potential to either promote or prevent achievement of conservation goals. A solid understanding of the causal links between threats and their impacts on specific biodiversity elements provides the basis for a rational set of interventions.

- **What are the characteristics of well-designed conservation activities?**

  – Responds to identified and prioritized threats,
  – Technically appropriate and based on best practices and lessons learned whenever possible,
  – Closely linked to conservation goals and targets,
  – Well-matched to the strengths of implementing organizations, and
  – Support appropriate partnerships among relevant stakeholder groups.

THE BUSHMEAT THREAT

The overhunting of wildlife for human consumption is a threat to biodiversity across the humid tropics. The hunting of wild meat (known as "bushmeat) has increased in recent years for several reasons, including loss of forests, increases in human populations, increased access for hunters to remaining forests as a result of road building and forest fragmentation, the use of efficient modern hunting technologies, loss of traditional hunting controls, and increased commercialization of hunting. Overhunting of wildlife was first recognized as a problem in West and Central Africa, and is often referred to as the "bushmeat crisis."

The demand for wild meat stems from two sources. Many people eat wild meat because it is the cheapest and most readily available source of meat, and they often shift away from eating it when household income increases or other sources of protein become reliably available. In other cases, city dwellers with rising household incomes may consider wild meat a delicacy, thereby increasing demand for it.

Hunting can have significant ecological consequences. It can result in what has been called the Empty Forest Syndrome, a forest without large animals. Such forests may suffer dramatic changes in structure and composition, because they may lack the animals responsible for pollination and seed dispersal. The loss of some animals and the secondary loss of certain plant species may jeopardize the function, stability, and long term survival of these ecosystems and the people dependent upon them.

The use of wild meat can also have human health consequences. Many diseases can jump between game species and humans during the hunting, handling, and consumption process. Primates, including humans, are susceptible to many of the same diseases, and monkeys and apes may have a role in the spread of new and virulent diseases to humans, including Ebola. Logging, mining, and construction of pipelines or power lines open up new areas of forest to commercial hunting, increasing the risk that humans will be exposed to new animal-borne diseases.

Solutions to the bushmeat crisis require an understanding of both the local situation and the broader context both direct and root causes. Possible activities for addressing the bushmeat threat include:

- Promoting awareness of the ecological and health implications of overhunting;
- Increasing law enforcement, especially to protect the most critically endangered species;
- Ensuring that hunting does not accompany resource extraction (of timber, minerals or oil, for example) and the road building associated with these industries;
- Determining sustainable levels of hunting for species and work with local communities to regulate; and
- Promoting cultivation of domestic livestock to provide needed protein.

For More Information

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8.0 MONITORING, EVALUATING, AND MANAGING ADAPTIVELY

KEY QUESTIONS

How can donors support adaptive management in the programs they fund?

What are some ways to measure impacts on biodiversity?

Adaptive management is often described as a variation of the project planning cycle. It emphasizes testing assumptions and hypotheses, monitoring appropriate indicators, learning, and adjusting activities during the course of the project.

Conservation involves complex ecological and social systems, whose responses to conservation activities and interventions are often unpredictable. Therefore, conservation interventions should be designed, in part, to test assumptions and hypotheses about the systems involved by observing their responses to interventions. The interventions are in turn adapted based on what is learned. This process can lead to better choices and more effective activities.

SELECTING EFFECTIVE INDICATORS

Ongoing monitoring is a key element of adaptive management. Many more things *could* be monitored than would be worth monitoring, and unnecessary monitoring wastes resources. A key question to ask in choosing indicators is "what information is needed for adaptive management of this project?"

Good program monitoring assesses progress toward achieving articulated conservation goals and targets. It also requires the monitoring

HANNAH FAIRBANK, USAID/EGAT/NRMB.

USAID is currently partnering with WWF in Peru to decrease the bycatch of marine turtles in Pacific longline fisheries through the use of alternative hook technology.

of key factors that are influencing conservation targets, including threats. Indicators used in conservation program monitoring should be directly linked to these goals, targets, and threats. This will likely involve a mix of ecological and socioeconomic indicators.

Some general criteria for a good indicator include:

- *Useful:* The information provided by the indicator can help inform programming decisions.
- *Measurable:* Appropriate quantitative and/or qualitative changes are assessed by the indicator.
- *Attributable:* The change measured by the indicator can reasonably be ascribed to the activities being undertaken.
- *Realistic:* It is practical, cost-effective, and feasible to collect the data.
- *Timely:* Data are collected at reasonable time intervals to effectively show change. Data is available when it is needed—at an appropriate time to inform decisions.
- *Reliable:* Standard data collection methodologies are used to collect data. Data is robust and verifiable.
- *Direct:* The indicator closely tracks the results it is intended to measure. If indirect proxy measures are used instead of direct measures for cost or other reasons, assumptions regarding how proxies are linked to intended results are clearly articulated.

LEARNING LESSONS AND ADAPTING ACTIVITIES THROUGH MONITORING AND EVALUATION

Learning is a key element in adaptive management. Monitoring and evaluation provides "feedback" about what works and what does not. This feedback can then be used to make adjustments and changes to the activities. Through iterative adjustment, adaptive management can help find the most rapid route toward reducing threats to biological diversity.

For example, an environmental education program may inform a community about the importance of trees and healthy forests in the nearby mountains for providing a year-round flow of clean water. Indicators may show that awareness and knowledge of the value of trees to watersheds is increasing in the local population because of this educational campaign. On the other hand, monitoring may show that trees are being cut and the forest is disappearing just as fast as before, despite this increased knowledge. This feedback should prompt stakeholders to revisit an earlier "step" in conservation planning: identifying threats and understanding their causes.

In this case, the main problem does not appear to be that local people do not know about the importance of forested watersheds, but that other factors are driving deforestation. Analyzing the threat further may show that a significant number of poor community members 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 requires enough time for its experimental, learning-by-doing approach to be effective. Project activities need time to influence social factors, behaviors, and threats, and the biodiversity targets need time to respond to these social changes. Learning in an adaptive management context can be rapid in some cases, however, if activities are well aimed at direct threats, and if result-oriented indicators are carefully chosen. In some cases, this learning dimension may require a longer time frame than USAID funding cycles will support. In such cases USAID managers can encourage projects to

initiate long-term adaptive management strategies that will continue beyond the end of USAID funding and influence future activities.

KEY QUESTIONS

- **How can donors support adaptive management in the programs they fund?**

  Donors who fund biodiversity conservation can support adaptive management by encouraging projects to be results oriented and by requiring sound monitoring and evaluation frameworks. The indicators used to monitor such programs should be results oriented as well. For example, trends in household income, if based on the sustainable harvest of a non-timber forest product (NTFP) such as wild mushrooms, would be a better indicator of desired *results* than the number of studies and publications about NTFPs produced by the project (even though such publications might be a valued output of the project and/or a useful tool for replicating it elsewhere). Indicators focused on the impact of interventions, such as changes in the state of biodiversity measured through changes in population size, quality and quantity of ecological services provided, and so on, are good results-oriented indicators.

- **What are some ways to measure impacts on biodiversity?**

  There is no ideal indicator for all situations. Issues of baseline data availability, cost or skills involved in collection, selection of indicator species or ecological processes are all valid issues to consider when choosing indicators that measure the impacts of an activity on biodiversity. However, some common direct measures that might be considered include:

  – Change in status of a certain species (measured as population size, number of breeding animals, number of viable offspring, occurrence in areas where previously eradicated, etc.);
  – Change in quality of habitat (measured as area of ground or canopy cover, rate of forest degradation, index of health of forest, coral reef or marine protected area etc.); and
  – Change in ecological processes (measured as quantity and flow of water, area of or numbers of animals, birds or fish undertaking migrations, etc.).

  Some illustrative proxy measures might include:

  – Area of forest cover;
  – Condition of forest, wetland, grassland, or marine area;
  – Management effectiveness of a protected or designated use area (with effectiveness criteria clearly defined);
  – Reduction of previously identified threats to biodivesity in area; and
  – Change in status of species on the IUCN Red List.

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9.0 FINANCING CONSERVATION

USAID programs and activities, including support for biodiversity conservation, are implemented though a variety of mechanisms (see Chapter 26, *Implementing Mechanisms and Partners*). USAID's support, however, typically funds activities only for a relatively short period of time—for 3 to 10 years, for example. USAID or other external donor funding is not seen as a reliable mechanism for providing the kind of long-term support that will certainly be needed to conserve biodiversity worldwide. Because of USAID's limited ability to provide long-term funding for conservation, an important element of planning conservation programs that will receive USAID support is to accurately identify financial needs, and develop alternate financial mechanisms that will sustain conservation activities after USAID funding ends.

Of course, all projects need a solid financial foundation to be feasible and sustainable, so a financial plan may be an integral part of any conservation plan. A financial plan should identify funding needs, lay out how the activities of the project will be funded, and describe the most appropriate sources of funding for the short-, medium-, and long-term needs of the project. A financial plan describes:

- Costs of existing and planned activities;
- Funding sources and funding gaps;
- Strategies for filling funding gaps, including identifying cost saving measures;
- How funding will be used throughout the designated time period; and
- What financial mechanisms will be used to continue the work after existing short-term donor support ends.

When working at larger scales, however, a plan for financial sustainability should involve multiple strategies and numerous partners over a much longer time frame than any particular donor's project cycle.

FINANCIAL MECHANISMS

In recent years, a range of sustainable conservation finance mechanisms have been used to provide reliable, long-term sources of funding for conservation programs. Many of these—including debt-for-nature swaps, conservation trust funds, tourism user fees, and conservation concessions—are described in more detail below, in order to illustrate the range and creativity of the possibilities.

The references at the end of this chapter give more information about innovative, long-term mechanisms for financing conservation. Conservation programs supported by USAID should plan to take advantage of such mechanisms to extend their work beyond the USAID funding "horizon" and to become financially sustainable over the long term.

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 investment in conservation (usually payments made in local currency) by the country's government. Several conservation NGOs, including The Nature Conservancy (TNC) and Conservation International (CI), have been actively involved in such international dept swaps for more than a decade. The proceeds generated by debt-for-nature swaps are often administered by local conservation trust funds, which disburse grants to specific projects and ensure accountable, transparent, and decentralized management. The U.S. government's *Tropical Forest Conservation Act* and the *Enterprise for the Americas Initiative* are bilateral programs used to forgive developing country debts in return for investments in conservation.

CONSERVATION TRUST FUNDS

Conservation trust funds are another mechanism for providing sustained, long-term funding for biodiversity conservation. Such funds have become more common during the past decade or so. 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 are used to finance activities over a set period of time (generally a relatively long time period); 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. USAID has considerable experience with endowments, particularly ones created with U.S.-appropriated dollars that are managed as trusts.

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 for addressing 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
- There are reliable systems of contracts, banking, record keeping, and auditing, as well as a climate of financial transparency in the country where the fund will be established.

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. The decision to tie up a large amount of capital to earn relatively small amounts of income over a long period of time should be weighed against alternative approaches—such as giving the money away as a grant, or making a loan.

TOURISM USER FEES

Tourism is the largest service industry worldwide, with ecotourism becoming an increasingly important segment of the market. Every year, millions of tourists around the world visit protected areas or travel to destinations for nature-based recreation. While protected areas often supply the most important part of such recreational experiences, they typically capture very little of the total economic benefits. One way to increase capture of those benefits is through relatively simple, market-based mechanisms (such as park entrance fees and concession fees), known collectively as tourism user fees. The fees partially reflect the cost for supplying recreational services, the demand for natural resources, and the value that visitors place on their experience at the site. The direct link between conservation and income from user fees provides conservation with a strong economic rational. With ecotourism growing so rapidly, and with the wide range of fees available, tourism user fees provide a conservation finance mechanism with perhaps the broadest application and highest overall revenue potential.

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.

RESOURCE EXTRACTION FEES

Extraction of nonrenewable natural resources is an important economic activity in many countries. Governments generally levy resource extraction royalties, fees, or taxes in order to capture a share of the income generated by natural resource exploitation. Ideally, governments then use these revenues to fund long-term investments in their countries' sustainable development. The concept of using resource fees for conservation suggests that a share of income from extractive activities could be devoted to natural resources and protected areas conservation; particularly for conservation sites located close to the extractive projects. Using funds from resource extraction to co-finance conservation activities not only represents an important new source of revenue for conservation, it provides an opportunity for traditional adversaries, such as environmentalists and oil or mining companies, to find common ground. In many parts of the world though, the extraction of (renewable and nonrenewable) natural resources has been unsustainable and the distribution of benefits inequitable. Under the proper governance structures though, fees and taxes related to resource extraction have the potential to support long-term biodiversity conservation and development.

BIOPROSPECTING PAYMENTS

Genetic resources from nature are a source of new chemical compounds that may have commercial value as sources of food, chemicals, industrial enzymes, or other products. Examples of bioprospecting arrangements might include:

- A country or community might license a company to collect plants related to species known to exhibit certain traits from a certain area.
- A company might establish a collaborative relationship with local communities or organizations, and pay them to do the actual collecting.
- After identifying a useful plant, a company might arrange for local communities to cultivate it for sale.

Under the UN Convention on Biological Diversity (CBD), countries may assert sovereignty over their biodiversity by regulating access to genetic resources. Governments may require companies seeking access to genetic resources to obtain prior informed consent and negotiate mutually agreed terms, which might include benefit sharing in the form of technology transfer, collaborative research, upfront or milestone payments, or royalties on eventual commercial sales.

PAYMENTS FOR ECOSYSTEM SERVICES

WATER

There is perhaps no other resource so valuable to humanity and yet so threatened as water. In response to this problem, innovative and potentially cost-effective means of providing clean and safe water that rely on the conservation of threatened watersheds are being tested and developed around the world. At the heart of this approach is the idea that healthy ecosystems, such as intact forests, clean and regulate water flows. Convincing key water users that the protection and maintenance of healthy watersheds provides real economic value to them, and as such is something worth paying for, is an important first step in generating water user fees. In some cases, water users have already begun to pay for the protection of watersheds.

SOURCES FOR MORE INFORMATION

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- Conservation International. Conservation Enterprises Program: http://www.conservation.org/xp/CIWEB/programs/conservation_enterprises/cons_enterprise.xml
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- The Nature Conservancy. 2003. EcoEnterprises Fund: Investing in Conservation: http://www.ecoenterprisesfund.com/index.htm
- Tropical Forests Conservation Act. 2003. Fact Sheet, U.S. Department of State, Bureau of Oceans and International Environmental and Scientific Affairs Fact: http://www.state.gov/g/oes/rls/fs/2003/22973.htm
- USAID. Center for Development Information and Evaluation. Bioprospecting and Biodiversity Conservation Report: http://www.dec.org/pdf_docs/pnaby200.pdf
- USAID. Enterprise for the Americas Initiative: http://www.usaid.gov/our_work/environment/compliance/eai.htm

III. CONSERVATION APPROACHES

10.0 Protected Areas

11.0 Community-Based Conservation

12.0 Sustainable Use

13.0 Environmental Communication

14.0 Policy Development and Reform

VEDA SANTIADJI, WWF-INDONESIA

A Bajau woman drying seaweed which provides additional income to many villagers living in Sama Bahari, Indonesia.

10.0 PROTECTED AREAS

KEY QUESTIONS

Does the protected area have clear and achievable ***management objectives*** and plans?

Do the management plans ***address threats*** to the biodiversity of the area?

Is the protected area legally recognized and does it have a ***legal management authority***?

Does the protected area have the financial, human, and capital ***resources*** to implement management plans?

Does the protected area have ***participation and support*** from stakeholders and other affected parties?

Is the protected area supported by a ***national level institution***(s) that provides the structures and capacity necessary to assist with effective management?

DEFINITION

The term *protected areas* encompasses the range of landscapes and seascapes that are managed to conserve and maintain elements of biodiversity and natural habitat. The World Conservation Union (IUCN) has developed the most widely recognized typology of protected areas, based on a protected area's primary management objectives (http://www.unep-wcmc.org/protected_areas/categories). Types of protected areas include strict nature reserves, national parks and monuments, wilderness areas, game management and hunting areas, and national forests. Protected areas can also be categorized by their management authority and scale.

BRUCE BYERS, ARD, INC.

A Kenyan Wildlife Service ranger at the entrance to Lake Nakuru National Park.

SIGNIFICANCE

Protected areas are one of the main elements in building a local, national, or regional strategy for biodiversity conservation. The importance of large-scale planning for conservation is gaining increasing recognition (see Chapter 3, *Issues of Scale*), and one aspect of such planning involves the development of networks or systems of protected areas. Developing a national system of protected areas should be part of a country's overall land use planning. The size and shape of protected areas, their placement in the ecological and human landscape, their type and management objectives, and their ecological connections to other protected areas are all issues that should be considered in developing a protected area system that both conserves biodiversity and meets human needs. National Biodiversity Strategies and Action Plans can help "mainstream" protected areas and other biodiversity conservation activities into national development plans. Mainstreaming biodiversity conservation requires communication and coordination with other sectors, including those dealing with transportation, agriculture, industry, commerce, and urban issues, at national and regional scales.

KEY QUESTIONS

- **Does the protected area have clear and achievable *management objectives* and plans?**

  Protected areas require management plans, as well as the capacity to develop and implement those 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:

  – The World Commission on Protected Areas for a wide variety of publications on the design and management of protected areas, including marine protected areas: http://www.iucn.org/themes/wcpa/pubs/guidelines.htm; and
  – The World Resources Institute's Guidelines for Preparing Protected Area System Plans: http://pubs.wri.org/pubs_content_text.cfm?ContentID=541.

- **Do the management plans *address threats* to the biodiversity of the area?**

  To be effective, protected area management must be based on an understanding of the threats the area 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 Chapter 7, *Designing Activities*).

- **Is the protected area legally recognized and does it have a *legal management authority*?**

  For management plans to be effective, implementers must have recognized legal management authority. In some cases, the implementers with legal management authority do not have actual ownership of the land. For example, in community forestry, local people may be primarily responsible for drafting and implementing management plans, while the government retains ownership of the area. The authority to manage a given protected area can vary across a wide spectrum of groups or organizations, including government and communities (see Section 10.1, *Community Conserved Areas*), or private individuals and organizations (see Section 10.4, *Private Protected Areas*):

  – National, provincial, and local government agencies;
  – Private organizations, either for-profit corporations or NGOs;
  – Private individuals;
  – Local communities; or
  – 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 *co-management* (see Chapter 11, *Community-Based Conservation*).

- **Does the protected area have the financial, human, and capital *resources* to implement management plans?**

  Managing protected areas requires resources—financial, human, and capital (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 authority 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 protected areas lack adequate resources to carry out and enforce agreed-upon 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, and
  – Conservation trust funds.

  Financial mechanisms for supporting biodiversity conservation are discussed in Chapter 9, Financing Conservation.

  Human Resources. Effective protected area management requires managers, staff, or volunteers with the skills and experience to carry out all of the management objectives. 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. 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 (Web link is indicated below).

  Capital Resources (Infrastructure and Equipment). As with human resources, financial resources are necessary but not always sufficient to obtain the equipment and infrastructure needed for sustainable protected area management.

- **Does the protected area have *participation and support* from stakeholders and other affected parties?**

  Establishing protected areas and developing their management plans are parts of the process that requires good governance, democratization, development of civil society, rule of law, political will, 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. This applies even to private reserves, which cannot function in total isolation from other stakeholders in an area.

- **Is the protected area supported by a *national-level institution*(s) that provides the structures and capacity necessary to assist with effective management?**

  Overarching all of the above is the need for a functioning national-level institution that is able to support the network of protected areas and to manage the national-level policy and planning processes. Capacities that need to be developed at the national level include (1) efficient and effective relationships with Park Management units, including proper balance of delegation of authority; (2) efficiency and capacity to actually approve management plans and ensure that management planning is being carried out according to their established legal criteria; (3) ability to develop laws, write laws, or contract/procure experts that can; (4) establishment of procurement mechanisms and financing mechanisms; and (5) systems that allow for coordination between agencies and systems that allow for public consultations.

  Support at the national level is often a long-term venture and, where necessary and reasonable, should probably be carried out in tandem with actions at the local level.

SOURCES FOR MORE INFORMATION

Global protected area systems

- World Heritage sites—the UNESCO World Heritage Committee: http://whc.unesco.org/nwhc/pages/sites/s_worldx.htm
- The Man and the Biosphere Reserves: http://www.unesco.org/mab/wnbr.htm
- Ramsar Wetlands of International Importance: http://www.ramsar.org/index_list.htm
- United Nations List of Protected Areas: http://www.unep-wcmc.org/protected_areas/UN_list/index.htm

Regional protected area systems

- European Union's Natura 2000: http://www.europa.eu.int/comm/environment/nature/home.htm
- Mesoamerican Biological Corridor: http://www.biomeso.net (Spanish), http://www.tbpa.net/case_10.htm (English description).
- ASEAN Heritage Parks and Reserves: http://www.aseansec.org/6078.htm (Declaration), http://www.arcbc.org/arcbcweb/pdf/vol1no3/49-51_profiles.pdf (Description).
- Baltic Sea Protected Areas: http://www.helcom.fi/Recommendations/en_GB/rec15_5/

Local systems

- Indigenous land and sacred groves (for example, see http://www.iucn.org/themes/wcpa/wpc2003/pdfs/workshops/sacredness.pdf)

Other

- Biodiversity Support Program. What's Your Role? A Guide for Training Officers in Protected Area Management: http://www.worldwildlife.org/bsp/publications/africa/whats_your_role/role_toc.html
- Brown, J.; Kothari, A. (eds). 2002. IUCN Local Communities and Protected Areas. World Conservation Union: http://www.iied.org/blg/researchthemes_index.html
- Convention on Biological Diversity: http://www.biodiv.org/programmes/cross-cutting/protected/default.asp
- United Nations List of Protected Areas: http://www.unep-wcmc.org/protected_areas/UN_list/

- United Nations Environment Program. World Conservation Monitoring Center: http://www.unep-wcmc.org
- United Nations Educational, Scientific, and Cultural Organization. Man and the Biosphere Program: http://www.unesco.org/mab/ and http://www.mabnetamericas.org/home2.html
- United Nations Educational, Scientific, and Cultural Organization. World Heritage Committee: http://www.unesco.org/whc/nwhc/pages/sites/s_worldx.htm
- U.S. National Parks Service: http://www.nature.nps.gov/protectingrestoring/index.htm
- Information about the location of protected areas around the world is available from the World Conservation Monitoring Center at: http://www.unep-wcmc.org/protected_areas/index.html
- World Commission on Protected Areas and the IUCN Program on Protected Areas: http://www.iucn.org/themes/wcpa/index.html
- World Conservation Union. Protected Areas fact sheet: http://www.iucn.org/news/pambrief.pdf
- World Parks Congress. 2003. Recommendation 17: Recognizing and Supporting a Diversity of Governance Types for Protected Areas: http://www.iucn.org/themes/wcpa/wpc2003/pdfs/outputs/recommendations/approved/english/html/r17.htm
- World Resources Institute. Biodiversity and Protected Areas: http://pubs.wri.org/pubs_content_text.cfm?ContentID=541
- World Wildlife Fund. Paper abstracts from Beyond the Trees: An International Conference on the Design and Management of Forest Protected Areas: http://www.panda.org/downloads/forests/beyondthetrees.pdf
- World Wildlife Fund. Position paper on protected areas: http://www.panda.org/downloads/protectedareaspositionpaperwpc2003_svvl.pdf
- World Wildlife Fund and World Bank. 2002. Reporting Progress on Management Effectiveness in Protected Areas-A simple site-level tracking tool: http://lnweb18.worldbank.org/essd/envext.nsf/80bydocname/reportingprogressinprotectedareamanagementeffectivenesstrackingtooljuly2002/$file/patrackingtooljune2003.pdf

10.1 COMMUNITY CONSERVED AREAS

KEY QUESTIONS

Has the community demonstrated a ***will*** to preserve the CCA?

Does the community have secure ***tenure*** over the CCA?

Does the community have the ***capacity*** and necessary support (technical, financial, etc.) to protect and manage the CCA?

Given resource extraction practices by the community, is the CCA sustainable in the long term?

Is there ***legal backing*** and government support for the CCA?

DEFINITION

Local communities have often conserved areas of natural or semi-natural habitat, for a variety of ecological and cultural reasons, and these have been called "community conserved areas" (CCAs). They may or may not be legally recognized by national governments and designated for management and protection. Thousands of small sites are conserved as village forests and pastures, sacred groves, and restricted hunting or fishing areas by communities worldwide.

SIGNIFICANCE

Many CCAs have enormous value for biodiversity and ecological services, yet most of these nontraditional protected areas are not part of official protected area networks. Because of this, their conservation benefits may not have been recognized, and they may not have received the support necessary to address the serious threats many of them face.

There are many types of CCAs around the world, including:

- *Sacred sites:* Sacred sites have been traditionally protected for their spiritual value and may be the least modified type of CCA. Strict prohibitions and regulations on resource use often have kept these areas rich in biological diversity, many of them harboring endangered plant species including rare herbs and medicinal plants. These areas include forests, rivers, lakes, springs, mountains, caves, trees, or islands.
- *Enriched natural forests:* Communities in many parts of the world have developed agroforestry systems that protect some elements of natural forest and supplement them with domesticated or semi-domesticated species in forest gardens.
- *Community forests:* Communities have protected, tended, and sometimes restored natural forests for woodlots, water protection, defense around human habitations, and other uses.
- *Rangelands and water sources:* These are traditional grounds of pastoral and nomadic communities, including rangelands, water sources and forest patches. They are strongly interdependent for herd, ecosystem, and collectively managed river basins (such natural and cultural ecosystems have multiple land/water uses integrated into each other).
- *Community declared wildlife sanctuaries:* These areas are conserved by communities to protect wildlife habitats.

Two types of CCAs that are increasingly receiving legal recognition are indigenous protected areas and community forests.

- *Indigenous protected areas:* Large areas under indigenous peoples' ownership or control exist throughout the world. Indigenous lands have an enormous potential to contribute to biodiversity conservation. Many of the indigenous lands are large, have high biodiversity value, and indigenous use may have had minimal ecological impact on the biotic resources of the area. The potential benefits of indigenous protected areas include effective conservation with extremely low levels of financial resources, and the mutual benefit to indigenous communities and to biodiversity from defending these lands from extractive industries and from settlement. These reserves must involve the full participation of the indigenous communities, and traditional practices of land and sea management should be incorporated in the management of these areas.

- *Community forests:* Community forests are forests that are managed or comanaged by local communities. Community forests are typically forest commons managed by local communities for local resource use, and they often represent only relatively modified ecosystems. Ecological conditions and the biodiversity value of community forests vary greatly. Studies show that many community forests have high floral diversity and provide many ecological services. These forestry systems have immense potential for contributing toward biodiversity conservation, particularly in buffer zones and corridors of officially designated protected areas. Community forests also contribute enormously toward meeting local subsistence needs, hence reducing pressure on protected areas that have communities living in or around them. In many parts of the world, communities have managed forests sustainably for the production of timber or non-timber forest products, thus providing income to the community.

KEY QUESTIONS

- **Has the community demonstrated a *will* to preserve the CCA?**

  For a CCA to be successful and sustainable, the community must have demonstrated a will to conserve it. Experience has shown that centralized models of development and conservation have undermined diverse, site-specific traditions of natural resources management in local communities. Many donor- or government-driven initiatives toward community participation in conservation have failed due to lack of transparency and accountability, inadequate transfer of powers and capacity, and lack of participation by communities.

- **Does the community have secure *tenure* over the CCA?**

  Communities need secure tenure over the natural resources within the CCA or their motivation to manage it sustainably will be compromised. Tenure may range from temporary rights through leases from the government, to ownership rights recognized by national legislation (see Chapter 14, *Policy Development and Reform*).

- **Does the community have the *capacity* and necessary support (technical, financial, etc.) to protect and manage the CCA?**

  For CCAs to be effective, the community must have the capacity—including technical knowledge, skills, resources (financial and otherwise), and institutions—to protect and manage the CCA. Given the larger context within which CCAs exist, communities will often require external support to effectively protect an area. At the same time, outside agencies must be careful to support and strengthen existing local natural resources management and governance, taking care not to undermine the community's approach.

- **Given resource extraction practices by the community, is the CCA sustainable in the long term?**

  For CCAs to be sustainable, community resource extraction rates must be within the carrying capacity of the area. Community population growth (from immigration or birth rates higher than replacement) and ties to external markets can rapidly affect the effectiveness and viability of the CCA.

- **Is there *legal backing* and government support for the CCA?**

  The benefits of CCAs to biodiversity and to local livelihood security often are not recognized or are poorly understood. Serious threats to CCAs may come from the larger context in which they exist. National politics, centralized control over natural resources, national and global markets, privatization of common property resources, and mass tourism may all contribute to threats from the outside. Addressing these threats generally requires legal backing and government support.

SOURCES FOR MORE INFORMATION

- Australian Indigenous Protected Areas Program: http://www.atns.net.au/biogs/A000447b.htm
- Borrini-Feyerabend, G. ed. 1997. Beyond Fences: Seeking Social Sustainability in Conservation. IUCN, Gland (Switzerland): http://www.iucn.org/themes/spg/Files/beyond_fences/beyond_fences.html#contents
- Brazilian indigenous reserves: http://www.conservation.org/xp/frontlines/people/focus31-2.xml
- Community forests and forestry: http://www.rainforestinfo.org.au/good_wood/comm_fy.htm; or http://www.fao.org/forestry/foris/webview/forestry2/index.jsp?siteId=4321&langId=1
- Promoting Community Conserved Areas in International Forums: http://www.iucn.org/themes/ceesp/Wkg_grp/TILCEPA/WPC/TILCEPA%20CCA%20mandate%20and%20work06.03.03.doc
- World Conservation Union. CCA and co-management: http://www.iucn.org/themes/ceesp/Wkg_grp/TILCEPA/community.htm
- World Parks Congress Recommendation 26: Community Conserved Areas: http://www.iucn.org/themes/wcpa/wpc2003/pdfs/outputs/recommendations/approved/english/html/r26.htm

10.2 MARINE PROTECTED AREAS

KEY QUESTIONS

Does the design of the MPA or network of MPAs include all areas necessary to significantly conserve the biodiversity and ecosystems of interest?

Are there land based threats to the MPA and are activities planned to reduce them?

DEFINITION

A marine protected area (MPA) is "an area of sea especially dedicated to the protection and maintenance of biodiversity, and of natural and associated cultural resources, and managed through legal or other effective means" (http://www.iucn.org/themes/wcpa/wpc2003/pdfs/programme/cct/marine/mpasfisheriesaut.pdf). As for other kinds of protected areas, MPAs can have a wide range of management objectives. They range from small, locally managed fisheries or "no-take" reserves to larger areas that are zoned for multiple uses, including national parks, wildlife refuges, marine sanctuaries, fishery management areas, and estuarine reserves.

THE NATURE CONSERVANCY, INDONESIA

Fish pens for live reef fish, Papua, Indonesia.

SIGNIFICANCE

Marine and coastal protected areas play vital roles in conserving biodiversity. MPAs can help maintain ecosystem productivity; protect important feeding, spawning, or nursery grounds for fish; and improve fisheries. MPAs can help increase fish populations both inside and outside the reserves by exporting eggs, larvae, and adult fish beyond their boundaries. More than 1,300 MPAs now exist worldwide.

KEY QUESTIONS

- **Does the design of the MPA or network of MPAs include all areas necessary to significantly conserve the biodiversity and ecosystems of interest?**

  The sizes and location of MPAs and MPA networks (as well as of *all* protected areas), is important to consider. As is the case for birds, mammals, and insects, many fish and other marine organisms require multiple habitats to provide needs for feeding, breeding, etc. throughout their lifecycle. Some marine species require coastal estuaries and mangroves as habitat during part of their lifecycle, and open ocean habitats at other stages. As with other kinds of protected areas, MPAs should be integrated into an ecosystem-scale strategy for conservation. The World Summit for Sustainable

Development and the World Parks Congress both called for the creation of networks of representative MPAs by 2012 to enhance the resilience of marine ecosystems and to ensure sustainable fisheries.

- **Are there *land-based threats* to the MPA and are activities planned to reduce them?**

  Land-based threats to MPAs may exist, such as from pollution or siltation due to erosion, and coastal land use and watershed planning may be needed to address them. Linking terrestrial and marine conservation efforts, such as in a "ridge to reef" approach, is often necessary to effectively conserve for MPAs.

SOURCES FOR MORE INFORMATION

- Commonwealth of Australia. 2003. Benefits of Marine Protected Areas: http://www.iucn.org/themes/wcpa/wpc2003/pdfs/programme/cct/marine/mpasfisheriesaut.pdf
- Marine Protected Area Executive Order and resource site: http://mpa.gov/mpa_center/mpa_center.html
- MPA News: http://depts.washington.edu/mpanews/
- Pacific Coast Federation of Fishermen's Associations. Marine Protected Areas and Marine Reserves: http://www.pcffa.org/MPA.htm
- Pew Oceans Commission. Marine Reserves: A Tool for Ecosystem Management and Conservation:" http://www.pewtrusts.org/pdf/pew_oceans_marine_reserves.pdf
- Pomeroy, Robert, John Parks and Lani Watson. 2004. How is Your MPA Doing? A Guidebook of Natural and Social Indicators for Evaluating Marine Protected Area Management Effectiveness. IUCN. Program on Protected Areas: http://www.effectivempa.noaa.gov/guidebook/guidebook.html
- The Nature Conservancy. Transforming Coral Reef Conservation: http://nature.org/initiatives/marine/strategies/art12286.html
- World Conservation Union page on MPAs: http://www.iucn.org/themes/wcpa/wpc2003/pdfs/programme/cct/marine/mpasfisheriesaut.pdf
- World Resources Institute. Tools for protecting marine biodiversity: http://pubs.wri.org/pubs_content_text.cfm?ContentID=810
- World Wildlife Fund. Conservation Science/Marine Science Program: http://worldwildlife.org/science/marine.cfm

10.3 TRANSBOUNDARY PROTECTED AREAS

KEY QUESTIONS

Does the transboundary conservation initiative achieve ***objectives*** that cannot be achieved through programs limited to the national level?

Is there ***political support*** for the transboundary initiative at the national and local levels in all participating nations?

Does the transboundary conservation effort include ***appropriate agreements*** to achieve its objectives?

Does the program emphasize ***good governance***?

DEFINITION

Transboundary conservation areas (TBCAs) involve cross-border (across the borders of sovereign states) collaboration to achieve biodiversity conservation and development goals. TBCAs can involve various spatial arrangements, but the most common is two or more contiguous protected areas that span a national boundary. TBCAs may also be referred to as transboundary protected areas (TBPAs) or transfrontier conservation areas (TFCAs). Transboundary river basins with high biodiversity value can also be a special type of TBCA in some cases. For information on various types of transboundary conservation initiatives, see the Web links below.

SIGNIFICANCE

TBCAs are an important tool for ecosystem-scale conservation and have increased rapidly over the last 15 years. Today there are more than 169 TBPA complexes, involving 666 protected areas in 113 countries, representing a variety of IUCN categories of protected areas. Transboundary conservation programs can provide a number of ecological as well as socio-political benefits. Transboundary initiatives can help maintain or restore linkages in ecological landscapes, maintaining cross-border watersheds, ecosystem processes, and critical habitats. TBCAs can help to address shared, cross-border threats jointly, and lead to collaborative efforts to realize mutual conservation benefits and economic opportunities (such as through ecotourism). TBCAs can improve cooperation among countries and communities. In many parts of the world, “peace parks” are being promoted for the conservation of biological and cultural diversity and peace.

KEY QUESTIONS

- **Does the transboundary conservation initiative achieve *objectives* that cannot be achieved through programs limited to the national level?**

  In many areas, threats may originate across political borders and can only be addressed through transboundary conservation initiatives. The benefits of a TBCA should outweigh the costs for each party if the collaboration is to be successful. Careful consideration should be given as to whether a TBCA will provide mutual benefits or if it is more effective for countries to manage their shared resources independently. It is critical that partner countries have a shared vision with common goals and objectives, and incentives for cooperation.

- **Is there *political support* for the transboundary initiative at the national and local levels in all participating nations?**

  The rewards from instituting TBCA initiatives are also accompanied by several challenges. They require collaboration among multiple national and local governments, as well as among local stakeholders across political borders. These complexities can make TBCA programs costly and time consuming. Because TBCAs often increase the involvement of upper government levels, the political will and long-term commitment from the national governments is especially critical for TBCAs to be successful. The production of joint education and outreach materials for transboundary protected areas, as well as regular joint technical meetings, trainings, seminars, and management plans have the potential to build political support, improve staff morale, and enhance cooperative efforts overall.

- **Does the transboundary conservation effort include *appropriate agreements* to achieve its objectives?**

  Although TBCA bilateral agreements hold great promise for international conservation cooperation, they have the potential to be lengthy, expensive, and limited in their success. Before formal talks take place between governments, a process that identifies issues, assesses different options for an agreement, and develops a strategy that creates reasonable expectations may help avoid many of the potential pitfalls of intergovernmental negotiations on transboundary conservation cooperation.

  In addition to formal agreements between governments, there are many flexible and less expensive legal options for creating TBCAs, including:

  – A joint arrangement (e.g., Memorandum of Understanding) for collaboration in cross-border protected area management or enforcement;
  – An agreement or protocol regarding environmental impact assessments (EIAs) and notice to, and possible participation by, people and institutions across the border prior to action affecting protected areas on or near the border;
  – Development of a bilateral/intraregional network linking key protected areas; and
  – A public/private contract or joint venture.

  Unlike an agreement that must be negotiated at the highest levels of government, these less formal mechanisms may be negotiated by the management of the protected areas and they can be more flexible, taking advantage of a mutual desire to collaborate. Initially, agreements may be limited to, for example, an annual meeting between managers. The agreement can evolve as the collaboration's effectiveness is seen, and changes can be easily negotiated. Eventually, the parties may be ready to negotiate a more formal agreement.

- **Does the program emphasize *good governance*?**

  Because of their transnational nature, TBCAs tend to increase the involvement of national government actors and stakeholders, whose interests sometimes conflict with the interests of local communities or private landowners. In cases where local and national-level interests conflict, donors and international NGOs supporting TBCAs must make special efforts to ensure that governance issues are addressed adequately. Because of the transnational aspects of TBCAs, it is especially critical that agreements emphasize good governance, including transparency and accountability within the government, and among local, regional, and national stakeholders.

SOURCES FOR MORE INFORMATION

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- Global Transboundary Protected Areas Network: http://www.tbpa.net/
- South Africa National Parks. Transfrontier Parks: http://www.sanparks.org/conservation/transfrontier/
- van der Linde, Harry et al. 2001. Beyond Boundaries: Transboundary Natural Resources Management in Sub-Saharan Africa: http://www.worldwildlife.org/bsp/publications/africa/144/Beyond Boundaries-Frontmatter.html
- World Bank –Transboundary implementation of the ecosystem approach: http://www-wds.worldbank.org/servlet/WDS_IBank_Servlet?pcont=details&eid=000094946_00101105374277
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10.4 PRIVATE PROTECTED AREAS

KEY QUESTIONS

Are there ***economic incentives*** for private land conservation (as well as for community conservation areas)?

Do landowners have the ***capacity and tools*** to undertake conservation on their land?

Is the ***government capacity*** and ***legal framework*** sufficient to promote and integrate private conservation efforts into national objectives?

Is there ***collaboration*** between public and private sectors in the management and conservation of protected lands?

DEFINITION

A private protected area refers to an area that is:

- Managed for biodiversity conservation objectives;
- Protected with or without formal government recognition; and
- Owned or otherwise secured by individuals, communities, corporations, or NGOs.

Private conservation areas, like publicly protected areas, vary greatly in terms of management objectives, allowable activities, and level of protection. These may include formally declared private areas, lands subject to conservation easements, game ranches, mixed commercial operations based on sustainable use, and land trusts.

SIGNIFICANCE

Privately owned protected areas are increasingly important components of national conservation strategies, numbering in the thousands and protecting several million hectares of biologically important habitat around the world. They can aid in protecting corridors, buffer zones, areas underrepresented in public park systems, and other key components of larger ecosystems that governments are not protecting for lack of financial resources, political will, or other reasons. In eastern and southern Africa, privately owned lands play an important role in conserving critical biodiversity, with private protected areas in southern Africa alone protecting millions of ecologically important hectares, especially in critical buffer zones and corridor areas.

Private protected areas often integrate conservation with economic uses. Examples include activities such as ecotourism, game ranching, or harvesting NTFPs. This integration provides revenues that make private conservation financially feasible. However, this may make private conservation lands more vulnerable to economic fluctuations caused by changes in policy at the local, national, and international levels or changes in the market, making competing land uses such as agriculture, logging, and ranching more profitable. This vulnerability, in turn, puts the conserved ecosystems at increased risk. This is also true for CCAs.

KEY QUESTIONS

- **Are there *economic incentives* for private land conservation (as well as for community conservation areas)?**

  Private landowners may be motivated to conserve their land for many reasons (family history, traditional livelihoods, etc.) but economic gain may be one of the more powerful incentives for private landowners to adopt conservation practices or establish a private protected area. Incentives can include property tax exemptions for lands placed in conservation status, payments for the environmental services provided by conservation lands, development of markets for environmental goods and services, purchase or transfer of development rights, and other forms of government financial and technical assistance.

- **Do landowners have the *capacity and tools* to undertake conservation on their land?**

  Landowners may need assistance and support to develop their capacity to conserve their lands and to understand the full value and potential of their land for conservation.

- **Is the *government capacity* and *legal framework* sufficient to promote and integrate private conservation efforts into national objectives?**

  National and local governments require the capacity and legal frameworks to authorize and monitor formal private conservation protection efforts, and integrate them into their overall conservation strategies. The government judicial systems need the capacity and legal backing to enforce private land conservation mechanisms effectively and consistently. Governments need the capacity to communicate available programs and conservation options as well as provide technical and legal assistance to landowners. Private land conservation efforts should be integrated into public conservation strategies by maximizing protection of ecosystems inadequately represented among public protected areas.

- **Is there *collaboration* between public and private sectors in the management and conservation of protected lands?**

  Cooperation between private landowners and other stakeholders, such as national governments or local communities, should be promoted, particularly regarding complementary land uses. Mechanisms should be created to increase and deepen the transfer of technology, knowledge, and experience between private landowners and other stakeholders.

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11.0 COMMUNITY-BASED CONSERVATION

KEY QUESTIONS

Is there a ***community*** that can be supported in its conservation activities?

Does the community have ***secure tenure*** to the land or resources to be conserved?

Is there full ***community participation*** in planning and management?

Does the activity address ***threats*** to biodiversity?

Does the activity recognize and incorporate ***local management systems and institutions***?

Is there a supportive ***national and international context*** and enabling environment?

DEFINITION

Community-based conservation (CBC) initiatives are undertaken by communities for the purpose of benefiting their long-term development while meeting biodiversity conservation goals. In CBC, local people play a central role in biodiversity conservation. CBC is a piece of the broader concept of community-based natural resources management (CBNRM), of which not all activities address biodiversity conservation goals specifically, but instead include natural resources management more widely.

CBC can occur in numerous settings, including:

- Community conserved areas (described in Chapter 10.1),
- Buffer zones of nationally managed protected areas of all categories,
- Nationally managed protected areas with communities inside their boundaries,
- Indigenous reserves, and
- Extractive reserves.

SARA AGGARWAL, ARD, INC.

A women's forest user group near the Barida Reserve in the Terai Arc Landscape (TAL) of southern Nepal. USAID supports the World Wildlife Fund's work in the region.

SIGNIFICANCE

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.

Potential benefits of CBC for biodiversity include:

- Stronger incentives for local people to conserve natural resources,
- Reduced cost through effective local management, and
- Management based on local ecological knowledge where it is present.

CBC is based on the idea that conservation of natural resources is best achieved by enabling local communities to derive benefits from the sustainable use of these resources. CBC initiatives are sometimes controversial because community development objectives are not always consistent with conservation objectives, and communities may or may not possess sufficient local ecological knowledge to sustainably manage their natural resources without significant support. This is also true for private land conservation and CCAs.

KEY QUESTIONS

- **Is there a *community* that can be supported in its conservation activities?**

  For a conservation activity to be called community based, local residents—the members of the local community—must have a strong role in managing the biodiversity resources in question. 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.

  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. Because of the diversity within local communities, there can be stakeholder groups with different interests even at the local level. All communities may have internal conflicts and divergent interests, as well as differences along economic, gender, and social lines. Any organization that wants to support CBC must understand and respect community heterogeneity. This is as true for leaders within the community 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 within a community as well as from those of stakeholders at the national or global level. In cases where values differ between these stakeholders, tradeoffs may have to be made increasing the need for conflict resolution tools and strategies (see Chapter 17, *Conflict*).

  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 *co-management*. It is a subset of the possible arrangements for CBNRM. Co-management is in some cases a step along the road to full devolution of management authority to local communities. In many other situations, however, co-management can be viewed as an endpoint in the attempt to balance the interests of stakeholders at both national and local levels. Co-management is sometimes called joint management or collaborative management.

- **Does the community have *secure tenure* to the land or resources to be conserved?**

  Successful CBC usually requires secure land or resource tenure at the community level. Tenure security can come through formalized and legal processes, or may stem from traditional, customary systems of community land rights. Increased security of tenure enables local communities to have the possibility of long-term incentives for sustainable resource management. Secure tenure is often a necessary condition for sustainable management, but not a sufficient one. (For more on tenure, see Chapter 14, *Policy Development and Reform.*)

- **Is there full *community participation* in planning and management?**

  Because CBC is defined by a fundamental shift in the locus of control over biodiversity and the responsibility for conserving it—that is, a shift from the international or national level to the local level—requires true and active *participation* of local communities. Sometimes this participation must be patiently cultivated. A long history of mistrust and bad relations between national wildlife authorities and local communities may require some time to overcome. In many cases, staff members of national parks; of departments of wildlife, forestry, and fisheries; and of international conservation NGOs must recognize the need to work with communities and learn how to do it. Building the capacity to work with local communities within the staff of these organizations may be a necessary first step toward effective 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. In some sites, CBC or CBNRM may not be feasible or the most effective management choice.

  Authentic participation requires full community involvement in setting conservation priorities (see Chapter 6, *Choosing Conservation Priorities*). The community must have the power to set priorities according to its own values and needs. The challenge, however, is to reconcile community priorities with those of stakeholders at national and international levels, if possible, and to find "win-win" solutions to conservation problems. When these priorities conflict, it is critical to make tradeoffs explicit and to have a transparent, open process through which to resolve these conflicts. Measuring and judging progress and success also requires participatory monitoring and evaluation (see Chapter 8, *Monitoring, Evaluating, and Managing Adaptively*).

- **Does the activity address *threats* to biodiversity?**

  As with any conservation activity, CBC must address threats to the biodiversity that the community is trying to conserve (see Chapter 5, *Analyzing Conservation Threats and Opportunities*). Not all CBNRM activities will have conservation of biodiversity as a priority or directly address threats to biodiversity. For example, an outside organization may help a community build a health clinic, without making a direct link between that development need and the conservation of local biodiversity. Another example of a loose conservation and development linkage would be a community effort to rear small livestock such as pigs, goats, or chickens to provide an alternative protein source and thereby reduce the need to hunt and trap wild animals for meat. In a case like this, if people are using bushmeat for food or to sell, small livestock programs may take pressure off of the local natural resources base, but there is the potential for this project to simply supplement the income or protein that is gained through bushmeat hunting, and not reduce hunting. To ensure that community-based activities do meet a biodiversity standard, the linkages between livelihood or other development ends and biodiversity conservation must be direct and explicit. Fortunately, even in cases where biodiversity conservation has not initially been considered, community-based activities can be easily modified or supplemented to meet multiple goals and enhance the success of both economic development and biodiversity conservation ends.

- **Does the activity recognize and incorporate *local management systems and institutions*?**

  Local communities have traditionally regulated natural resource use themselves, including land, forests, water, pastures and wildlife. In many traditional management systems, communities zone their territory for different uses (e.g., village areas, agricultural fields, grazing lands, hunting areas, and sacred sites), and place species-specific or time-specific restrictions on resource use. Traditional ecological knowledge (see Chapter 11.2) informs these local management systems. These traditional natural resources management systems often favor collaborative action, have mechanisms for collective decision making, monitor and enforce norms of behavior, and help resolve disputes.

  Many of these traditional resource management systems have been suppressed or lost, in part because national-level natural resources management agencies assumed that traditional management systems are unscientific and incompatible with conservation.

- **Is there a supportive *national and international context* and enabling environment?**

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

  At the national level, a legal and policy framework is needed, because successful CBC may require formal devolution of resource use and management rights that were formerly held by agencies at the national level, or formal recognition of *de facto* or indigenous rights over natural resources. An essential role for national governments is to provide a legal framework that recognizes the rights and responsibilities of local groups in conservation and natural resources management. CBC also does not mean that national governments can abdicate all authority for conservation and sustainable use of natural resources. If they do, conservation values 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 a fair role in conservation, stakeholders at other levels also have legitimate interests, and these should be respected.

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11.1 INDIGENOUS AND TRADITIONAL PEOPLES AND INDIGENOUS AREAS

KEY QUESTIONS

Do indigenous peoples' ***organizations*** have the ***capacity*** to represent the community, and are they effectively engaged?

Are indigenous people's ***rights*** recognized and secured, particularly land and other property rights?

DEFINITION

Indigenous and traditional peoples are groups of people who have resided in a region for generations, and can be distinguished from the rest of the national community based on social, cultural, and economic conditions. Indigenous and traditional peoples have unique cultures that may be closely integrated with the local natural environment. These communities typically have a strong stake in the natural resources around them due to their dependence on these resources to sustain their livelihoods and cultures. These groups are often marginalized. Indigenous areas are those areas traditionally inhabited by these peoples.

SIGNIFICANCE

Indigenous and traditional peoples have unique cultures that may be closely integrated with the local natural environment. These communities typically have a strong stake in conserving the natural resources around them that sustain their livelihoods and cultures. This close relationship can make indigenous groups a powerful force for conservation. Areas used by indigenous peoples often have less habitat disturbance and more natural levels of biodiversity than areas that have become more completely incorporated into modern agricultural and industrial economic systems.

Within indigenous communities there can be wide variation in ecological knowledge and sustainable management practices. For example, overhunting by indigenous people in areas of the Amazon Basin can lead to "empty forests," which appear to have normal forest cover or plant composition, but which in fact suffer from local extinction of some game species. In addition, as indigenous and traditional peoples have become increasingly tied into market demands and cash-based economies, resource extraction rates are increasing and larger areas are being converted to agriculture to generate income for meeting basic needs. Because indigenous and traditional peoples control at least 25 percent of forest areas in developing countries, it is critical to engage them fully in the design, implementation, and evaluation of biodiversity and forest management programs.

KEY QUESTIONS

- **Do indigenous peoples' *organizations* have the *capacity* to represent the community, and are they effectively engaged?**

  Indigenous communities are often marginalized, lacking the organizational capacity for political representation and advocacy at the national level. Government agencies or NGOs that address indigenous affairs exist in many countries, but they do not always represent indigenous concerns. Individual members of indigenous communities also may not be completely representative of their group. For example, older indigenous men may represent a community because of their age or social status, but they may not be able to fully represent the interests and concerns of youth or women. Care

and transparency are needed to ensure full representation when working with indigenous communities and their representative organizations.

Indigenous communities are increasingly organizing themselves to actively seek rights to their land and recognition of the importance of their culture and language. One area in which the capacity of indigenous groups requires strengthening relates to recent international agreements dealing with genetic resources, trade, and intellectual property rights (IPRs), including traditional knowledge. The Convention on Biological Diversity (CBD) and the Trade-Related Intellectual Property Rights (TRIPs) Agreement of the World Trade Organization (WTO) raise issues of importance for indigenous peoples and for sustainable use and management of the biodiversity of their traditional lands.

- **Are indigenous people's *rights* recognized and secured, particularly land and other property rights?**

  Indigenous people have often been resettled, or had their traditional access to land and natural resources restricted when protected areas were established on their traditional lands. In the process, customary indigenous rights to resources have often been ignored, and basic human rights may have been violated. Protected areas established on indigenous lands without consent, and sometimes involving relocation, may not comply with international human rights standards or international law. The rights of indigenous, traditional, and marginalized stakeholder groups must be respected, and decision making should be transparent and build their capacity for effective participation and negotiation.

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11.2 TRADITIONAL OR LOCAL ECOLOGICAL KNOWLEDGE

KEY QUESTIONS

Does the activity ***recognize, understand, and strengthen*** local knowledge, conservation practices, and institutions for resource management?

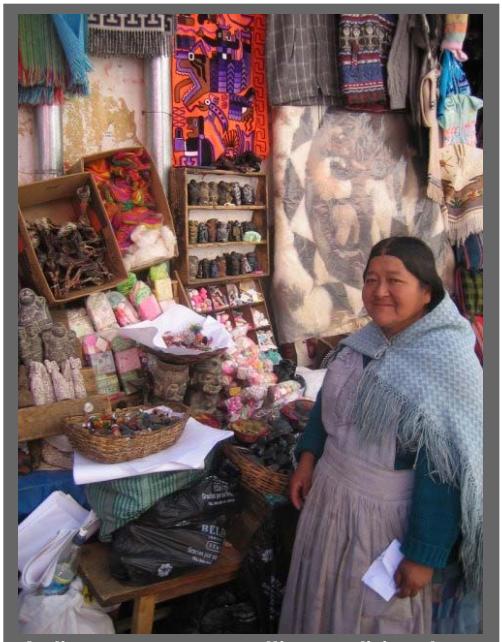
Does the activity ***recognize key experts*** of local ecological knowledge in the community?

Does the activity seek ***mechanisms*** that allow traditional and modern ecological knowledge to supplement each other?

Does the activity take ***knowledge ownership and intellectual property rights*** into account?

DEFINITION

The term traditional ecological knowledge (TEK) is used to describe the knowledge, practices, and beliefs that traditional cultures use to conceptualize and interact with their environments. TEK encompasses everything from the observation of ecological processes to cultural norms for land management and resource allocation. This wealth of knowledge is acquired through experience and informal experiments, gathered over generations by observers whose survival depended on it. Some TEK is therefore "scientific" in that it is generally gathered through methods that are empirical, experimental, and systematic, although this may not be true for all TEK. Based on their traditional ecological knowledge, some traditional communities, especially indigenous groups, have managed their natural resources and ecosystems sustainably, protecting ecological integrity in order to survive.



HANNAH FAIRBANK, USAID/EGAT/NRM/B

Indigenous woman selling traditional remedies in La Paz, Bolivia.

Two dimensions of TEK that are relevant to modern conservation include the ecological knowledge itself and the practices that result from that knowledge:

- *Knowledge.* Local communities typically know something about the diversity and ecology of the species in their ecosystem. TEK often includes detailed ecological knowledge of rare, threatened, and endangered species. This knowledge varies significantly by gender, age, and status within a community.

- *Practices.* Based on their ecological knowledge, communities often develop social norms that lead to sustainable uses of the ecosystems on which they depend. Traditional forest dwellers, for example, often develop systems for maintaining forest structure and function through selective harvesting of many tree species, and through managing forest gaps to allow the regeneration of certain early-successional species. Practices such as these—involving management of complex, dynamic systems—are quite sophisticated even by the standards of modern scientific ecological management. Traditional practices may help conserve rare species. They can also lead to local extinctions of species.

SIGNIFICANCE

The ecological knowledge of local communities is often ignored or underestimated by conservationists and governments. In other cases, it may be overestimated or exaggerated by some anthropologists or NGOs. Neither extreme is appropriate, and diverse views must be weighed with caution. Natural resources management imposed by national governments may ignore local knowledge and management systems, based on the assumption that traditional systems are unscientific, and incompatible with conservation. Local institutions that govern natural resources and rely primarily on locally available skills and materials may be more sustainable and cost-effective than introducing technologies and management systems from outside. More importantly, incorporating TEK into activities contributes to local empowerment, increases self-sufficiency, and strengthens self-determination. Incorporating TEK gives an activity legitimacy within the community, and allows the community to solve local problems with local ingenuity and resources.

Incorporating TEK into conservation has some limitations, of course. Local management systems may no longer be as functional and dynamic as in the past. A significant challenge to TEK is whether it can adapt to a rapidly globalizing world. While many local ecological practices have been sustainable in the past, they may no longer be adapting to changes such as increasing levels of use of natural resources driven by growing populations and links to external markets. As communities experience changes such as greater integration with market economies and labor migration to urban areas, some households may well become less dependent on local natural resources, and lose interest in, and commitment to, managing them sustainably.

KEY QUESTIONS

- **Does the activity *recognize, understand, and strengthen* local knowledge, conservation practices, and institutions for resource management?**

  Traditional ecological knowledge should be documented, evaluated, and used in managing natural resources where appropriate. TEK is usually transmitted through an oral tradition, including learning by doing, apprenticing with elders, observing, and experiencing. These processes of teaching, learning, and transmitting knowledge are critical components of TEK, where appropriate.

- **Does the activity *recognize key experts* of local ecological knowledge in the community?**

  Elders in a community often are the most accomplished practitioners and disseminators of TEK, although different members of a community may have different knowledge about different parts of the ecosystem. Women and men often have different experiences with the environment. Women may have more knowledge concerning medicinal plants, seed stocks, and small game, and may be best able to identify indicator species of ecosystem health, while men may have more knowledge of large mammals. Different groups within a community may have knowledge about different species—fishermen know about the fish they catch, hunters about the species they hunt, healers about the plants they collect for medicine.

- **Does the activity seek *mechanisms* that allow traditional and modern ecological knowledge to supplement each other?**

  TEK and modern scientific knowledge should be seen as complementary rather than competing kinds of knowledge. TEK can complement modern scientific knowledge by providing practical experience about living in a given ecosystem and responding to changes in it. Methods for involving local people and scientific resource managers in mutual learning should be supported whenever possible. The integration of traditional and modern science can strengthen participatory monitoring and adaptive management.

- **Does the activity take *knowledge ownership and intellectual property rights* into account?**

  Conservation programs must be sensitive to the issue of intellectual property rights over TEK. As the recognition of the importance of TEK has increased, so has the concern by local people that knowledge is taken from them and used without their awareness, or their "prior informed consent." When protected area management plans are developed, for example, local communities may be asked what resources they extract and from where. They may provide this information with the expectation, and often the reassurance, that it will be used to protect their rights to use the resources. Sometimes, however, the information may be used by external protected area managers to recommend restrictions on the use of resources without input from communities. All activities that incorporate TEK should have a plan for protecting that knowledge, respecting community wishes concerning its use and distribution, and for maintaining community control over their indigenous knowledge.

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12.0 SUSTAINABLE USE

KEY QUESTIONS

Are the ***many kinds of values and uses*** of biodiversity being adequately considered in the sustainable use of these resources?

Do stakeholders have ***incentives*** to use natural resources sustainably?

Is there ***agreement among stakeholders*** about sustainable levels of use?

Are there ***criteria of sustainability***, certification mechanisms, and monitoring instruments?

Do ***negative sanctions and enforcement*** mechanisms exist?

Is there a ***policy and legal framework*** to support sustainable use?

DEFINITION

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.

SIGNIFICANCE

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 Policy Statement on Sustainable Use of Wild Living Resources, 2000: http://www.iucn.org/themes/sustainableuse/policy/polstateng.html).

BRUCE BYERS, ARD, INC.

Community members, who have harvesting rights within the local national park, collect native grasses for thatching.

KEY QUESTIONS

- **Are the *many kinds of values and uses* of biodiversity being adequately considered in the sustainable use of these resources?**

  The term *sustainable use* is sometimes used to refer only to the ecological sustainability of 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 resources managers from taking a broader view of the many kinds of values and uses of biodiversity. Biodiversity includes many different elements or aspects (see Chapter 6, *Choosing Conservation Priorities*), and provides numerous products, services, benefits, and values. The use of a single species could probably not be called ecologically sustainable if the level of harvest by humans were so high that other, nonhuman species that also depended on the harvested species were threatened by that level of human use.

  Many conservationists are now realizing that the indirect, ecological services provided by ecosystems are one of the most valuable "uses" or benefits of biodiversity. 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, however, is often unknown or unmeasured. 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 aesthetic, 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 or seascape conversion for example, because of the mistaken perception that other land uses are more valuable. Therefore, a broad understanding of the values, uses, and benefits of biodiversity can help to justify its conservation.

- **Do stakeholders have *incentives* to use natural resources sustainably?**

  Sustainable use of natural resources 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 have the potential to be 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. 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.

  Markets can also create incentives to overharvest wild resources, however, so extra care must be taken to ensure sustainable harvest levels when wild products are marketed outside of the area where they are produced. Systems of monitoring and limiting harvest levels need to be established.

- **Is there *agreement among stakeholders about* sustainable levels of use?**

  Who sets the criteria used to determine sustainability? Sustainability has both an objective dimension derived from ecological science and a subjective dimension. Objectively, the supply of biological products and ecological services available for use is limited by the 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, for example, 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 all affected ecosystem components is essential to allow adaptive reductions or increases in harvest levels.

  On a more subjective level, socially determined "limits of acceptable change" have also 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 natural resources 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" in practice require considerable debate and negotiation among stakeholders as well as credible ecological information.

- **Are there *criteria of sustainability*, certification mechanisms, and monitoring instruments?**

  The Convention on International Trade in Endangered Species (CITES) (see Chapter 27, *International Treaties*) is the main international mechanism for monitoring and "certifying" the sustainable use of species that enter into international trade as 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. The following are a few general examples of the types of conditions forest certification frameworks may require: management meets all applicable laws; has legally established rights to harvest; respects indigenous rights; safeguards the environmental, social, and economic benefits of forests; protects biological diversity; has a written and implemented management plan; maintains high conservation value forests; and engages in regular monitoring.

  Some people are willing to pay more for goods that are produced sustainably and contribute to conserving biodiversity than for goods not produced in that way. Certification provides 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, sustainably harvested timber, and tourism. Certification has some potential to create a market niche in which sustainable products are financially viable. Significant barriers to certification still remain, however. In many markets, there is resistance to paying higher prices. In addition, certification only works effectively in countries with strong rule of law, enforcement mechanisms in place, and low levels of corruption.

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.

- **Do *negative sanctions and enforcement* mechanisms exist?**

  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 rewarding and motivating because the benefits exceed the costs, then conversely 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 harvest to ensure sustainability. Such community forest 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.

  Enforcement systems are only as strong as the weakest link in the enforcement chain (which includes detection, arrest, prosecution, and conviction). Despite common assumptions, poor enforcement is not always the result of too few enforcement agents and too few vehicles. While investing millions in agents and equipment may raise the probability of *detection* substantially, the impact of this improvement overall will be negligible if, for instance, prosecution rates continue to be very low. Investing resources to improve the rates of success of the weakest links in the system is more efficient, as it will yield a greater overall deterrent effect.

- **Is there a *policy and legal framework* to support sustainable use?**

  Sustainable use, like any other approach to biodiversity conservation, requires a supportive enabling environment (see Chapter 14, *Policy Development and Reform*). At the local and national scales, this means good governance, secure land and resource 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 that regulate trade in biotic products and help maintain incentives for conservation, such as the provisions on rights to genetic resources in the CBD or controls on trade in endangered species. 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.

SOURCES FOR MORE INFORMATION

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- World Conservation Union. Biodiversity Economics Site: http://www.biodiversityeconomics.org
- World Conservation Union. Sustainable Use Specialist Group: http://www.iucn.org/themes/ssc/susg/

INTEGRATED CONSERVATION AND DEVELOPMENT PROJECTS (ICDPS)

Although integrated conservation and development projects (ICDPs) can take many forms, they all link biodiversity conservation in and around protected areas to the socioeconomic development of human settlements in these areas. The ICDP activities may involve alternative income generation, such as from ecotourism or NTFPs; sustainable use of biological resources; CBNRM; and provision of education or health services. The objective in linking conservation and development activities is to reduce threats to protected areas by improving the well-being of local communities.

ICDPs were first initiated by conservation NGOs in the early 1980s. These programs were very popular and well funded by conservation organizations and development agencies. However, starting in the 1990s, the effectiveness of the ICDP approach was called into question. One of the shortcomings of the site based ICDP approach was its inability to address the influences of large scale, external political and economic forces on local communities and conservation. This was one of the many reasons why biodiversity conservation has moved toward a large scale, whole ecosystem approach, in which the larger context within which conservation takes place can more easily be seen and addressed. Although the term ICDP is not used frequently now, many conservation projects are still trying to link conservation with local development. Many lessons have been learned over the past 20 years about how to design better integrated conservation and development projects:

Make and identify clear links and causation between conservation and development activities.

Conduct threats analyses.

Design projects at multiple scales, rather than focusing exclusively on one level, such as the local level or ecosystem level.

Pay adequate attention to resolving internal conflicts and equity issues.

Invest sufficient resources in new technologies, institutional innovations, and markets that would reduce the tradeoffs between conservation and development objectives.

FOR MORE INFORMATION

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World Bank Group's information on ICDPs: http://lnweb18.worldbank.org/ESSD/envext.nsf/48ByDocName/ToolsIntegratedConservationDevelopmentProjects

12.1 FORESTRY

KEY QUESTIONS

What forest management activities could be incorporated into USAID mission programs to help sustain natural forest resources, conserve biodiversity, and yield economic benefits?

What are the most effective ways that USAID can help strengthen forest governance at the local level and support the devolution of authority for forest management to communities?

DEFINITION

Forestry is the science and practice of managing trees and forests to provide a diverse range of benefits. The sustainable management, use, and conservation of natural forest ecosystems to maintain their health, flows of timber and non-timber forest products, nonmaterial values and benefits and the ecological services they provide is the type of forestry that will be discussed here, as an example of the sustainable use of biodiversity.

SIGNIFICANCE

Many people, especially those in rural parts of the developing world, depend on forests for their livelihoods, deriving food, medicine, fuel, construction materials, and monetary income from forests. Forests are also important for their spiritual and aesthetic values and are central to the cultural identities of many indigenous peoples. Local forest communities often serve as stewards, preserving and protecting areas rich in biological diversity. In other cases, economic conditions, settlement patterns, cultural changes, or population dynamics can drive what may have been traditionally sustainable use patterns into overexploitation of key species or habitats. Many local economies depend on the sale of forest commodities, especially timber, for revenue. Healthy forests also provide critical ecological services of local, regional, and global significance, such as climate regulation, carbon sequestration, watershed protection, soil conservation, storage, and recycling of organic matter and mineral nutrients. These services are the results of ecological processes that depend on the resilience of the forest ecosystem which rely on the maintenance of biological diversity. There are clear linkages to the maintenance or loss of biological diversity and environmental services.

BRUCE BYERS, ARD, INC.

Community tree nursery for producing seedlings of native tree species for reforestation, Michoacan, Mexico.

The greatest threat to biological diversity, especially in tropical regions, is the loss of forest cover as forest lands are converted to other land uses, especially due to agricultural expansion and forest degradation. Poor governance; weak legal, judicial and institutional capacity; and poor national policies that fail to

promote sustainable use or promote agricultural or frontier expansion may subsidize forest conversion to other uses. Tropical forests, and the biodiversity they contain, are also being destroyed due to destructive conventional forest practices and the extraction of unsustainable volume of timber. Illegal logging activities and corruption further accelerate the destruction of many of the world's forests. But this pattern can be reversed and, if managed in an environmentally sound and socially and economically sustainable manner, forest ecosystems can provide many of the resource and environmental needs of today as well as those of future generations. A major challenge to protecting forests, the biological diversity they contain, and the environmental services they provide is the failure of the market to capture noncommercial values of forests.

Forest and biodiversity conservation is dependent on conserving forest species and ecosystems within protected areas, as well as the sustainable use of forests in managed or production forests outside of protected areas. In these forests, logging is perhaps the most important forestry activity that influences the sustainability of the forest management because of its direct and indirect environmental impacts. Depending on the intensity, logging can change the mosaic of habitat types, alter species distribution and forest turnover rates, change soil nutrient and moisture quality, and influence aquatic communities downstream. The greatest harm to biodiversity associated with logging, however, often results from the indirect effects of logging—human encroachment and forest conversion that are facilitated by easy access on logging roads.

As home to 70 percent of all terrestrial plants and animals, forests are critical to conserving biodiversity on a global scale. The sustainable management of natural forest resources, whether through the collection and marketing of NTFPs such as resins, rattan, or medicinal plants, or harvesting of timber products through reduced-low impact logging techniques, has the potential to support economic development both locally and nationally. This can be done while conserving and maintaining terrestrial biological diversity outside the boundaries of formal protected areas. However, efforts to maintain forest biodiversity existing outside protected areas—where the vast majority of the biodiversity is located—must be an integral component of a larger, landscape-level approach to biodiversity conservation and sustainable development.

KEY QUESTIONS

- **What forest management activities could be incorporated into USAID mission programs to help sustain natural forest resources, conserve biodiversity, and yield economic benefits?**

  The following are a few examples of sustainable forest management activities which, if well designed and adaptively managed, can yield both biodiversity conservation and income generation outcomes:

  - Foster public-private partnerships for the sustainable management of forest products (including timber and NTFPs);
  - Raise awareness and build capacity toward forest certification and certification of wood products;
  - Promote reduced impact logging in appropriate forest areas; and
  - Encourage the planting of indigenous species with market value on private or communal land, including timber and fuelwood plots.

  In Indonesia, USAID has catalyzed a groundbreaking public-private alliance to combat illegal logging, comprised of the U.S. government, the Government of Indonesia, international and local NGOS, research institutions, and over 17 private companies. These alliance partners work to:

  - Sustainably manage forests,
  - Track sources of wood, and
  - Link legal and sustainable wood producer groups to buyers (such as the Home Depot) and avoid forest destruction by building awareness among international banks and other financial institutions.

These activities have generated increasing incomes from sustainable forest products while conserving high biodiversity forests.

- **What are the most effective ways that USAID can help strengthen forest governance at the local level and support the devolution of authority for forest management to communities?**

  By supporting the strengthening of local institutions and systems to manage forest resources including indigenous land use systems which offer firm foundations for sustainable natural resources management and livelihoods, village institutions that are accountable and recognized by government and local decision-making institutions, communities can significantly improve their local governance and equitable access to forest resources.

  In Ecuador and Colombia, USAID supports activities to involve indigenous groups in designing management plans for forest reserves, certifying forests and forest products for increased market value, resolving land and resource tenure issues, integrating traditional subsistence activities with sustainable natural resources management practices, learning through exchange visits, and sharing best management practices. The results of these activities have strengthened conservation of biodiversity, enhanced local and indigenous capacity, and improved income levels in the region.

SOURCES FOR MORE INFORMATION

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- Food and Agriculture Organization. Forestry biodiversity: http://www.fao.org/biodiversity/Forests_eco_en.asp
- USAID. BOLFOR Project: http://bolfor.chemonics.net/
- USAID's Foreign Assistance Act Section 118 Report: Tropical Forests: http://www.usaid.gov/our_work/environment/forestry/index.html

12.2 NON-TIMBER FOREST PRODUCTS

KEY QUESTIONS

Is the NTFP harvest ***sustainable***?

Are NTFP enterprises appropriate and desired by local communities?

Are NTFP based enterprises developed using ***value chain*** analyses?

Have the ***appropriate investments*** been made to ensure the success of an enterprise activity?

What are the social ***implications*** of NTFP production?

Has certification of the NTFP been considered?

Has the NTFP enterprise been integrated with ***other economic activities***?

DEFINITION

The term "non-timber forest product" (NTFP) includes all biological materials other than wood that are extracted from forests for human use. This term is used here as the equivalent of "non-wood forest products." NTFPs include plant products such as fruits, tubers, roots, seeds, leaves, resins, fungi, and grasses such as bamboo; and animal products such as meat and skins, insects, and fish and aquatic invertebrates. NTFPs may be used for subsistence or as a source of income. They may provide a wide range of direct material uses, including for food, fiber, medicine, building materials, fuel, and cultural and religious objects.

SAFIA AGGARWAL, ARD, INC.

Sustainable menthol production from cultivated mint in the buffer zone area of Bardia Reserve, Terai, Nepal.

SIGNIFICANCE

It is estimated that 80 percent of the population of developing countries relies on NTFPs for their primary health and nutritional needs (FAO, 1995. see Web link below.). Many rural communities trade NTFPs in local, regional, and international markets, and in some forest communities, poorer households get a substantial part of their incomes from NTFPs. NTFP enterprises have the potential in some cases to diversify and improve local economies.

At least 150 NTFPs, including honey, gum arabic, rattan, bamboo, cork, nuts, mushrooms, resins, essential oils, and plant and animal parts for pharmaceutical products are important export commodities and are significant in international trade. Trade of NTFPs, particularly for pharmaceutical uses, may form a significant portion of regional, and at times the national economy, comparable in some countries to annual timber sales. However, despite their widespread use and importance, NTFPs have generally been considered as minor or specialty products and not included in regional or national forest planning.

Interest in NTFPs, like other kinds of sustainable use of biodiversity, has grown due to the increasing awareness of their potential role in biodiversity conservation and sustainable forest management. Managing forests for NTFPs can increase the long-term value of forests, and may provide a competitive alternative to other land uses such as timber harvest or agricultural production.

KEY QUESTIONS

- **Is the NTFP harvest *sustainable*?**

  Ensuring that harvest of NTFPs is sustainable for subsistence and commercial uses may be the greatest challenge. Sometimes little is known about the basic biology of an NTFP, such as basic information about its ecology, response to harvesting, or potential for domestication, semi-domestication, or silviculture. Practical, participatory, and cost-effective methods of estimating the potential harvest level and monitoring the response to harvesting should be developed (for more on sustainable use, see Chapter 12). Please note that activities that support the sustainable use of NTFPs are not necessarily biodiversity conservation under USAID's biodiversity code. All biodiversity conservation activities, in order to be attributed to the biodiversity earmark, must adhere to the biodiversity code and criteria, (for example, tight linkages between identified threats to biodiversity, and the proposed NTFP activity must be present).

- **Are NTPF enterprises appropriate and desired by local communities?**

  NTFP investments may improve community capacity, access to natural resources, and income levels. However, it is important to understand what forest uses the community wants over the long term, and to help them develop sustainable uses. NTFP-based enterprises, for example, sometimes are proposed because, unlike wood-based enterprises, they may not require a large investment in equipment. However, NTFP-based enterprises may fail because the low volumes produced at the community scale require "scaling up" to supply markets of sufficient size to support them.

- **Are NTFP-based enterprises developed using *value chain* analyses?**

  It is important to understand how the NTFP value chain operates, including production, collection, processing, storage, transport, marketing, and sales, in order to identify weak links in the commercial process. A market analysis must be carried out and a business plan developed to guide the enterprise. The rights, responsibilities, and returns should be clear for each actor in the chain. Rights should be clear and sufficient, responsibilities should be achievable and agreed upon, and returns must be sufficient to reward time and effort invested.

- **Have the *appropriate investments* been made to ensure the success of an enterprise activity?**

  Success of NTFP enterprises is dependent on access to markets, availability of labor and human resources, availability of money for investment, strength of institutions, and the bargaining power of groups involved in the NTFP enterprises. Enterprise activities often require a great deal of support to the local communities, individuals, or institutions involved, including microfinance schemes, assistance with transportation, and training.

- **What are the social *implications* of NTFP production?**

  The potential social impacts of an NTPF-based enterprise depend on who in the community gathers and processes the NTFP, how the resource is managed, and how the income is distributed. Women from poor households generally rely more on NTFPs for both subsistence use and income. An enterprise development activity may encourage additional members of the community to collect the NTFP, decreasing their availability to poorer households. Enterprise activities may also add to women's time burdens, since they are often the ones who harvest NTFPs, and NTFP-based enterprises may actually decrease women's incomes if men take over the enterprise.

- **Has certification of the NTFP been considered?**

  Various forms of certification are available for some NTFPs that can increase their market value in certain circumstances. Most accepted certification schemes include criteria focused on the environmental, and to some extent, social aspects of forest product harvest, and involve "chain-of-custody" tracking that follow a forest product through the value chain, from harvest, through processing or manufacturing steps, to marketing and point of sale. Organic certification focuses on production and processing stages for agricultural and agroforestry products, and sometimes NTFPs, as well as tracing products to ultimate point of sale. Fair trade certification focuses on fair compensation to the producers. Certification also increases producer costs, and will only increase market value if the market price is increased sufficiently to cover those costs.

- **Has the NTFP enterprise been integrated with *other economic activities*?**

  To be successful, NTFP enterprises must be integrated with other economic activities. If a community depends too much on one enterprise, they may lack resilience when a harvest fails or market demand decreases. These possibilities should be taken into account when designing the activity. One way to address this is to diversify enterprise activities to avoid excessive dependence on a single NTFP.

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- Rainforest Alliance. Sustainable Botanicals Initiative: http://www.rainforest-alliance.org/news/2002/news44.html
- Rainforest Alliance. Annotated Collection of Guidelines, Standards, and Regulations for Trade in Non-Timber Forest Products and Botanicals: http://www.rainforest-alliance.org/programs/forestry/trees/activities/botanicals-non-timber-products.html
- United Nations Environment Program/World Conservation Monitoring Center. What are NTFPs? http://www.ntfp.org/definition.html
- World Wildlife Fund. CARPE Program: http://www.worldwildlife.org/bsp/publications/africa/127/congo_10.html

12.3 AGROFORESTRY

DEFINITION

Agroforestry straddles the line between natural resources management and agriculture. Agroforestry systems usually combine native species with domesticated crops, including domesticated tree crops such as fruits, palms, and nuts. Domesticated and wild animals are usually involved in these complex ecosystems as well. Agroforestry systems range across a spectrum from those dominated by wild species, such as the forest gardens of traditional rainforest peoples, to those mainly dominated by domesticated or introduced species. Agroforestry encompasses a wide variety of practices, including intercropping of trees with field crops or grasses, planting of trees on field boundaries or irrigation dikes, multistory and multispecies forest gardens or home gardens, and cropping systems using bush or tree fallows.

SIGNIFICANCE

Traditional agroforestry ecosystems are areas that include high-value commercial annual and perennial crops with wild species of subsistence and commercial value. Many agroforestry systems in the tropics partially mimic the structure of the surrounding forest. The overall species diversity in traditional agroforestry systems tends to be high, sometimes higher than in other natural ecosystems nearby. In the latter case, this is often due to the maintenance of pioneer species, the extension of the range of native species, or the introduction of nonnative species. This type of farm or agroforestry diversity must be differentiated from *natural ecosystem diversity* and *biodiversity*.

Apart from its contributions to biodiversity conservation, agroforestry tends to be more ecologically sustainable than agriculture based only on annual crops, and also more economically profitable for farmers. However, pressure for greater productivity and profitability, caused by global market forces, is leading to the simplification of agroforestry systems, thereby reducing their species diversity. Promoting agroforestry on agricultural lands surrounding protected areas may benefit conservation in those areas. A word of caution, however; the profitability of some agroforestry systems can lead to incentives for increased conversion of natural forests, to the detriment of native biodiversity. Ideally, agroforestry can help to restore biodiversity to cleared forest lands, a form of afforestation or reforestation. Positive economic incentives for agroforesty, such as payments to farmers for the watershed protection afforded by forested land, or the elimination of subsidies for monocultures or cattle pastures, can help. In buffer zones of protected areas, management plans should ensure that agroforestry activities do not provide incentives for forest encroachment or degradation.

SOURCES FOR MORE INFORMATION

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- World Agroforestry Center: http://www.worldagroforestry.org/

12.4 FISHERIES

KEY QUESTIONS

How can the productivity of fisheries, both artisanal and commercial, be maintained or enhanced through investments in biodiversity conservation?

How can the design of biodiversity conservation activities contribute to fisheries management, food security, and good governance?

DEFINITION

Fisheries involve the sustainable use, management, and conservation of wild fish and other aquatic animal species and their natural marine or freshwater ecosystems to produce high-protein food for humans. Because they generally involve harvesting from wild, natural populations, fisheries are a form of sustainable use of biodiversity. Aquaculture, the agricultural form of producing and harvesting aquatic organisms, is discussed in Chapter 15.

SIGNIFICANCE

Fisheries, both marine and freshwater, make important contributions to food security and nutrition in many countries. Fishing provides livelihoods and income, and may serve as a last line against starvation when crops fail. In many rural coastal areas, people both farm and fish. However, fisheries management and protection of critical fish habitat often are not incorporated adequately into agricultural, water, and food security programs.

Marine fisheries account for 17 percent of the total annual animal protein consumed globally. In Indonesia, for example, 60 percent of the animal protein comes from fish. The net foreign exchange earnings for fishery commodities by developing countries reached nearly U.S. $18 billion in 2001. But 75 percent of fisheries' stocks are exploited at or above their maximum capacity and several have already collapsed due to overfishing. Improved fisheries governance is clearly needed.

Coastal ecosystems contain some of the planet's most biologically productive habitat, supporting a disproportional amount of economic output per unit of area, through fisheries and other productive activities. Over half of the world's population lives and works in a coastal strip just 200 kilometers wide, and a full two-thirds—four billion people—are found within 400 kilometers of a coast. The productivity of many coastal ecosystems is threatened by increasing population pressures, habitat degradation, destructive fishing practices, loss of critical fish habitat, and sedimentation from poor land use practices.

HANNAH FAIRBANK, USAID/EGAT/NRM/B

Fishing boat in Pucusana, Peru fleet.

KEY QUESTIONS

- **How can the productivity of fisheries, both artisanal and commercial, be maintained or enhanced through investments in biodiversity conservation?**

  One of the most effective approaches for maintaining or enhancing fisheries productivity is to maintain the ecosystem health of critical fisheries habitats. This can be maintained by creating ecological reserves where no fishing is allowed (also referred to as no-take areas). Ecological no-take reserves and/or multipurpose marine protected areas are especially effective coastal management approaches that can result in early and sustained management dividends. When critical feeding, nursery, and spawning sites are protected, ecological reserves can improve fishery yields and help build and maintain healthy fish populations. Reserves have also proven very effective in the conservation of marine biodiversity and the generation of jobs and revenue through tourism. Such tools, when coupled with ongoing education, enforcement, and sustained livelihood schemes, offer the best hope for reducing or eliminating stress on coral reefs and other marine habitats vital for productive fisheries.

  USAID technical and financial resources were used in Indonesia to establish the country's first marine protected area (MPA) in conjunction with the first District Integrated Coastal Management Plan and Provincial Coastal Law. USAID/Indonesia and the Government of Indonesia have found that MPAs are an invaluable tool to augment fisheries management, alternative livelihood, and coastal stewardship goals. At their request, scaling-up efforts have produced 29 MPAs involving 1,250 hectares of marine and mangrove areas. An evaluation has determined that these sites save over U.S. $430,000 annually from destructive coastal and marine resource extraction activities.

  The establishment of networks of MPAs is an especially critical strategy for maintaining resource productivity, enhancing resiliency, and ensuring protection of marine and coastal habitats. Through the Global Conservation Program, USAID is supporting efforts of partners to establish resilient, functionally connected networks of MPAs in several major regions of the world.

- **How can the design of biodiversity conservation activities contribute to fisheries management, food security, and good governance?**

  For coastal communities, fishery issues are a natural way to engage local communities in participatory, decision-making processes that can secure livelihoods, increase access to food, and empower self-reliance. USAID/Philippines is working to reverse declining fish populations and fish catches, and safeguard food security by advancing the practice of ecosystem-based fisheries management, while advancing sound coastal governance. Over the last 10 years, the Philippines has established a sound foundation for improved fisheries management; the adoption of coastal resource management (CRM) as a basic service by local government is the most recent benchmark of institutional awareness and capacity for managing marine and coastal ecosystems.

  The Fisheries for Improved Sustainable Harvest Project builds on this foundation and lessons learned from the Coastal Resources Management Project and other projects and programs to achieve the next crucial benchmark in managing fisheries and coastal resources in the Philippines. This benchmark calls for integrated fisheries management driven by informed, disciplined, and cooperative stakeholders at national and local levels of engagement. The project is expected to result in a 10 percent increase in fish stocks in four target implementation areas by 2010. To achieve this, national and local activities are undertaken to build capacity, improve the national policy framework, and develop an informed constituency for fisheries management.

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12.5 ECOTOURISM

KEY QUESTIONS

Have the potential social and ecological impacts of tourism been addressed in planning, and are they being monitored?

Is ecotourism part of a broader strategy for sustainable economic development in the community?

Who will benefit from ecotourism development?

Does the project include ***education*** and ***awareness raising*** components for communities and tourists?

DEFINITION

Ecotourism is defined as "responsible travel to natural areas that conserves the environment and improves the well-being of local people." (see http://www.ecotourism.org/index2.php?what-is-ecotourism).

BRUCE BYERS, ARD, INC.

Damaraland Camp, Namibia. This ecotourism operation is a joint venture between the Torra Conservancy, a community based wildlife conservancy, and a private tourism company.

SIGNIFICANCE

Ecotourism is a growing component of tourism, one of the largest growth sectors of the global economy, with increasing numbers of tourists seeking to visit remote areas with natural beauty and cultural uniqueness. Ecotourism is frequently promoted as a strategy for biodiversity conservation because it has the potential to generate revenues sustainably and create incentives for continued ecosystem conservation. It can, in some cases, be a more environmentally sustainable alternative to farming, logging, mining, or harvesting of wildlife. Care needs to be taken, however, as ecotourism activities can place a significant burden on local resources, particularly water and waste management services, and lead to degradation of the area if not implemented correctly.

KEY QUESTIONS

- **Have the potential social and ecological impacts of tourism been addressed in planning, and are they being monitored?**

  Ecotourism, as defined above, is tourism that is ecologically, culturally, and economically sensitive and sustainable. Nature-based tourism development, if it is not planned carefully, can have negative impacts on the biodiversity on which it depends. Development of roads, lodges, and other tourism infrastructure has led, in many cases, to habitat conversion and degradation of the ecosystems that attract tourists to being with. Increasing demand for energy and local natural resources from tourism, and the associated increase in waste and pollution, can create major environmental challenges. In

coastal areas, poorly planned tourism development has resulted in damage to coral from anchors, pollution from improper disposal of solid waste, and excessive use of fresh water.

Tourism development has also led, in many cases, to large influxes of people from surrounding areas seeking work in the tourism industry, and this can further increase demand for local resources. Tourism development, if not planned carefully, can also contribute to the erosion of local cultural traditions, affect access to natural resources, and reduce local quality of life. Given the potential negative ecological and social impacts of poorly planned tourism, it is important to anticipate adverse consequences, develop plans to address them, and monitor key social and ecological indicators as tourism develops.

- **Is ecotourism part of a broader strategy for sustainable economic development in the community?**

  Because tourism is often a seasonal business, and usually influenced by far-off political, social, and financial trends, too much reliance on it can actually result in greater hardships for local communities. Ecotourism initiatives should be designed as part of a broader strategy for sustainable economic development in the community.

- **Who will benefit from ecotourism development?**

  Benefits to local people from nature-based tourism have often been limited or nonexistent. In many places, tourism operations are owned and run by foreigners, and revenues go to these foreign investors, and to airlines and tour operators, providing few benefits to local communities. Revenues from this kind of tourism typically are not reinvested in the community or in conservation. This kind of tourism does not fit the definition of ecotourism given above.

  Economic benefits from ecotourism to local communities should be clearly linked to conservation of the biodiversity that draws the tourists. Local ownership and staffing should be encouraged and supported. Revenue-sharing mechanisms, such as tourism taxes and user fees, can be developed in order to ensure equitable sharing of the income from tourism. Some of the revenue generated from ecotourism may be put into collective benefits to the community such as water, community organizations, health, education, skills development, and training.

- **Does the project include *education and awareness-raising* components for communities and tourists?**

  Ecotourists are typically interested in learning about the ecology and culture of the region they are visiting. Interpretation and education programs should target all stakeholders, including the tourists themselves. Nature-oriented tourists generally want to minimize their impact on an area and help conserve. Tour operators, lodge owners, nature guides, local communities, and anyone participating in the industry should be aware of the environmental and socioeconomic impacts of tourism. Ecotourism should provide an opportunity for local people to share their local ecological knowledge with visitors, develop community pride, gain a broader perspective, and recognize the global value of their local biodiversity.

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- World Conservation Union. WCPA World Parks Congress, Tourism Components: http://www.iucn.org/themes/wcpa/wpc2003/english/outputs/tourism.htm
- World Tourism Organization: http://www.world-tourism.org

13.0 ENVIRONMENTAL COMMUNICATION

KEY QUESTIONS

Have ***stakeholders*** been clearly identified for environmental communication initiatives?

Is there an ***understanding of the motivations*** underlying environmental behavior?

Is the activity designed to ***influence motivations*** and ***build capacity***?

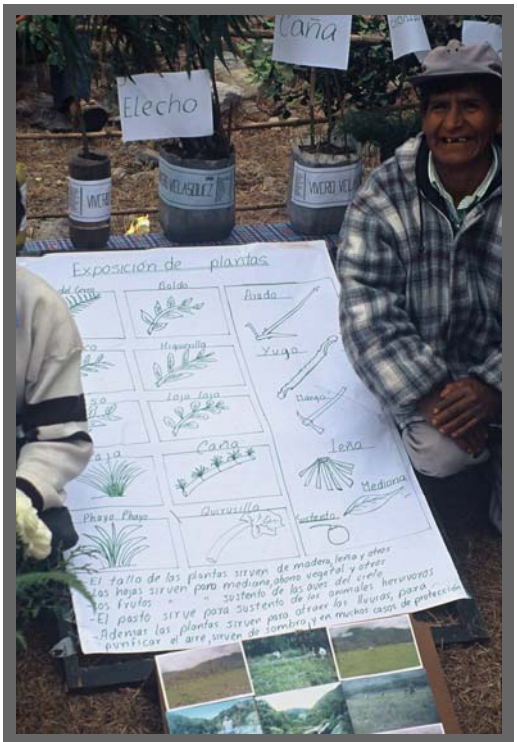
DEFINITION

In a broad sense, environmental communication includes any activities that provide people with the information, motivation, and capacity to enable them to act as environmental stewards and to conserve biodiversity.

SIGNIFICANCE

The objective of environmental communication is to foster environmentally sustainable behaviors with the following goals: (1) change current human behaviors and interactions with the natural environment; and (2) give people the background knowledge, awareness, motivation, and skills needed to make environmentally sustainable choices later. Accomplishing these goals requires much more than providing information about the environment. For example, the following activities build on and extend traditional types of communication in support of conservation: social marketing, outreach, and public relations techniques.

Key stakeholders should be involved in the design of environmental communication activities from the very beginning of the process. All are needed to help identify the actions and practices that threaten biodiversity and to learn about the motivations for those critical behaviors (see Chapter 4, *Involving Stakeholders*).



BRUCE BYERS, ARD, INC.

Poster showing uses of native plants and trees at an environmental education fair organized by Municipality of Tarija, Bolivia, with help from Prometa. USAID/Bolivia, together with TNC, have been working with Prometa to support biodiversity conservation, watershed protection, and sustainable livelihoods.

KEY QUESTIONS

- **Have *stakeholders* been clearly identified for environmental communication initiatives?**

  The appropriate stakeholders to involve in environmental communication activities are usually one or more subgroups within a community or population that impact biodiversity and whose behavior may be changed. These individuals may include members of a local community, a business or industry, or the government. By identifying the people or groups who engage in behaviors that impact biodiversity, activities that aim to change behavior can then be identified.

  Some education and outreach activities may be designed to raise awareness and provide knowledge about the environment to the general public. For example, traditional or formal environmental education may be designed for 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 addition to activities that aim to provide knowledge or change behavior, training programs are needed to provide a steady supply of conservation professionals, technicians, and practitioners. Wildlife management, forestry, and conservation biology programs at the university level contribute to a population's capacity to engage in effective conservation. Training initiatives for classroom teachers, ecotourism guides and interpreters, game guards, or plant collectors involved in biodiversity prospecting, for example, can also play a role in building a population with environmental literacy and a commitment sustainable stewardship.

- **Is there an *understanding of the motivations* underlying environmental behavior?**

  To develop activities that will influence behaviors that threaten biodiversity, it is necessary to understand what motivates those behaviors. What are the barriers to the adoption of more sustainable practices? Key factors that can determine the behaviors of target audiences can include knowledge, values, social norms, cultural factors, options, skills, economics, policies, and laws.

- **Is the activity designed to *influence motivations* and *build capacity*?**

  Once the key factors that motivate behaviors affecting biodiversity are identified, activities can be designed to influence those motivations and build capacity. For example, if stakeholders (e.g., government, industry, community) do not know that their 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 effective if lack of awareness and knowledge is the critical barrier to the adoption of new, biodiversity-friendly practices.

  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 Chapter 2, *The State and Importance of Biodiversity*). In the past, the concept of biodiversity has sometimes 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 have an understanding of the concept. Likewise, biodiversity is valuable for many reasons, some of which are not immediately apparent, (e.g., ecosystem services and nonmaterial values), therefore raising public awareness of the various values of biodiversity is critical. Unfortunately, lack of knowledge is often *not* the reason that people engage in activities that threaten biodiversity. For example, 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 or just may not care about the negative environmental impacts their behaviors are having.

USAID programs can make use of several kinds of activities that build on and extend more traditional types of education and communication tools in support of conservation, such as:

- *Social marketing:* This is the application of models and techniques derived from commercial marketing and from behavioral psychology to promote new behaviors. Social marketing has been used to promote healthier lifestyles (e.g., eliminate tobacco use, encourage better diets, promote less risky sexual behavior) and is being applied in some cases to promote changes in behaviors that threaten biodiversity. For example, media coverage of illegal logging and their impacts are being used in Indonesia to mobilize local communities to report illegal logging activities.
- *Outreach:* This usually refers to efforts to "reach out" to and enlist the support of other stakeholders for conservation activities.
- *Public relations:* This can be thought of as a special dimension of environmental 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.

PATRICK SMITH, USAID/NRM/B

A local TV crew interviews a boy scout during a media event at Lawachara National Park in Bangladesh. Organized by USAID's local partners, scouts went on a hike through the protected forest with a naturalist and then were interviewed by local media about their experience.

In addition, it is important to use environmental education approaches in concert with other strategies and interventions that may more directly address some of the key identified barriers to behavior change. For example, if lack of economic alternatives prevents people from conserving a biodiverse ecosystem, development of a compensation scheme for environmental services, coupled with increased awareness, may make behavioral change more appealing.

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- World Wildlife Fund: http://worldwildlife.org/windows/index.cfm

14.0 POLICY DEVELOPMENT AND REFORM

KEY QUESTIONS

Does the policy ***clarify management authority and responsibility***?

Does the policy ***resolve conflicts*** between traditional and modern management systems?

Does the policy ***have effective implementation and enforcement mechanisms***?

Does the policy ***link with economic policies*** through environmental accounting mechanisms?

DEFINITION

The policies, laws, and regulations of governments or other organizations provide the framework and 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 provide users of biotic resources and other biodiversity stakeholders with incentives to manage biodiversity sustainably.

SIGNIFICANCE

Conserving biodiversity requires a supportive policy environment which creates incentives for the conservation and stewardship of ecosystems and disincentives for their degradation.

ANDREAS H. MULJADI, THE NATURE CONSERVANCY INDONESIA, 2004

Raja Ampat, Limalas. Sago harvest is a main product from Papua. USAID supports TNC s work in marine conservation in this region.

There are many entry points for supporting policy development and reform. Some activities that could help create or change policies or laws that affect the conservation of biodiversity include:

- Developing national programs for the conservation and sustainable use of biological diversity, such as the National Biodiversity Strategies and Action Plans required for all parties to the Convention on Biological Diversity (this includes all USAID assisted countries except for East Timor and Iraq);
- Establishing national systems of protected areas;

- Modifying national income accounts so that they reflect the economic loss that results when biological resources are degraded and biodiversity is lost;
- Integrating biodiversity conservation into relevant sectoral and cross-sectoral plans, programs, and policies, including Poverty Reduction Strategy Papers (PRSPs);
- Identifying conflicts between laws and regulations affecting biodiversity, and harmonizing the laws and regulations through policy reform;
- Ensuring that policies concerning forests, marine, and freshwater ecosystems are compatible with biodiversity conservation (for example, reform forestry policies that encourage resource degradation and the conversion of forest ecosystems to other less valuable uses);
- Reforming agricultural policies that provide incentives for unsustainable agricultural practices and land conversion;
- Establishing mechanisms to respect and maintain the traditional ecological knowledge and practices of indigenous and local communities; and
- Managing living resources through new forms of community-state partnership and cooperation.

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—must be developed to fit local conditions. Stakeholders are more likely to support policies and laws for which they have been able to participate in an open and accountable policy development process. Where stakeholders do not have a role, or if some stakeholders can dominate the process at the expense of others, disputes are likely to occur.

Effective conservation requires a mosaic of land uses, management regimes, and sustainable levels of resource use. To create an enabling environment for conservation, the political and legal ties between these elements need to work together rather than against each other. Appropriate policies, laws, and regulations 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; and
- Management of coastal zones.

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

International treaties can encourage and motivate national policy development, reform, and implementation. National policies in turn, should support a country's international obligations under the conventions and treaties to which the country is a party (see Chapter 27, *International Treaties*). 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.

Some international treaties relevant to biodiversity conservation are:

- The Convention on International trade of Endangered Species (CITES) requires policies and laws regarding import/export control of specific threatened or look-alike species.
- The Convention on Biological Diversity (CBD) obligates parties to develop national action plans/strategies for the conservation and sustainable use of biological diversity.
- The Convention on Wetlands of International Importance, commonly referred to as the Ramsar Convention, requires parties who are to signatories to designate at least one national wetland for conservation.
- The United Nations Convention to Combat Desertification (UNCCD) requires developing country parties requesting assistance to develop national action plans to address land degradation and desertification.
- The United Nations Framework Convention on Climate Change (UNFCCC) also requires a national action plan. Many other international and regional treaties also require action by sovereign states.

KEY QUESTIONS

- **Does the policy *clarify management authority and responsibility*?**

  Understanding the chain of authority for managing biodiversity and natural resources in a given situation is key to creating policies and laws that support conservation. Clarifying management authority may be a first step in policy development or reform. Issues needing clarification may include land tenure, user rights (such as rights to harvest or use water, fish, trees, wild animals, or grazing lands), common property resources, privatization, and decentralization and devolution.

  Tenure refers to the authority, rights and responsibilities of using and managing property or resources. The individual, traditional or indigenous community, private entity, or government authority 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. Tenure can be complicated. For example, 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.

  Resources owned and managed in common, generally by a community, are sometimes called *common property* or *common pool resources*. Common property resources require appropriate rules to control use and access, and a strong community consensus about resource use in order to mitigate unsustainable harvesting from an unmanaged, unregulated commons (the so-called "tragedy of the commons.")

  Natural resources can also be owned and managed privately by individuals or corporations. *Privatization* of biodiversity resources may improve incentives for conservation under some circumstances, especially where private owners are willing to make investments to managing natural resources that a communal group may be unwilling to make. Privatization does not automatically lead to conservation and sustainable use, however—some private resource managers may have a short-term economic interest in "mining" a potentially renewable natural resource, converting it to private wealth, thereby destroying its option value for future generations.

  Concessions and leases are mechanisms for temporarily granting some level of private control over publicly owned land or biodiversity resources. These should be developed in a legal and transparent

way, and long-term sustainable management should be an objective. 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 tourism concessionaire may be reluctant to build a lodge unless the lease is long enough to allow cost recovery, or a logging concessionaire may be reluctant to build a network of roads if the lease is too short to allow road-building costs to be recovered from harvesting timber. On the other hand, short leases could lead to unsustainable harvests—the "cut and run" syndrome in logging, for example—unless there is adequate monitoring and enforcement of harvest levels and rates.

Increasingly, private companies are developing partnerships with local communities and local governments rather than just central government agencies. This is a result of increasing devolution of decision making to the local level.

Devolving management authority over resources to local governments or communities is an increasingly used policy reform aimed at improving local decision making, increasing economic opportunities, and promoting sustainable management of resources. As in 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. In practice however, many decentralization and devolution initiatives have occurred without transferring all relevant rights to the local decision makers. In other cases, devolution has resulted in appropriation of local decision-making powers. Appropriate decentralization and devolution initiatives need to carefully take into account what is being decentralized or devolved, as well as the resulting transfer of rights, responsibilities, and decision-making powers.

In addition, it is important to keep in mind that 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. Co-management (see Chapter 11, *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 and more capable in practice of actually assuming the responsibilities of decentralization. To the extent that they depend on higher levels of government for funding, their real authority may be reduced accordingly.

- **Does the policy *resolve conflicts* between traditional and modern management systems?**

Traditional land and resource tenure systems often exist alongside more recent legal and state-based systems. Although different stakeholders may view different systems as the most legitimate, the existence of more than one system does not necessarily imply conflict between them. The two systems sometimes operate in different places. For example, the state-based system might be dominant in urban areas, whereas traditional tenure systems may operate in rural areas. Where different stakeholders use different systems to make decisions about resource use in the same area, the conflict between systems can lead to unsustainable exploitation of resources.

Local residents, whether fishers, hunters, farmers, irrigators, or pastoralists, may have developed their own management systems (e.g., authorities, laws, rules, taboos) governing natural resources use. Traditional and locally crafted management systems are not likely to be uniform across even small areas, much less across a whole country. They represent the outcome of processes that reflect local scarcities, power relationships, personalities, and other factors. Attempts to build on them should be evaluated carefully, as this will 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 of 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.

- **Does the policy *have effective implementation and enforcement mechanisms*?**

  Changes in management authority through policy reform, new laws, or enforcement of laws not previously enforced may require communication campaigns (see Chapter 13, *Environmental Communication*). If people are not aware of policies and laws, or do not understand the reasons for them, the laws and policies may generate conflict and may 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 television programming 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 often find ways to ignore or subvert laws. On the other hand, stakeholders who understand and support laws contribute greatly to their application and enforcement. Co-enforcement systems that involve local stakeholders, such as the use of community forest or wildlife guards, are often effective when there is local support for policies, laws, and regulations.

- **Does the policy *link with economic policies* through environmental accounting mechanisms?**

  Linking conservation and economic policy through the use of environmental accounting mechanisms contributes 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 and environmental goals.

  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, which can in some cases far exceed market values of biodiverse systems. The components of the accounts that may be useful in a given country depend on its environmental concerns and the extent to which its economy depends on

natural resources. Environmental valuation analyses may be useful in some cases to help decision makers understand the extent of these values in general, and to influence specific policies or management approaches in particular.

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IV. CROSS-SECTORAL LINKAGES FOR BIODIVERSITY CONSERVATION

15.0 Agriculture

16.0 Biotechnology

17.0 Conflict

18.0 Conservation Enterprise Development

19.0 Democracy and Governance

20.0 Global Climate Change

21.0 Humanitarian Assistance and Disaster Response

22.0 Human Population and Health, including HIV/AIDS

23.0 Nonrenewable Extractive Industry: Energy and Mining

24.0 Urban Issues

25.0 Watersheds and Water Resources

DR. BRUCE MARCOT, US FORESTRY SERVICE

Buttress of an old growth tropical tree growing in the heart of the Congo River Basin, Equateur Province, Democratic Republic of the Congo.

CROSS-SECTORAL LINKAGES FOR BIODIVERSITY CONSERVATION

This section addresses ways in which biodiversity conservation is and can be linked, either programmatically or substantively, with other sectors in USAID's portfolio of development activities. Programmatic linkages describe mechanisms for connecting sectors within a program or activity, such as coordinating activities in the field. A health project and a conservation project may be working in the same geographic area and share resources and field staff, for example. Substantive linkages occur when sectors are conceptually linked. A watershed restoration project that was designed jointly by staff from the health and conservation sectors to integrate the provision of clean water and the conservation of forest biodiversity is an example of these types of linkages.

It is nearly impossible to be aware of every cross-sectoral activity that might affect biodiversity. Mission staff and biodiversity program managers should develop an awareness of the cross-sectoral linkages between biodiversity conservation and other sectors. They can then develop activities that address the linkages in order to achieve mutually beneficial results in each sector. They must prioritize, deciding which cross-sectoral linkages can be addressed, and create partnerships and activities to do so.

The following chapters give USAID mission staff and managers a place to begin considering cross-sectoral linkages and approaches for biodiversity conservation.

Each chapter provides:

- A description of some of the substantive linkages and dynamics between the sectors;
- Questions and issues that mission staff and other users of this Guide are advised to consider in the management, review, and design of cross-sectoral activities for biodiversity conservation;
- Examples of USAID-supported projects that have linked sectors; and
- Web resources for more information.

Important issues such as water resource management, poverty alleviation, and the mainstreaming of gender have been addressed in this section as crosscutting themes. These themes, because of their importance and pervasiveness, arise and should be addressed throughout and across multiple sectors. Water issues (aside from the Watershed/Water Resources section), for example, concern the urban sector (in the context of supply and sanitation), agriculture (irrigation and aquaculture), fisheries (habitat and quality), and so on. Similarly, gender and poverty come up in multiple sectors. Taking a cross-sectoral approach to biodiversity conservation allows for these central themes to be incorporated and addressed throughout conservation activities.

Please note: all USAID programs and activities should strive to be "biodiversity friendly" but may not qualify as biodiversity conservation within the Agency's biodiversity code (see USAID's *Definintion of Biodiversity Programs*). Further, some examples and programs presented in this section (and the Guide as a whole) are "biodiversity friendly," but would not necessarily qualify as biodiversity conservation within the Agency's biodiversity code *per se*. (For the most up-to-date information on the biodiversity code and definition, USAID employees may access the USAID Intranet).

15.0 AGRICULTURE

KEY QUESTIONS

What strategies can USAID managers use to increase agricultural production and also conserve biodiversity?

How can USAID staff support policies and build capacity to promote biodiversity conservation in conjunction with agricultural development?

How can rangeland management and pastoralism help to conserve biodiversity?

How can aquaculture help to conserve biodiversity?

What measures are being taken in the design and implementation of aquaculture operations to prevent or mitigate negative impacts on biodiversity?

The quadrupling of the world's population over the last century has in large part been fueled and supported by a constantly growing food supply, as well as advances in public health. According to the World Resources Institute: on average, food supplies are 24 percent higher per person than in 1961, and real prices of agricultural food products are 40 percent lower, although the distribution of this supply is highly unequal. Agriculture is currently the world's largest industry, employing over one billion people and generating over $1 trillion worth of food products annually. The same land that is occupied by farms and pastures also provides habitat and food for the majority of the world's plant and animal life. However, the rapid expansion of agricultural production over the last century has also had a profound negative effect on biodiversity globally.

Whether positive or negative, the interactions between agriculture and biodiversity occur along the four stages of the agricultural supply chain: from preproduction services (such as input and technology supply), to on-farm production, to processing and trade, and finally ending in the consumption of agricultural products. The following are a few examples of the negative impacts of agriculture on biodiversity at the production level of the supply chain:

- Millions of hectares of forests and natural vegetation have been cleared for agricultural use causing fragmentation of natural habitats and their populations of wild species into smaller units, rendering them vulnerable to extinction.
- Farmers often eliminate wild species from their lands to reduce the negative effects of pests, predators, and weeds.
- The misuse or overuse of agricultural inputs such nonorganic pesticides and fertilizers has poisoned water and soil and polluted coastal areas.
- As the largest user of freshwater globally, agricultural production puts an immense strain on water resources and causes water scarcity and damage to aquatic ecosystems in many places.

The complex and interconnected nature of agriculture on the world economy, human livelihoods, and biodiversity, makes agriculture one of the most important frontiers for conservation of ecosystems globally. Therefore the integration of agricultural development and conservation of wild biodiversity (through sustainable agribultural practices, ecoagriculture, agroforestry), building on ecoregional approaches to conservation (see Chapter 3, *Issues of Scale*) is increasingly important to both sustaining the well-being of human populations and the health of biodiverse ecosystems.

15.1 ECOAGRICULTURE

Healthy natural ecosystems and biodiversity that provide a range of ecological services are essential to agriculture. Insects, birds, and other animals play important roles both in pollination and pest control. Insects, bats, and birds are the principal pollinators of many fruit trees and major staple food crops such as potatoes, cassavas, yams, taro, beans, and coffee. Declining populations of pollinators and species responsible for seed distribution threaten both the yields of major food crops and the survival of wild plant species. In terms of increasing productivity, wild species of domesticated races and cultivars are increasingly important for out-crossing for disease- and pest-resistant crop variants. Action is needed to effectively conserve these species in their native habitats, as well as to conserve the variety of species that may be important in the future for food and/or medicine.

Ecoagriculture is "a framework that seeks to achieve improved livelihoods, conservation of biodiversity (genetic resources, ecosystem services, and wild flora and fauna), and sustainable production at the landscape scale" (from the Nairobi Declaration, see Web link below). It includes systems and practices that link production and biodiversity across landscapes, such as:

- Agroforestry production systems that integrate wild and domesticated plants and livestock (trees, shrubs, grasses, crops, etc.), and to the extent possible mimic the structure of natural vegetation and maintain ecological functions;
- Low external input and organic agriculture that emphasizes locally adapted methods;
- Reduction and management of agricultural input use and farm wastes to minimize off-farm pollution of aquatic ecosystems;
- Soil and water conservation;
- Taking the needs of local farming, pastoralist, and forest communities into account when planning and implementing biodiversity conservation activities in rural landscapes;
- Use of unfarmed areas, forest mosaics and wetland ecosystems to develop habitat networks and connectivity that support or expand the range of wild species, including those with migratory patterns;
- Reduction or reverse conversion of wild lands to production agriculture, agroforestry, forestry, or aquaculture by sustainably increasing the productivity of land already under use; and
- Placement of protected areas within the process of landscape planning and implementation, enabling the livelihood, biodiversity conservation, and economic benefits to be articulated and realized.

KEY QUESTIONS, ISSUES, AND EXAMPLES

- **What strategies can USAID managers use to increase agricultural production and also conserve biodiversity?**

  Designing and implementing programs and activities using ecoagricultural techniques, agroforestry, organic agriculture, certification programs, and cleaner production at all levels of the food supply chain can all create synergies that both improve agricultural production and help to conserve biodiversity.

  "Shade coffee" is grown under the shade of the canopy of native trees, which provide a habitat for plants, birds, mammals, and insects. It is a traditional practice of small farmers. "Sun coffee" or large-scale industrial coffee production involves cutting down the original forest and planting a monoculture of coffee trees, and using pesticides and other agricultural inputs to boost yields. USAID has helped support shade coffee farming through the Finance Alliance for Sustainable Trade (FAST) program, which creates partnerships among U.S.-based alternative lenders; socially responsible importers and roasters; and organizations that run independent, ecolabeling programs, and social audits, such as Fair Trade certification. In 2003, FAST helped 29 trade credit facilities in Latin America, including more than $5.7 million in trade credit to 18 different coffee farmer organizations. The program helped more than 4,000 small farmers improve their livelihoods while benefiting biodiversity. A coffee grower organization in Guatemala launched a regional reforestation program focused on coffee shade farming, and an increasing number of farmers in Costa Rica have switched to growing organic coffee and shade coffee, particularly in high biodiversity habitats.

- **How can USAID staff support policies and build capacity to promote biodiversity conservation in conjunction with agricultural development?**

  Agricultural activities, such as the development of farmers groups for sustainable farming practices, community engagement with extension agencies, and the participation of farmers in farmer field schools can strengthen capacity to conserve biodiversity and to sustainably increase agricultural production and farm income. USAID staff can also support the creation of agricultural and biodiversity policy that aims to conserve biodiversity while improving agricultural practices and production. Economic and policy incentives can also be powerful tools for farmers to conserve biodiversity.

  In East Timor, USAID is helping to build the capacity to farm in ways that help to conserve biodiversity through a collaborative program that brings innovative techniques to East Timor's farmers. The University of Hawaii and the U.S.-based National Cooperative Business Association (NCBA) have joined forces to establish tree seedling production, develop improved farming practices, and provide research and extension training on sustainable farming practices for workers and farmers. NCBA supports Cooperativa Cafe Timor (CCT), East Timor's largest cooperative organization and producer of coffee. CCT is also involved in expanding vanilla production and improving cattle-raising skills. It has a membership of more than 20,000 farm families. To support its agricultural activities, CCT runs a seedling nursery in Dili that can produce up to a million seedlings each year. Seedlings include shade trees for coffee, host trees for vanilla vines, and fodder trees for cattle.

SOURCES FOR MORE INFORMATION

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- World Bank Global Workshop on Sustainable Fisheries. June 2004: http://lnweb18.worldbank.org/ESSD/ardext.nsf/11ByDocName/NewsEventsEventsGlobalWorkshoponSustainableFisheries
- World Resources Institute. Linking Biodiversity and Agriculture: Agrobiodiversity as a basis for production and survival: http://pubs.wri.org/pubs_description.cfm?PubID=2633

15.2 RANGELAND MANAGEMENT AND PASTORALISM

Pastoralism is a form of agriculture that involves grazing livestock, such as cattle, sheep, goats, camels, llamas, or reindeer. This ancient agricultural practice is especially suited to the grassland ecosystems of Earth, and takes advantage of native grasses as the base of a productive food chain that supports humans.

Managed and pastoral grazing lands are ideal habitats to link sound grassland management, improved livestock production and effective conservation of wildlife habitat. Managing for sustainable stocking rates and reliable access to markets can lead to improved grassland health and reductions in livestock-wildlife conflict. Improved grazing systems can also lead to increased wildlife populations.

KEY QUESTIONS, ISSUES, AND EXAMPLES

- **How can rangeland management and pastoralism help to conserve biodiversity?**

  Mobile pastoral people are increasingly marginalized in developing economies, yet their nomadic systems are often based on a wealth of traditional ecological knowledge and are often well adapted to dryland ecosystems in many parts of the world, from the Andes, to eastern and southern Africa, to Central Asia. Communal tenure regimes are often in conflict with other types of tenure that have developed in nonmobile farming communities. Opportunities exist in many places where USAID works to support the synergies between traditional pastoral systems and conservation of biodiversity.

BRUCE BYERS, ARD, INC.

Prometa, a Bolivian NGO, is supporting llama herding in the Reserva de Sama. Llamas, indigenous livestock of Andean alriplano, have a lower impact on vegetation than sheep, which were promoted by Spanish colonists.

  In East Africa, USAID support to the African Wildlife Foundation has worked with Maasai communities in the Maasai Steppe Heartland. These pastoralists live in areas surrounding famous wildlife parks such as Amboseli and Masai Mara in Kenya; and Tarangire, Lake Manyara, and Serengeti National Parks in Tanzania. They also live within the Ngorongoro Conservation Area adjacent to the Serengeti in Tanzania, sharing it with wildlife.

SOURCES FOR MORE INFORMATION

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- International Center for Integrated Mountain Development. Rangeland Management in the Hindu Kush Himalayas: http://www.icimod.org.np/focus/rangelands/range_toc.htm
- World Alliance on Mobile Indigenous Peoples. Briefing Notes on Mobile Peoples and Conservation: http://www.cenesta.org/projects/Pastoralism/WAMIP%20Briefing%20Notes%20on%20Mobile%20Peoples%20and%20Conservation.pdf
- World Conservation Union. Dana Declaration on Mobile Peoples and Conservation: http://www.iucn.org/themes/ceesp/dana.htm
- World Parks Congress Recommendation 27: Mobile Indigenous Peoples and Conservation: http://www.iucn.org/themes/wcpa/wpc2003/pdfs/outputs/recommendations/approved/english/html/r27.htm

15.3 AQUACULTURE

Aquaculture is the production of aquatic organisms (fish, crustaceans, mollusks, seaweeds, etc.) under controlled conditions for all or part of their lifecycle, and is thus a type of agriculture. Freshwater fish farms, seaweed farms and shrimp farms are some examples of aquaculture systems. Aquaculture that occurs in coastal and marine waters is referred to as mariculture. Aquaculture is one of the fastest growing food production sectors globally and now accounts for one-third of all fishery products (fish, crustaceans, mollusks, aquatic plants) consumed by volume. This trend is due in part to the growing global scarcity of wild fish stocks and the resulting increased restrictions on the harvest of many marine species combined with the increased global demand for freshwater and marine fisheries products. Despite its potentially crucial role in the reduction of overexploitation of natural fish stocks and improving food security in tropical and subtropical regions, aquaculture has had some significant negative impacts on biodiversity and local environments, including the destruction of coastal mangrove forests to make way for ponds, pollution of local water ways, introduction of exotic fish species, and its intensive use of natural resources inputs (e.g., fishmeal for use in aquaculture feeds). These impacts are most prevalent for intensive aquaculture systems such as those used in the production of salmon and shrimp. The vast majority of aquaculture systems, especially freshwater systems that account for about 60 percent of global aquaculture production, have had minimal environmental impacts. Through recent innovations and improvements in production technologies, aquaculture is increasingly being implemented in ways that minimize negative impacts on biodiversity and the local environment, while producing fish protein for local use and international trade as well as taking pressure off of local ecosystems.

KEY QUESTIONS, ISSUES, AND EXAMPLES

- **How can aquaculture help to conserve biodiversity?**

  Depending on the location of the activity and local markets, aquaculture may have the effect of offsetting the demand for wild fish stocks, thereby taking pressure off these populations and contributing to the conservation of marine and freshwater biodiversity. This is especially true when native species that have high local market demands are cultured. Also, aquaculture systems can be use to produce fish to replenish overexploited fish stocks—especially in ponds, lakes and rivers.

  In Indonesia, USAID, in collaboration 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.

- **What measures are being taken in the design and implementation of aquaculture operations to prevent or mitigate negative impacts on biodiversity?**

  The location of the aquaculture ponds as well as the species of fish cultivated (native vs. nonnative), the health of the fish stock, the type and volume of feed resources used, and the design of water and waste cycling systems all have important impacts on biodiversity. The choice of culture species is also critical. For example, fish species such as carp and tilapia that feed low on the food chain require much less in the way of nutrient inputs (feeds) and chemicals than do species that are higher up on the food chain such as salmon. Great care must be taken with raising nonnative species, however. For example, there are many cases in which nonnative tilapia have escaped from aquaculture ponds into natural aquatic systems and caused local extinctions of native fish species and therefore negatively impacting biodiversity.

  The following are examples of cross-sectoral efforts to reduce negative impacts of aquaculture on biodiversity:

- Making freshwater aquaculture part of an integrated agriculture system (e.g., rearing fish in rice paddies, etc.), thus intensifying food production in existing areas and possibly taking pressure off of local biodiversity;
- Reusing "fertilized water" from fish ponds on fields as nutrient enrichment for crops;
- Breeding native fish species for the dual purpose of stocking aquaculture systems as well as for replenishing overexploited fish stocks—especially in ponds, lakes, and rivers;
- Producing and capturing biogas from the waste materials produced during fish processing for use as a low-cost source of energy; and
- Locating fish ponds on the edges of wetlands, rather than in the middle of wetlands, through incentive programs with aquafarmers.

SOURCES FOR MORE INFORMATION

- Aquaculture Collaborative Research Support Program: http://pdacrsp.oregonstate.edu
- Network of Aquaculture Centers in Asia-Pacific: http://www.enaca.org/
- U.S. Department of Agriculture. Economic Research Service, Aquaculture Briefing Document: http://www.ers.usda.gov/Briefing/Aquaculture/
- World Fish Center: http://www.worldfishcenter.org

16.0 BIOTECHNOLOGY

KEY QUESTIONS

What are the potential benefits of biotechnology to biodiversity conservation?

What are the potential risks to biodiversity conservation of biotechnology?

What measures can be taken to reduce the risks of biotechnology to biodiversity?

USAID supports biotechnology as a tool to improve agricultural productivity and nutrition in developing countries. Modern biotechnology encompasses a range of tools, from the use of molecular markers to enhance traditional breeding, to disease diagnostics, to development of genetically engineered (or "bioengineered") crops and livestock vaccines. Bioengineered crops with enhanced pest or disease resistance, tolerance to certain herbicides, or improved micronutrient quality are being developed or are already in production. These technologies are being developed by both the private sector and by public research institutions around the world. As with all agricultural interventions, there is a tradeoff between agricultural improvements brought about through bioengineering and environmental sustainability. Currently a rich dialogue is ongoing between scientists, policymakers, and the agricultural sector on the risks and benefits of biotechnology. Despite potential risks of biotechnology to biodiversity, some studies and experience have demonstrated potential environmental benefits to biodiversity of bioengineered crops. As developing countries develop and adopt these technologies, USAID can facilitate risk assessment and the safe and effective application of biotechnology.

KEY QUESTIONS, ISSUES AND EXAMPLES

- **What are the potential benefits of biotechnology to biodiversity conservation?**

  Biotechnology can be a tool to decrease the impact of current agricultural practices on biodiversity and as a tool to directly study natural plant and animal biodiversity outside of agriculture. In the broadest context, increasing agricultural productivity on existing lands (intensification) may reduce pressures to convert additional habitats to crop or livestock production. Crops engineered to be insect or disease-resistant can reduce the use of pesticides, sometimes very dramatically, and this could have direct benefits to wild species.

  An example of this technology, which is currently being used in developing countries, is insect-resistant cotton (called Bt, for *Bacillus thuringiensis*, the bacterial source of the gene). Decreased pesticide use reduces the impact on nontarget insects present in those agro-ecosystems, and decreases pesticide runoff into watersheds. Some herbicide-tolerant traits engineered into crops like cotton, soybean, and corn facilitate the use of reduced or "conservation" tillage practices. Reduced soil tillage improves the soil productivity by increasing biomass in the soil while decreasing soil erosion and siltation of local water resources.

  In addition to the benefits from integration of biotechnology into agriculture, the tools of molecular biology can enhance our characterization and monitoring of native biodiversity. For example, one can look at the genetic diversity of a particular plant or animal species as a means to describe species in greater detail, to track migration or breeding between populations, or understand the genetic health of

a very limited breeding population. Biotechnology has recently been used to monitor elephant populations in Africa in order to track illegal trade in ivory.

- **What are the potential risks to biodiversity conservation of biotechnology?**

  The potential risks posed by biotechnology to biodiversity must be evaluated and assessed on a case-by-case basis; evaluating the risk for each technology for each ecosystem. In general, bioengineered crops do not change the inherent nature of the plant, but add one or two very discrete traits. The regulatory system to support this type of risk assessment, referred to as biosafety, is discussed below. The types of risks to biodiversity of biotechnology fall into the following categories:

  – Risk of interbreeding of crop plants to wild relatives (out-crossing) in regions, known as "centers of origin" or "centers of diversity," where the crop was originally domesticated thousands of years ago. Out-crossing can only occur with closely related plants, so, for example, maize does not pose a risk of out-crossing to native plants in Africa, but sorghum does. Out-crossing is a risk to biodiversity when the trait that was engineered into the plant increases the weediness—the tendency to exist in nonnative environments or act as an invasive species—of native relatives, thus affecting the prevalence or competitiveness of those native plants in ecosystems.
  – Risk that the bioengineered trait will affect nontarget organisms or have other unintended effects on ecosystem dynamics. The most common of these concerns is the impact of a pest-resistance trait on insects that are not pests. Most pest-resistance genes being deployed to date are specific only to a narrow range of insects and cannot harm other animal species directly. Other types of unintended effects might be potential shifts in insect populations, or species that feed on insects, due to reduced target pest insects, or secondary changes in ecosystems dues to changes in agricultural practices such as reduced pesticide use and tillage practices. For crops engineered for increased nutritional content, potential impacts on biodiversity are not yet known.
  – Risks that genetic material identified and isolated from local flora or fauna from developing countries will be commercialized and patented in developed countries without benefiting the genetic material's source country.
  – Risk that pest insects can develop resistance to the trait engineered into insect-resistant crops, thus diminishing the efficacy of the insect-resistant crop. There are implications for biodiversity if diminished efficacy results in increased use of conventional insecticides.

- **What measures can be taken to reduce the risks of biotechnology to biodiversity?**

  USAID currently supports three types of programs and actions to mitigate the potential risks of agricultural biotechnology research and crop production on biodiversity. These are consistent with a new international environmental agreement, the Cartagena Protocol on Biosafety, which regulates the transboundary movement of some types of bioengineered products. The Cartagena Protocol falls under the Convention on Biological Diversity (see Chapter 27, *International Treaties*). While the U.S. is not a party to the Cartagena Protocol, many of our client countries are; thus this agreement is taken into account in our technical assistance efforts.

  Research: Environmental research to understand risks to biodiversity and support science-based risk assessment. EGAT/ESP and EGAT/NRM oversee the Biotechnology and Biodiversity Interface competitive grants program which makes annual research grants in this area. A sample of current grants include research on the potential risks of growth-enhanced tilapia to native fish in Thailand, bioengineered rice in Asia to native biodiversity, out-crossing of bioengineered sorghum to native grasses in Africa, bioengineered maize to nontarget species in Africa, and bioengineered maize to soil microbes in Colombia.

Biosafety Capacity Building: EGAT and USAID missions in about a dozen countries worldwide support development of biosafety systems to assess and regulate the risks of biotechnology to the environment and human health. The types of assistance include regulatory policy development, outreach to the public and other stakeholders, and training in risk assessment and other technical areas of regulatory implementation.

USAID Environmental Review: In addition to building host-country capacity to effectively regulate the risks of biotechnology, USAID policy requires the review of potential environmental risks under Regulation 216. To implement this policy with respect to research programs that involved development of bioengineered crops or vaccines, USAID requires an independent biosafety review before any products are tested in the field or other direct environmental release. A new ADS policy is being finalized. For further information, missions should contact USAID Washington's ESP Office in the EGAT Bureau.

SOURCES FOR MORE INFORMATION

- AgBios—a partner of USAID in biosafety development: http://www.agbios.com/main.php
- Biotechnology Union of Concerned Scientists: Food and Environment: http://www.ucsusa.org/food_and_environment/biotechnology/index.cfm
- Braun, Richard and Klaus Ammann. Biodiversity: The Impact of Biotechnology: http://www.botanischergarten.ch/EFB/UNESCO-Biodiv-Biotech-Final.pdf
- Ecological Society of America: http://www.esa.org/pao/esaPositions/Papers/geo_position.htm
- European Commission environmental research: http://europa.eu.int/comm/research/quality-of-life/gmo
- International Council for Science. National Studies on Biotechnology: http://www.icsu.org/1_icsuinscience/GMO/html/national_studies.htm
- The Royal Society (UK). Genetic modification of plants: http://www.royalsoc.ac.uk/landing.asp?id=1216
- U.S. biotechnology regulations: http://usbiotechreg.nbii.gov/

17.0 CONFLICT

KEY QUESTIONS

How does the design of biodiversity conservation activities affect the possibility of conflict in the program area?

In areas of violent conflict, are the negative effects of conflict on natural resources and biodiversity being taken into account in planning activities?

How do policies and laws in other development sectors affect natural resources conflicts in the program area?

The high economic value of biodiversity (such as tropical timber) and the importance of biodiverse ecosystems to local livelihoods often places biodiversity at the center of violent conflict in the following ways: disputed access and increasing scarcity of valuable elements of biodiversity as the catalyst for conflict, the exploitation of elements of biodiversity to finance violent conflict, and the degradation of biodiversity as an impact of war and violent conflict.

The lack of *good governance*, just law enforcement, and security of tenure often leads to competition and conflict over access and rights to biodiversity. For example, local communities may have resource and biodiversity management traditions but insecure tenure. External pressure on local resources (exerted by elites, loggers, migrants, etc.) may force communities into violence in defense of their resource rights. These conflicts have the potential to arise within, as well as between communities. Further, the increasing ***scarcity*** of vital natural resources and biodiversity enhances competition for access to resources, exacerbating conflict. Empowering communities to manage and uphold access rights, develop better institutions and systems of resource governance, and minimize corruption will both minimize conflict and conserve biodiversity.

JAMES JARME, ARD, INC.

Villagers in Porsea protest the reopening of the *PT Toba Pulp Lestari* mill in North Sumatra. The mill has taken land to grow plantations and is simultaneously responsible for widespread clearance of natural forests.

The unsustainable exploitation of biodiversity to *finance violent conflict operations* has degraded ecosystems around the world, especially in parts of both Africa and Asia. For example in Liberia, the warlord President Charles Taylor clearly exploited both diamonds and timber (sometimes referred to as "conflict timber") to finance his military operations domestically. In this case, the dynamics between biodiversity and violent conflict have clear negative

impacts on local populations (for example the migration of communities to Guinea to escape local violence, etc.) and ecosystems (the unsustainable, unjust exploitation of biodiversity resources).

KEY QUESTIONS, ISSUES AND EXAMPLES

- **How does the design of biodiversity conservation activities affect the possibility of conflict in the program area?**

  Biodiversity conservation and natural resources management activities in some cases may address the allocation of access to resources. The manner and process through which this occurs may either ***increase*** or ***mitigate*** the possibility of conflict in the area. Ultimately though, biodiversity conservation activities should encourage the equitable and sustainable utilization and conservation of biodiversity resources.

  In the Terai region of Nepal, the establishment of the Royal Chitwan National Park in 1973 led to considerable conflict and marginalization of local populations since the park was established and managed by the central government and military with little input from or regard for local populations resource needs. Over the last three decades these conflicts have been addressed in part through legislation allowing for decentralized, local management by forest user groups of forests in the buffer zone surrounding the park. USAID has supported conservation and community development efforts aimed at decreasing conflict, meeting communities' social and economic development needs, while conserving sensitive biodiversity in the Terai region.

- **In areas of violent conflict, are the negative effects of conflict on natural resources and biodiversity being taken into account in planning activities?**

  Conflict can break down established institutions of ecosystem protection (functioning biodiversity conservation organizations, law enforcement, military support, protected area management) by diverting attention, resources, transportation, and information systems in an area away from biodiversity conservation. Violent conflict can also cause the movement of populations into remote areas/ecosystems therefore increasing the exploitation of biodiversity in those sensitive regions.

  On a macro-policy level, 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. On a regional level, the use of environmental information, such as locations of protected areas and areas of high biodiversity, can inform the siting of refugee camps in areas which will have limited negative impacts on local ecosystems.

- **How do policies and laws in other development sectors affect natural resources conflicts in the program area?**

  Policies and laws intended to improve socioeconomic development or resource governance, for instance, have the potential to result in increased conflict. For example, they may take land or traditional use rights to natural resources away from already marginalized groups, or create conflicts between a country and its neighbors over shared, transboundary natural resources, or between national-level and local-level stakeholders with different interests.

  In Indonesia, the rapid devolution of rights to forest resources to the district level has "fragmented command and control over the country without creating meaningful opportunities for stable, democratic self-governance," (ARD, Inc., Conflict Timber, Volume II, May 2003, Web link given below) leading to unequal and uncoordinated control of forest resources throughout the country. Newly devolved power over natural resources has also been abused by corrupt politicians at the local level.

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18.0 CONSERVATION ENTERPRISE DEVELOPMENT

KEY QUESTIONS

What issues should be considered during product development and the business management of conservation enterprises?

What kinds of products could form the basis for enterprises serving local, national, and international markets?

Are there opportunities to support the development of such enterprises with business management and financial assistance?

Sustained economic growth and development depends on a healthy environment, and therefore the management and conservation of natural resources contribute to a country's prosperity. However, perverse incentives created by the short-term benefits of rapid economic growth, and the long-term costs of unsustainable natural resources management, have created a dynamic that continues to plague the economic development process. Short-term economic incentives have long motivated societies to unsustainably exploit natural resources. The same short-term economic incentives driving unsustainable resource exploitation can, however, also be used to motivate communities to conserve natural resources through sustainable enterprise development.

BOSNIA LAMP PROJECT. ARD, INC.

An employee at the Bosnian company, Mushroom, holds up an enormous wild mushroom. USAID s Linking Agricultural Markets to Producers project in Bosnia Herzegovina is helping to provide thousands of jobs to Bosnians and protect wild biodiversity as the country struggles to recover from conflict.

Biodiversity conservation should not occur at the expense of poor communities around the world. As the stewards of their local environment, rural communities can and should benefit from local biotic resources. The goals of economic development and biodiversity conservation can both be met when communities living in areas with important natural resources and biodiversity adopt income-generating activities that are compatible with and encourage biodiversity conservation. When communities benefit from biodiversity they are more likely to conserve, and sustainably manage it.

KEY QUESTIONS, ISSUES AND EXAMPLES

- **What issues should be considered during product development and the business management of conservation enterprises?**

  Market research and analysis is required to identify opportunities, from the demand side, for conservation-linked enterprises. Ecologically sustainable harvesting levels of any wild product upon which such enterprises will be based should also be determined, in order to understand any limitations of supply that might affect enterprise development. Without a viable market and yield analysis for these products or services, the long-term economic and ecological sustainability and benefits of these enterprises are highly unstable. Additionally, the strength of the linkage between an enterprise, and incentives for conservation can vary widely, and should be explicitly defined and considered during enterprise planning and development. Business ownership structure (e.g., cooperative, community-based, private, non-profit), as well as the size and scale of the enterprise, are important considerations for creating incentives for local communities. The ecological sustainability of the "product" is a fundamental issue since the economic sustainability ultimately rests on the ecological foundation of production, and conversely, the health of local ecosystems depend on sustainable resource use and management.

  Activities chosen as economic alternatives should provide sufficient revenues and take sufficient labor to actually replace environmentally destructive activities—otherwise there is a significant possibility that the activities may actually increase environmental degradation. For example, in the Philippines, a project promoted cashew production as an alternative to destructive fishery practices. However, producing cashews required only about one or two months of labor per year, and therefore did not provide the year-round employment or income needed to replace destructive fishing practices.

  In the Himalayan foothills of northern India, USAID has supported community-owned enterprises producing honey and silk which are helping to provide economic incentives for the conservation of natural forests. Honey is produced by bees that forage for nectar in natural forests, alpine meadows, and agricultural lands, and sold to pilgrims visiting famous Hindu shrines in the area. Tasar silkworms are a species raised on oak leaves harvested in natural forests. For both of these enterprises, community ownership was the most appropriate business structure—ownership of the companies lies with village institutions that have traditionally played a role in communal management of local forests. To ensure the ecological sustainability of silkworm production, a system is in place for monitoring the harvesting of oak leaves and its effect on forest regeneration.

- **What kinds of products could form the basis for enterprises serving local, national, and international markets?**

  There are a wide variety of products based on local biodiversity such as ecotourism, sustainable wood products, NTFPs, sustainable hunting, bioprospecting, and agroforestry products (e.g., shade-grown coffee). Product development is a critical step in creating conservation enterprises, and technical assistance may be needed, whether the products are tourism destinations and experiences; wood products; or non-wood natural products, such as foods, crafts, or medicines. Developing marketable products from some element(s) of biodiversity may also require inputs of technology or infrastructure. Value chain analyses can also help to ensure that a proposed conservation enterprise will bring benefits to poor, rural people; assisting them with their economic needs, and thereby providing economic incentives for conservation. This is especially important for products aimed at global markets where disparities of wealth and power between the producers and consumers are often vast.

In Sulawesi, Indonesia, the Bunaken National Marine Park has been successfully co-managed, with revenues being generated through fees charged to divers. Fees are divided up between the local community, park management, and local government with revenues over $75,000 in the first year.

- **Are there opportunities to support the development of such enterprises with business management and financial assistance?**

  In order to develop profitable and sustainable businesses, communities and small-scale entrepreneurs may need support in developing appropriate business ownership structures and in organizational development. Business management training can provide the skills needed to run a profitable business (e.g., licensing, accounting and bookkeeping, negotiating agreements, marketing). Conservation enterprises, especially if owned by communities or poor, rural entrepreneurs, may need assistance to find sources of finance and credit, sometimes even for very small amounts (e.g., microfinance, microcredit). These enterprises may also need support for training and human resources development.

  In Namibia, USAID has been supporting the development of community-based natural resources management since 1993 with its Living in a Finite Environment (LIFE) project. Through this project, communal-land conservancies with the right to manage wildlife on their land have been developed, and some of these have established conservation enterprises. For example, thanks to organizational, business, and human resources development supported through the LIFE project, the Torra Conservancy was able to negotiate an agreement with a large ecotourism company for the operation of a luxury-tented lodge in the Namib Desert. This venture earned the conservancy more than U.S. $34,000 in 2003. The conservancy also earned $11,000 through the sale of wildlife to private game ranchers, and $14,000 for trophy hunting concessions. (For more information, see USAID/Namibia Natural Resources Management: Related News Stories, and Wilderness Damaraland Camp, Web links given below.)

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19.0 DEMOCRACY AND GOVERNANCE

KEY QUESTIONS

How can natural resources management and biodiversity conservation increase opportunities for democratic participation and empowerment of marginalized stakeholder groups, or NGOs that represent their interests?

Can decentralization of authority be advanced through support for local community access and secure rights to ecological resources?

What are the opportunities to better conserve biodiversity and natural resources by improving laws and policies, strengthening the rule of law, increasing transparency and accountability in government, and reducing corruption?

What are the opportunities to improve citizens' access to information and the media, and strengthen their ability to advocate for their views, through a focus on critical environmental problems and issues?

The linkages between governance, democracy, and biodiversity conservation are mutually reinforcing. Therefore, the governance of natural resources and biodiversity based on democratic decision-making processes and principles of participation, equity, and sustainability can support the long-term health of ecosystems and the communities that depend on them. Poor governance—demonstrated through a lack of key stakeholder participation, overcentralized authority, corrupt or weak capacities to implement environmental protections and benefit sharing, and illegal harvesting of valuable natural resources for a privileged few members of society—can subvert sustainable natural resources management and impede achievement of conservation and development goals. Likewise, unsustainable and inequitable use of natural resources and loss of biodiversity can work against the development of more democratic societies—for example, by fueling conflicts over scarce natural resources, and the inequitable distribution of these resources.

There are four essential elements of effective democratic governance to consider in biodiversity conservation programs: participation, decentralization, information advocacy, and policy law. Efforts to strengthen the voice of civil society and include traditionally disenfranchised or marginalized stakeholders (including women) in resource decision making generally improves the chances that conservation interventions will be accepted and sustained over the long term. With secure rights and access to land and other resources in place, local communities can more effectively partner in conservation and development programs. Improvements in public access to information about biodiversity, natural resources, and the environment allows people to more effectively manage and plan for a sustainable future. A suitable enabling environment, in the form of relevant environmental legislation, appropriate reforms, and accountable and transparent mechanisms for policymaking is necessary to ensure sustainable resources management over time.

KEY QUESTIONS, ISSUES AND EXAMPLES

- **How can natural resources management and biodiversity conservation increase opportunities for democratic participation and empowerment of marginalized stakeholder groups, or NGOs that represent their interests?**

  Participation by citizens and representation of their diverse interests within a pluralistic society are key characteristics of democratic governance. Participation and representation can lead to better, more sustainable decisions and can reduce conflicts. Because ecological resources and biodiversity are so important to people in developing countries—and often disproportionately important to the poorest and most marginalized groups—their use and management can provide entrée for increased participation and improved societal representation.

  In Bolivia, USAID and conservation partners such as the Wildlife Conservation Society are working with local indigenous populations to more effectively participate in resource management and decision making in areas surrounding Madidi National Park. After years of prolonged negotiation with the Bolivian government, over 325,000 hectares of Tacana communal lands were secured for local indigenous populations. USAID is helping the Tacana people to undertake participatory zoning processes, develop resource management plans and specific resource use regulations that they can self-monitor and enforce, and strengthening advocacy skills of indigenous peoples' organizations like CIPTA (*Consejo Indigena del Pueblo Tacana*) to participate in conservation and development planning at local and national levels. As a result of these activities, indigenous populations who have traditionally been marginalized from decision-making processes have a new role in determining how their local environment is managed and exploited. The Tacana experience has increasingly been touted as a model for local participation by the national government's protected area agency.

- **Can decentralization of authority be advanced through support for local community access and secure rights to ecological resources?**

  Highly centralized government authority sometimes can retard development because it may be less democratic, participatory, and representative of diverse perspectives of stakeholders; may be less flexible and innovative; and may be more prone to corruption and control by political or economic elites. The devolution of authority over natural resources such as forests, grazing lands, or wildlife to local communities or regional or local governments, can empower these groups. Decentralization, coupled with appropriate technical support and appropriate policies, can provide new sources of income from local ecological resources to meet local development needs, and give local governments and leaders experience in managing funds accountably and transparently. Local management and benefit sharing from biodiversity and natural resources is often an incentive for such resources to be managed sustainably. If decentralization occurs too quickly, however, without appropriate institutions, policies, and rule of law in place, and with high levels of local corruption, it can lead to severe environmental degradation, as seen in some areas of Indonesia.

  In the Philippines, through the Governance and Local Democracy Project, USAID helped devolve land tenure and extraction rights from the central government to local communities, improving the livelihood of local families while leading to the increased protection and improved management of 2.9 million hectares, including 50 percent of the Philippines' remaining forests. In one municipality, USAID support helped local authorities, and a 90-member committee representing all segments of the community, to develop a forest land use plan. The democratic processes used to develop the plan helped ensure its success. As community members began to feel like stakeholders, they began to report illegal logging, for example. With greater participation and increased control over local resources, community members have incentives for the protection and sustainable use of those resources.

- **What are the opportunities to better conserve biodiversity and natural resources by improving laws and policies, strengthening the rule of law, increasing transparency and accountability in government, and reducing corruption?**

  The conservation of biodiversity requires a supportive enabling environment of government policies and laws. Laws and policies to enable citizen participation in environmental decision making, decentralize the management of ecological resources, ensure access and the secure rights of indigenous communities to natural resources, provide safe and transparent channels for dispute resolution, and require assessments of environmental impacts and tradeoffs for infrastructure and other development projects are all important.

  Through support for analyses of the problems of illegal logging and "conflict timber" in Asia and Africa, USAID is linking rule of law, transparency and accountability, anticorruption activities, and other aspects of improved governance with sustainable management of forest resources and conservation of biodiversity.

- **What are the opportunities to improve citizens' access to information and the media, and strengthen their ability to advocate for their views, through a focus on critical environmental problems and issues?**

  Citizens and the organizations of civil society that represent them can not effectively participate, advocate their positions, or exert their influence on government without access to relevant information. Easy access to information and a media that can communicate this information broadly to citizens and civil society is necessary for making government accountable and transparent. Strengthening the advocacy, communications, and monitoring capacities of legitimate civil society organizations ensures a foundation for informed discussion about relevant conservation and environmental issues. Global Forest Watch is an organization that seeks to provide information to civil society to enable better advocacy for sustainable forest management and forest conservation. The USAID Central Africa Regional Program for the Environment (CARPE) has supported the work of Global Forest Watch in Central Africa.

  In Indonesia, USAID's GreenCOM project worked with NGOs on a large media campaign to educate the public about the urgent need to preserve the country's forests and natural heritage. GreenCOM staff held workshops for Indonesian journalists and other communications professionals on environmental reporting and strategic communication for social change. The goal of the campaign was to convince Indonesians that the country's forests belong to everyone, not just a privileged few. As an emerging Southeast Asian democracy, the Indonesian government has a duty to listen to its citizens' concerns about natural resources just as the citizens have a responsibility to advocate for the protection of the forests and the preservation of the country's rich biodiversity.

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20.0 GLOBAL CLIMATE CHANGE

KEY QUESTIONS

How can biodiversity conservation activities most successfully protect ecosystems in the face of global climate change?

How can biodiversity conservation activities help to mitigate global climate change?

A growing body of scientific evidence shows that growth in greenhouse gas emissions, including carbon dioxide (CO_2), is leading to an increase in average global temperatures and climactic variability, causing potentially dramatic changes to global climate systems and resultant impacts to terrestrial and aquatic ecosystems. As human populations and their economies, which are highly dependent on carbon-based fossil fuels continue to grow, emissions of greenhouse gases also rise. Since climate change affects the global environment, human populations, and economic development, the challenge to the global community is to sustain economic development while limiting the associated growth in greenhouse gas emissions.

THE NATURE CONSERVANCY

Coral reef, Wakatobi, S.E. Sulawesi, Indonesia.

Loss of biological diversity is one of many environmental impacts associated with changing climatic conditions. Past changes in the global climate have triggered massive shifts in the range of species and ecosystems. Today, scientists are reporting changes in species distribution, population sizes, ecological community composition, and plant productivity in ecosystems around the world. For example, coral reefs are bleaching, partly

due to elevated sea temperatures, and arctic permafrost is melting due to sustained increases in average annual temperature.

In addition to being affected by climate change, terrestrial and marine ecosystems that maintain biodiversity also play an important role in regulating the global climate. Through the process of photosynthesis, plants and trees in these ecosystems serve as a carbon "sink" by absorbing carbon dioxide from the atmosphere and storing it in their biomass and soils. USAID supports many activities related to biodiversity conservation and land use that contribute to offsetting emissions of greenhouse gasses and associated global climate change.

KEY QUESTIONS, ISSUES, AND EXAMPLES

- **How can biodiversity conservation activities most successfully protect ecosystems in the face of global climate change?**

  Conservation planners should incorporate the potential effects of regional impacts of climate change on biodiversity into conservation and land and water use planning, through such means as planning on a larger scale and incorporating multiple elevation zones and resilient areas of ecosystems into protected areas. Climate change has the potential to shift the range of a particular species as well as the distribution of entire ecosystems; therefore, traditional, strictly delineated protected areas may not be sufficient to conserve biodiversity in a changing climate.

  USAID supports the effective conservation and management of resilient networks of marine protected areas in several regions, including along the Meso-American Reef in Mexico and Central America; in Wakatobi National Park and Raja Ampat, Indonesia; and in Kimbe Bay, Papua New Guinea. Activities identify areas of coral reefs that are resilient and resistant to coral bleaching, with the intent of setting aside these areas within marine reserves. These protected reefs may then act as "reseeding" areas for the rest of the reef which continues to suffer die-off and damage caused by rising sea surface temperatures linked to global climate change.

- **How can biodiversity conservation activities help to mitigate climate change?**

  Biodiversity conservation activities that prevent deforestation or other habitat conversion help to sequester and absorb carbon, preventing its release into the atmosphere as a greenhouse gas. Additionally, the use of alternative energies, such as solar or wind power, has the potential to prevent negative impacts on biodiversity (reducing fuelwood collection) and the climate (less fuel combustion that causes the release of greenhouse gases into the atmosphere).

  In Africa, CARPE focuses efforts in 11 specific landscapes located across the Congo Basin, which holds massive expanses of closed canopy tropical forest. The region is threatened by unsustainable timber exploitation, shifting cultivation, urban expansion, and decades of human conflict. In addition to providing other valuable ecosystem services, the large, forested area of the Congo Basin serves as a globally important carbon stock. CARPE's principal goal is to reduce the rate of forest degradation and loss of biodiversity through increased local, national, and regional biodiversity conservation and natural resources management measures. Key activities include protected area management, natural resources management planning, improved logging policies, sustainable forest use by local inhabitants, and improved environmental governance. Currently, the Agency's Global Climate Change Team is supporting a study in one of the Congo Basin landscapes to determine the impact of reduced impact logging practices on the carbon budget.

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21.0 HUMANITARIAN ASSISTANCE AND DISASTER RESPONSE

KEY QUESTIONS

How can USAID activities help to reduce the negative environmental effects of disaster induced displacements of people?

What are potential effects of aid or reconstruction activities on local ecosystems and natural resources?

Who are the key environmental points of contact in a country, and how can USAID staff encourage their mobilization to address environmental issues in the early phases of a disaster?

Natural disasters and conflict-induced emergencies can have serious negative impacts on the health of ecosystems and local population's control of, and access to, natural resources. Additionally healthy, intact ecosystems can play an important role in mitigating the negative effects of natural disasters.

Due to the prioritized imperative in humanitarian assistance and reconstruction activities of saving lives and relieving human suffering as quickly as possible, environmental considerations are often disregarded by planners and responders. Accumulated experience has shown us, however, that to not address actual or potential environmental threats to biodiversity only leads to increased threats that must be mitigated later on, almost always at a much higher human, monetary, and environmental cost.

During an emergency, the top priority of the relief sector is to save human lives. At the same time, during and immediately following a crisis, local environment and natural resources are often vulnerable, and as a result, many relief and development operations can have adverse environmental impacts. For instance, without careful consideration for their siting, camps for displaced people can harm ecosystems through their setup, infrastructure, water and sanitation, food distribution, fuel collection, and agricultural practices. In the case of long-standing crises, resettlement camps can take on a more permanent function than originally anticipated. Such scenarios present particular environmental management challenges in terms of refugees' need for fuelwood, water, more permanent housing materials, and bushmeat. Sources for many of these resources may lie outside of the camp.

These types of impacts can be significantly reduced if relief and development sectors integrate environmental considerations in the planning stages. Collaborative planning with governments, local stakeholders, relief organizations, and environmental actors can identify mutually agreed-upon responses that are both culturally and environmentally appropriate. Understanding and addressing gender issues is crucial, as women may be more vulnerable to disasters due to reduced access to resources, domestic burdens in shelters or camps (gathering water and fuelwood, cooking), and overrepresentation in the agricultural and informal sectors—areas most often heavily hit by disaster. Environmental damage from humanitarian or reconstruction operations is far less costly to prevent or mitigate than to repair. Moreover, all parties involved in humanitarian relief, reconstruction, and development have a powerful incentive to

collaborate in biodiversity conservation activities, simply because the livelihoods and ultimate survival of local communities and refugees alike depend on natural resources and healthy ecosystems.

Additionally, intact ecosystems such as forests and coral reefs can play a significant role in protecting human populations from the full brunt of natural disasters. In the case of the 2004 Asian Tsunami, areas of coastline that had intact and healthy coral reefs (such as the Maldives) or mangrove forests for the most part suffered fewer deaths and less destruction of human property and infrastructure than in adjacent areas, where unplanned or badly planned coastal development had stripped the area of natural ecosystems. Similarly, forests can act to stabilize hillsides which would otherwise be prone to dangerous landslides. Highly denuded (deforested) regions, such as the Philippines, chronically suffer from deadly damaging landslides, like the slide and flooding that killed over 8,000 people in 1991 on Leyte Island. Central America, as a result of Hurricane Mitch, suffered even greater human losses due to habitat destruction and poor planning. These examples illustrate how the loss of these ecosystems can result in increased human suffering and importantly how intact, natural ecosystems can significantly buffer against the full impact of natural calamities.

KEY QUESTIONS, ISSUES AND EXAMPLES

- **How can USAID activities help to reduce the negative environmental effects of disaster-induced displacements of people?**

  Conflicts and natural disasters often cause affected populations to move temporarily from their homes to escape harm or seek assistance. The new environments that they move to often cannot sustain the additional burden of a larger human population. Competition and conflict between the displaced and local groups can break out over control and access to such life-sustaining resources as water, crops, fodder for animals, and fuelwood. Early consideration of these problems can help determine effective ways to better share assets and reduce the impact on local ecosystems.

  A new methodology, the rapid environmental assessment (REA), developed by implementing partners with Office of U.S. Foreign Disaster Assistance support, can help determine environmental issues and risks in a disaster context and provide a foundation to effectively address them. In Ethiopia, the application of REA has enabled international and local NGOs and governmental representatives to prioritize environmental issues and help determine how the country can move away from yearly food assistance toward more self-sufficiency.

- **What are potential effects of aid or reconstruction activities on local ecosystems and natural resources?**

  The influx of personnel, vehicles, and the other items associated with humanitarian assistance or the materials needed for reconstruction operations, can exact a significant toll on local ecosystems. Environmentally sensitive early planning can help ensure that ecosystems and natural resources are used in a sustainable manner. “Green procurement”—the acquisition and use of ecosystem-friendly materials and goods—should be a part of all humanitarian assistance or reconstruction initiatives. Livelihoods that involve productive resources programs must be designed and implemented with medium- to long-term environmental and livelihood interests in mind.

  For example, as a result of the destruction inflicted to parts of Indonesia by the 2004 Tsunami, the World Wildlife Fund launched the Timber for Aceh initiative, bringing together a public-private alliance including the Indonesian government, other humanitarian aid, and environmental NGOs, as well as the private sector. This initiative seeks the donation of responsibly managed wood from U.S.-based forest product companies for the rebuilding of homes, hospitals, and crucial fishing infrastructure in the region. The alliance works for sustainable reconstruction in the region while protecting Indonesia’s forests and ultimately acts to mitigate the negative impacts of future natural disasters.

- **Who are the key environmental points of contact in a country, and how can USAID staff encourage their mobilization to address environmental issues in the early phases of a disaster?**

  One of the reasons that environmental issues are often not addressed adequately or early enough is insufficient planning and coordination before disasters strike in order to facilitate response during the intense phases of a crisis. USAID missions should make contact with local, regional, and state environmental points of contact before a disaster hits to anticipate impacts on local ecosystems and concrete steps that could be taken to mitigate them.

  In many nations where USAID works, hurricane- or typhoon-generated natural disasters are an annual event and ecosystem destruction has led to severe deforestation, erosion, and habitat destruction. Where the opportunity exists for USAID to collaborate with a national disaster prevention agency, the mission could help agency personnel to engage local populations in determining ways to reduce ecosystem degradation and vulnerability to destruction, harvest losses, and human lives.

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- Wisner, Ben and Piers Blaikie, Terry Cannon and Ian Davis. 2003. At Risk: Natural Hazards, People's Vulnerability, and Disasters, London, Routledge; ISBN 0 415 25216 4; 471 pp.
- World Bank Indicators: Environment. 2001: http://www.worldbank.org/data/wdi2001/pdfs/environment.pdf
- World Wildlife Fund: 'Green Reconstruction' Vital in the Aftermath of the Tsunami: http://worldwildlife.org/news/displayPR.cfm?prID=174

22.0 HUMAN POPULATION AND HEALTH, INCLUDING HIV/AIDS

KEY QUESTIONS

How do human health or population issues have the potential to enhance, or constrain, the achievement of biodiversity conservation results?

Do synergies with human health and/or population programs exist?

How can effective linkages be made between population and/or health interventions and biodiversity conservation?

Biodiversity and natural systems are inextricably linked to human populations. A healthy environment can provide the clean and safe food, water, medicines, and energy that people need to live healthy lives. Effectively functioning ecosystems filter harmful pollutants out of air, water, and soil. A diversity of plant and animal life provides more options for meeting food security and nutrition needs of both near and distant human populations.

Increasing human populations coupled with poor development planning can put an enormous strain on biodiversity and natural resources. People struggling with poor health and nutrition are often not effective agents for conservation. Local capacity to sustainably manage biodiversity can be decimated by illness and death caused by diseases like HIV/AIDS. Outbreaks of Ebola and other infectious diseases that move across species can threaten human and wildlife populations alike. Extinction of species can limit present and future opportunities for deriving beneficial pharmaceutical compounds or expanding food crop alternatives.

For all of these reasons, an integrated approach to human population, health, and environment may be warranted in order to achieve biodiversity conservation objectives. Clearly, not every program should be expected to address all of these complex and interrelated issues. However, given the primary importance that health, fertility, and population issues tend to play in the lives of humans, particularly the poor, these dimensions of biodiversity conservation may provide credible entry points for working with relevant communities and other partners. By addressing issues in an integrated way, there is often a greater potential for engendering broad buy-in for a complementary suite of conservation and human development goals.

KEY QUESTIONS, ISSUES AND EXAMPLES

- **How do human health or population issues have the potential to enhance, or constrain, the achievement of biodiversity conservation results?**

  In many cases, the sustainability of conservation results can either be threatened by or secured through changing population demographics and health concerns. For example, rapidly expanding human populations may exceed sustainable rates of resource consumption and put pressures on biodiversity. Alternatively, concerns and education regarding disease transmission between wildlife and humans can effectively curtail the human consumption of certain species known to be disease vectors, thus decreasing the pressure on this species and the prevalence of these diseases in human populations. A good understanding of the threats, opportunities and synergies between human health, population and biodiversity conservation can lead to more successful conservation activities.

  Ebola is a life-threatening virus for humans and apes that can be transmitted in a variety of ways. Beyond direct impacts on local populations, the occurrence of Ebola outbreaks in a region also limits the potential to generate income from ecotourism activities. In response to outbreaks of the disease in Central Africa, the Wildlife Conservation Society is working with the U.S. Peace Corps, U.S. Fish and Wildlife Service, USAID and other partners to provide remote communities with appropriate education on disease transmission and strategies for protecting themselves. In this way, they can prevent future outbreaks that threaten to decimate both human and wildlife populations alike.

- **Do synergies with human health and/or population programs exist?**

  In many cases the tools and technologies for meaningful interventions in population, health, and biodiversity conservation already exist. Often the greater challenge lies in finding ways for different programs and stakeholders who do not traditionally work together to effectively form partnerships around common objectives. When this is done well, synergies can be exploited and movement toward sustainability undertaken.

  In Madagascar, USAID's Environmental Health Project supports the Voahary Salama Association, an NGO umbrella organization that includes both local and international health and conservation organizations. The organization is focused on linking natural resources management and family planning activities in three major forest corridors critical for biodiversity conservation. Through education, technical assistance, extension services, and other interventions, diverse NGO partners work with local communities to better understand the linkages between family planning, nutrition, disease, water sanitation, unsustainable agriculture, and deforestation. Through an integrated approach with explicit conservation and health objectives, the practice of slash and burn, a leading threat to intact habitats for biodiversity, has decreased from 55 to 25 percent while access to safe water has risen from 19 to 24 percent.

- **How can effective linkages be made between population and/or health interventions and biodiversity conservation?**

  In many cases, 'win-win' opportunities for human health, population, and biodiversity may exist. For example, the restoration of intact upstream forests may also ensure potable water supplies for downstream users. The promotion of alternative sources of fuel to replace wood consumption may also decrease the occurrence of human respiratory problems. Reforestation may reduce the spread of malaria by limiting standing water sources that serve as breeding grounds for mosquitoes. Support for integrated community development and conservation in more remote areas may help relieve pressure of urban migration, while population programs focused on urban areas may influence the demand for consumption of natural resources. Yet for any of these interventions to be sustainable over the long

run, the benefits of biodiversity need to be understood and felt by people. It is important that such mutual benefits are recognized as explicitly tied to program activities.

In Bangladesh, USAID supports activities focused on improved management of open water, forest, and biodiversity resources to benefit local communities. Through policy and technical assistance activities, community-managed fish sanctuaries have led to an increase in fish production, income for poor fishing families, and overall fish biodiversity. Increased protein consumption has also improved the health and food security situation for local populations.

SOURCES FOR MORE INFORMATION

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- AIDS Toolkits—HIV/AIDS and Community-Based Natural Resources Management. USAID Office of Sustainable Development, Africa Bureau. http://www.afr-sd.org/Environment/AIDS Toolkit-150 res.PDF
- AIDS Brief for Sectoral Planners and Managers—Community-Based Natural Resources Management. Development Alternatives, Inc. Washington, DC: USAID Office of Sustainable Development, Africa Bureau: http://www.afr-sd.org/Environment/AIDS Brief-all-150 res.pdf
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- Nash, Jonathan. 2001. Healthy People Need Healthy Forests. Population Reference Bureau. http://www.prb.org/Template.cfm?Section=PRB&template=/ContentManagement/ContentDisplay.cfm&ContentID=5772
- Wildlife Conservation Society. AHEAD Program: http://www.wcs.org/wcspubs/wcsreports/460166

23.0 NONRENEWABLE EXTRACTIVE INDUSTRY: ENERGY AND MINING

KEY QUESTION

Does the design of biodiversity conservation activities take into account the threats to biodiversity of local, regional, and national energy needs and mining operations?

Nonrenewable extractive industries extract and sell nonrenewable resources such as minerals and hydrocarbons. The extraction of these resources often poses special challenges for biodiversity conservation. In many parts of the world, areas with high hydrocarbon extraction potential correspond closely with some of the most environmentally sensitive areas. Issues of biodiversity conservation and extractive industries are often highly politicized, and can lead to conflict.

Energy and mineral resources are central to economic and social development activities, such as water supply and sanitation, transportation, telecommunications, and health and medical services. Provision of energy services can stimulate wealth-creating activities to help bring the poor into the mainstream of national and political life, as well as to strengthen democratic structures and governance frameworks.

Global energy demand is projected to increase significantly over the next few decades, primarily to meet growing demand for electricity and transportation, especially from the developing world. Despite growing energy use in these countries, per capita energy consumption between developing and developed nations likely will continue to differ greatly. For example, the average individual in India uses only *one-fortieth* of the energy used by the average individual in the United States. Nevertheless, increases in energy consumption will lead to increased impacts on biodiversity.

KEY QUESTION, ISSUES AND EXAMPLES

- **Does the design of biodiversity conservation activities take into account the threats to biodiversity by local, regional, and national energy needs and mining operations?**

  By taking a threats-based approach to biodiversity conservation, current and potential threats posed by local and national energy needs can be identified, addressed, and mitigated on various scales through multisectoral stakeholder participation (see Chapter 7, *Designing Activities*). To better understand relationships between energy services and biodiversity conservation, it is helpful to consider the energy chain. The energy chain tracks energy from the raw resource extraction (e.g., oil/gas from a well, coal from a mine) through transportation, processing, and distribution to the end use (i.e., electricity generation, transmission, and distribution; gasoline for transportation). All the steps along the energy chain, from production and transport of the fuel to actual use/combustion of the fuel, have the potential to impact biodiversity. At the macro level, the extraction and transport of a resource, such as petroleum, may require surveying and development in areas with high biodiversity, such as lowland tropical

forests. Transportation and distribution of fuels or electricity may require roads, railroads, pipelines, seaport facilities, or transmission lines. Processing of fuels and generation of electricity will require industrial-scale facilities, with associated transportation or distribution infrastructure. Biodiversity impacts will mostly derive from the siting of the facilities, although impacts from operations (e.g., greenhouse gas emissions, waste, and other effluents; leakages from operational inefficiencies) may also occur. The migration of human populations to environmentally sensitive areas to work with mega-energy and mining operations is another serious secondary impact of these industries. The processing chain for mineral resources can be similar and pose similar challenges for biodiversity conservation.

Through policy and technical support, USAID engages at several levels in extractive industry. In many cases, USAID comes into the discussion, once the tension level is already high, on publicly financed activities with perceived high-potential negative environmental impact. USAID has been very active in a number of these debates at the country level, and has also been engaged from Washington. Regardless of the type of nonrenewable resource or the entry point, mitigation of environmental impacts of energy and mining projects on biodiversity at all steps of the energy chain should be a priority for policymakers and practitioners at the international, national, and local levels. In the past few years, particular focus has been given to the identification and dissemination of best practices, including identification of "no-go" areas, the development of social and environmental contracts between industry, local stakeholders, and transparency in decision making. Further, there are several areas in which USAID can focus its efforts:

At the policy level*:*

- *Engaging in national, regional, or international dialogue on planning of extractive industry investments, siting, and/or identification and dissemination of best practices*. USAID's support, where politically appropriate, can help bring appropriate stakeholders to the table, or raise the profile of environmental and social issues; and
- *Reviewing proposed multilateral development bank support for investments in nonrenewable extractive projects, particularly with regard to their environmental impact assessments*.

At the project level:

- *Direct support for activities designed to promote best practices in extractive industry or leverage industrial investment to advance USAID goals*. USAID can provide support to leverage additional environmental investment in a region, taking advantage of the industry's initial investment or technical resources. Several recent public-private alliances have provided this type of support.
- *Support for energy-efficient practices and technology*. Investing in energy efficiency is the most cost-effective means of meeting energy demand without resorting to additional energy extraction/generation. Reduced energy consumption can delay the need for costly investments in energy supply infrastructure, thereby lessening impact on biodiversity and saving scarce financial resources for other uses. In addition, numerous technologies exist that can help mitigate environmental impacts of energy production and consumption.
- *Support for utilization of alternative energy sources*. Utilizing alternative sources of energy is one way to minimize impacts on biodiversity while delivering high quality, low cost fuel. Alternative energy sources such as solar, wind, and micro-hydro power are energy options that, despite sometimes high upfront costs, can be cost-effective and have low impact on biodiversity and the environment throughout the energy chain.
- *Support for effective governance structures*. Impacts on biodiversity are often greater in countries that lack effective legal and regulatory regimes for environmental protection as well as the energy and mining sectors. Efforts to improve environmental policymaking, monitoring, and enforcement may help prevent or alleviate environmental degradation resulting from energy and mining activities.
- *Support for post-mining remediation (e.g., reforestation) programs*.

SOURCES FOR MORE INFORMATION

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- Energy and Biodiversity Initiative: http://www.theebi.org/
- Global Village Energy Partnership Online: http://www.gvep.org
- Renewable Energy and Energy Efficiency Partnership: http://www.reeep.org/
- World Bank Environment, Health, and Safety Guidelines: Mining and Milling: http://www.natural-resources.org/minerals/CD/twb.htm#Guidelines and http://www.natural-resources.org/minerals/CD/energy.htm#General
- World Conservation Union. Mining and Biodiversity Conservation: Best Practices Dialogue: http://www.iucn.org/themes/business/mining/index.htm
- World Conservation Union. Working Group on Extractives Industries and Biodiversity: http://www.iucn.org/themes/business/mining/WGEIB.htm
- World Resources Institute. The Electricity Governance Initiative: International Financial Flows and the Environment Project with the Access Initiative, Prayas-Pune and the National Institute of Public Finance and Policy: http://electricitygovernance.wri.org

24.0 URBAN ISSUES

KEY QUESTIONS

How can the planning and design of biodiversity conservation activities take into account the effects of urban areas on ecosystems?

How can well planned urban areas promote the conservation of biodiversity?

The world in which USAID works today is increasingly urban. About 50 percent of the families in developing countries currently reside in cities and towns. In the next 30 years the world's population will grow by 2.2 billion people. Of these, 2.1 billion will be born in cities and 2.0 billion will be born in the world's poorest cities. This means that over 90 percent of the world's population growth in the coming two decades will occur in developing cities—most of it in urban slums. Urban areas can have negative impacts on biodiversity, but they also hold the potential for alleviating pressure on local ecosystems.

Rapid urban growth with no or poor planning, partly a result of rural-urban migration, can have a dramatic effect on people's quality of life with loss and fragmentation of native habitat, the subsequent extinction of species, and the replacement of native with nonnative species. Dense human populations also may have increasing consumption and resource use, waste generation, freshwater use, and local and downstream pollution, all of which negatively impact ecosystems. Conversely, by concentrating people in urban areas, there is the potential for improved efficiency in the utilization of environmental services and natural resources, as well as economies of scale for infrastructure such as water treatment, sanitation, and waste management. Well-planned, dense urban areas also have the potential to concentrate populations in previously settled areas, thus avoiding further settlement in intact, biodiverse ecosystems. Intact forest ecosystems also often play an important role in stabilizing hillsides surrounding cities, preventing the increased threat of devastating landslides and flooding posed by denuded, deforested uplands.

ERIC STONER, USAID/BRAZIL

Belem, Brazil urban area abutting tropical forest.

Urban areas also offer the opportunity of educating and mobilizing large numbers of people around environmental issues, as well as creating markets for sustainably produced goods, NTFPs, and ecotourism ventures. The mobilization of citizens of urban areas provides an opportunity to build civic values and promulgate national laws, regulations, and policies

based on ecologically sound development principles that seek to balance urban development needs with biodiversity and ecosystem conservation.

KEY QUESTIONS, ISSUES AND EXAMPLES

- **How can the planning and design of biodiversity conservation activities take into account the effects of urban areas on ecosystems?**

  On a landscape level, through a threats analysis, USAID mission staff frequently identify those areas where high biodiversity value are adjacent to, and threatened by, areas of intense human land use and urbanization, while designing and planning biodiversity conservation activities. Depending on feasibility and other biodiversity conservation needs, these areas should be priorities for conservation initiatives. Practitioners should design programs that mitigate threats posed by urban areas but also take advantage of the opportunities urban areas may provide to enhance and support conservation activities.

  In El Salvador, USAID supports the establishment of payment systems for watershed services. In the city of Caro Sucia, residents pay an extra 11 cents to their regular monthly $2 water fee to support the management of El Imposible National Park. The revenues pay for hiring park guards who help ensure that the forest will remain intact, conserving biodiveristy, and providing clean drinking water to the downstream city.

- **How can well-planned urban areas promote the conservation of biodiversity?**

  Given limited resources and the immense challenges of urban planning in the developing world, there is a tendency for city managers to resort to an *ad hoc* "bandaid" approach to land use and environmental management, resulting in negative impacts on biodiverse ecosystems. The high cost of environmental cleanup and treatment and the irreversibility of biodiversity loss should encourage urban professionals and elected officials to think creatively about how they can reduce the amount of pollution that is produced and the per capita consumption of natural resources. USAID staff can work with city planners and officials to design and implement longer-term, environmentally sustainable, urban growth management goals to conserve biodiversity while improving urban quality of life. Some ways that USAID staff can help is with urban land use planning, demand/consumption management, public-private partnerships, and influencing the creation of incentives and policy for improving technological efficiency and decreasing pollution.

SOURCES FOR MORE INFORMATION

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- Man and Biosphere Urban Group: http://www.unesco.org/mab/urban/urbanhome.htm
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- UN-HABITAT/United Nations Environment Program. The Sustainable Cities Program: http://www.unchs.org/programmes/sustainablecities/
- USAID. Making Cities Work: http://www.makingcitieswork.org/ and Cities Alliance: Cities Without Slums: http://www.citiesalliance.org

25.0 WATERSHEDS AND WATER RESOURCES

KEY QUESTIONS

How can biodiversity conservation contribute to achieving the goals of IWRM?

How can a focus on watershed or basin-scale governance models and approaches benefit biodiversity conservation goals?

Will a watershed or basin scale management approach provide additional opportunities for sustainable conservation financing?

Working at the watershed scale is increasingly common in USAID environmental programs in general, and in biodiversity conservation programs in particular. Watershed management often involves more than biodiversity conservation, and not all biodiversity concerns can be addressed by employing a watershed approach. However, there are many situations where management at the watershed or river-basin scale is both effective and desirable to meet biodiversity conservation ends as well as broader sustainable water management objectives.

USAID supports the internationally recognized Integrated Water Resources Management (IWRM) approach in its water resources and watershed management programs. This approach promotes the coordinated development and management of water, land, and related resources in order to maximize economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems. IWRM recognizes that properly allocating and managing water resources is important for sustaining ecosystem health. This approach also recognizes that protecting the natural ecosystems that cover watersheds is essential for providing environmental goods and services for people—such as clean water—on a sustainable basis. Using a watershed or river basin as the landscape unit for management is an approach that can help to achieve truly integrated ecosystem management and biodiversity conservation.

KEY QUESTIONS, ISSUES, AND EXAMPLES

- **How can biodiversity conservation contribute to achieving the goals of IWRM?**

  There is a potentially mutually supportive relationship between watershed management/IWRM and biodiversity conservation goals and approaches. Biodiversity stakeholders in watersheds or river basins (and the coastal and marine zones they influence) that are valued for their biological diversity and productivity (e.g., fisheries) or ecosystem services (e.g., water purification) can more easily articulate and defend ecosystems as a legitimate user of water resources. In the same way, biodiversity conservation activities can have a very direct positive effect on sustaining the supply of high quality water of sufficient quantity for a wide range of human uses.

  USAID/RCSA recently launched a transboundary river basin management program in the highly biodiverse Okavango River basin shared by Namibia, Botswana, and Angola. The program seeks to

mitigate competition and conflict among riparian states for scarce water resources while maintaining the health of the critical Okavango Delta ecosystem. This will be achieved through governance and management approaches that stress the sharing of benefits, including a wide range of biodiversity and ecosystem goods and services provided by the intact watershed system.

- **How can a focus on watershed or basin-scale governance models and approaches benefit biodiversity conservation goals?**

  Because of the importance of water resources for many human activities, there can be greater political will to act at the watershed scale than in other landscape units or sites. In addition, an effective, multisectoral watershed management approach requires the involvement of a broad range of stakeholders that may not normally be engaged in "conservation" projects, potentially yielding broader constituencies in support of the biodiversity values and ecosystem services of the basin.

  Panama has the highest level political endorsement and support for management of the critically important Panama Canal Watershed, and has put in place a legal and institutional framework to support management at the basin scale. To complement the national structure, USAID/Panama has supported strengthening of broad-based stakeholder involvement in governance at the subwatershed level, as well as sustainable management activities on the ground to most effectively achieve biodiversity goals and long-term sustainability of the ecological processes of the watershed.

- **Will a watershed or basin-scale management approach provide additional opportunities for sustainable conservation financing?**

  Taking a watershed approach can involve payment for ecosystem services as well as other revenue-generating schemes (e.g., water supply tariffs, pollution taxes, tourism fees), and these may provide mechanisms for sustainable conservation financing.

  USAID has worked with The Nature Conservancy and other organizations to support work on watershed management fees in Latin America. Under these Payment for Environmental Services (PES) schemes, a portion of the urban water supply tariff is applied to the protection and management of upper watershed areas that serve as the source for clean, potable water supply.

SOURCES FOR MORE INFORMATION

- Global Water Partnership IWRM Toolbox: http://gwpforum.netmasters05.netmasters.nl/en/index.html
- Environmental Protection Agency. Aquatic Biodiversity: http://www.epa.gov/bioindicators/aquatic/
- International Development Research Center. Global Initiatives for Improved Management of Aquatic Biodiversity: http://web.idrc.ca/en/ev-67649-201-1-DO_TOPIC.html
- Ramsar Convention on Wetlands: http://www.ramsar.org/
- Ramsar/Convention on Biological Diversity. River Basin Initiative: http://www.ramsar.org/key_rbi_index.htm
- World Conservation Union. Water and Nature Initiative: http://www.waterandnature.org
- World Conservation Union. 2004. Flow: The Essentials of Environmental Flow: http://www.waterandnature.org/flow/main.html
- World Conservation Union. 2005. Value: Counting Ecosystems as Water Infrastructure: http://www.waterandnature.org/value/index.html

V. USAID PROGRAM INFORMATION

26.0 Implementing Mechanisms and Partners

27.0 International Treaties

28.0 U.S. Legislation

29.0 USAID Regulations

HANNAH FAIRBANK, USAID/EGAT/NRMB

Bromeliads in a community conserved area in the USAID-supported Parks in Peril Central Selva site, Peru.

26.0 IMPLEMENTING MECHANISMS AND PARTNERS

USAID programs and activities are implemented through three main kinds of *procurement vehicles:* acquisition, assistance, and interagency agreements. Please note that the primary reference for information on acquisition and assistance is found on the USAID ADS, series 300, (http://www.usaid.gov/policy/ads/300/).

BULGARIA BCEG PROJECT, ARD, INC.

U.S. Ambassador to Bulgaria, James Pardew, hands over Bulgaria's first National Ecotourism Strategy and Action Plan to the Prime Minister of Bulgaria, Simeon Saxe-Coburg Gotha. The Minister of Environment and Waters, Delores Arssenova, looks on (2004).

USAID policies do not favor one or the other of these mechanisms, but they do recognize that each has unique advantages and constraints, some of which are described in Table 2 (http://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, and 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 that of the grantee, with USAID assessing—prior to awarding the grant—that the proposed program appears to support 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 may be appropriate where a long-term organizational commitment to a site is desirable beyond the anticipated USAID support. No matter which mechanism is used, it is important that USAID's implementers and partners be able to work effectively with the key stakeholders, including the national government of the country.

TABLE 2. IMPLEMENTING MECHANISMS AND USAID ROLE AND LEVEL OF INVOLVEMENT

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

ACQUISITION

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. Acquisition allows more technical control by USAID managers than grants, cooperative agreements, or interagency agreements. For example, a consulting firm could be hired to conduct a media campaign to raise national awareness of forest loss or threats to an endangered species, or 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., natural resources management, policy, water, 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 are ordered only after an actual need has materialized, and (3) Agency obligation is limited (an IQC has a low minimum of services that must be contracted over a given time).

IQC prime contractors are chosen through a competitive Request for Proposals (RFP) process. Each prime contractor is affiliated with a group of subcontractors whose expertise can be used in response to task order needs. Typically, task orders must be available for bidding by all IQC primes, unless there is a "set-aside" for small businesses. This bidding process is streamlined and significantly reduces the burden on USAID technical and procurement staff, in comparison to a full and open competition. Task orders may not specify which subcontractors should carry out the work. They should specify distinct products or "deliverables."

ASSISTANCE

Assistance includes grants and cooperative agreements to organizations, usually an NGO, private voluntary organization (PVO), or community-based organization (CBO), to support activities contributing to USAID's strategic objectives. There is little (cooperative agreement) or no (grant) technical control or input by USAID managers. For example, USAID could fund a national environmental NGO that is working with local communities on sustainable utilization of wild animal or plant products. *Grants* and *cooperative agreements* are distinguished by the level of involvement anticipated between USAID and the implementing partner (please see Table 2 for more information). Grants and cooperative agreements may be awarded competitively or noncompetitively to unsolicited proposals under certain circumstances (please see description below of *Leader with Associates* grants for exceptions) and usually require some cost sharing from the grantee. Competition for assistance mechanisms is carried out through a Request for Application (RFA) or through an Annual Program Statement (APS).

Leader with Associates grants and cooperative agreements are assistance mechanisms managed from a pillar bureau. Leader Awards are made in response to a competitive RFA issued at the request of a pillar bureau. The Leader Awards are given to cover a specified worldwide activity. Associate Awards (grants or cooperative agreements) 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 benefits of this mechanism include (1) no competition required for mission awards under the Leader/Associate grant, (2) simplified procurement procedures for recipients and USAID, and (3) direct partnership and reporting directly between missions and recipients is allowed. Notably, the private sector can receive a grant or cooperative agreement, they simply cannot take profits. Conversely, an NGO can receive a contract, but again no profit may be taken.

INTERAGENCY AGREEMENTS

Interagency Agreements (IAAs) are agreements with other U.S. government agencies to share staff and expertise and to collaborate on joint programs, such as Resources Support Services Agreements/ Participating Agency Service Agreements (RSSAs/PASAs) with the USDA and U.S. universities. 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 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 park managers or interpreters, or with the U.S. Peace Corps on environmental education in schools.

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

- *Environmental Education and Communication (GreenCOM) Project*

  Contractor: The Academy for Educational Development: http://www.greencom.org.

- *Integrated Water and Coastal Resources Management IQC*. Contractors:

  – ARD, Inc.: http://water.ardinc.com,
  – Chemonics International: http://www.ridgetoreef.com/en/index.aspx,
  – Development Alternatives, Inc.: http://www.wateriqc.com,
  – International Resources Group and Tetra Tech, Inc.: http://www.irgltd.com, or
  – PA Consulting: www.paconsulting.com/.

- *Rural and Agricultural Incomes with a Sustainable Environment (RAISE) PLUS IQC*: http://www.raise.org

  Contractors: ABT, ARD, Inc., Development Alternatives, Inc., Fintrac, and Weidemann Associates.

- *Environmental Policy and Institutional Strengthening IQC (EPIQ 2):* http://www.epiq2.com/

  Contractors: International Resources Group, Chemonics International, Inc., and PA Government Services, Inc.

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

- *The Global Conservation Program:* This 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.

- *Parks in Peril*: A Cooperative Agreement with The Nature Conservancy.

Integrated Management of Coastal and Freshwater Systems (IMCAFS): This program has two Leader with Associates Cooperative Agreements focused on coastal resources management (led by the University of Rhode Island) and integrated freshwater management (led by Florida International University), respectively.

Interagency Agreements used to support biodiversity conservation include:

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

- *International Technical Assistance Program*. Collaborating Agency: U.S. Department of Interior.

IMPLEMENTING ORGANIZATIONS

USAID has increasingly focused on building alliances with a broader range of partners. In particular, USAID has placed increasing emphasis on expanding public-private partnerships. Traditional conservation partners include both private consulting firms and conservation NGOs. Private civil organizations—such as conservation, development, and community NGOs—may be uniquely qualified to deliver services and project management on the ground if they have the necessary local knowledge and resources. Private sector partners in alliances may bring access to a new or broader set of stakeholders and resources, and may also offer unique opportunities for broad scale impact and influence. Finally, private consulting firms offer professional, targeted expertise and are often organized for quick responsiveness to USAID needs. 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 Chapter 9, *Financing Conservation*) and human capacity (see Chapter 4, *Involving Stakeholders*), and

- 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.

USAID has increasingly focused on building alliances with a broader range of partners. New procurement processes, such as the APS, have developed to increase flexibility in USAID's programming. For more information on alliances at USAID, such as the Global Development Alliance program, see http://www.usaid.gov/our_work/global_partnerships/.

BENEFITS OF PARTNERSHIPS

Public-private partnerships "add private-sector creativity and flexibility to public-sector accountability and credibility" (Ingerson, Alice, 2000). 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 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 Chapter 4, *Involving Stakeholders*).

- *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 with 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.

27.0 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.

ERIC STONER, USAID/BRAZIL

Scarlet macaw, Brazil. The scarlet macaw, *Ara macao*, is protected by the Convention on International Trade in Endangered Species (CITES). It is listed on CITES Appendix I as a species threatened with extinction, and international trade is generally prohibited, unless permits are granted under exceptional circumstances.

Although the State Department is primarily responsible for negotiating environmental treaties, USAID plays a vital role in the treaty negotiation process by ensuring that Agency and mission international experience and perspectives on development and developing countries are taken into consideration in the evolution of U.S. positions. USAID has been influential in helping to shape U.S. positions at major negotiation rounds for many international treaties, including the United Nations Convention to Combat Desertification (UNCCD) and the United Nations Framework Convention on Climate Change (UNFCCC). In addition, the Agency provides key technical assistance to its developing country partners, helping to build their capacity to participate effectively in treaty 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, climate change, 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, which can be helpful to USAID staff in a given mission in determining priority sites and actions for biodiversity and natural resources 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. As of 2004, 188 countries were parties to the Convention. Although a signatory, the United States is one of a few countries that have 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; and
- 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

- Almost 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 (entered into force in 2003) 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.

- CBD Web site: http://www.biodiv.org.
- World Resources Institute summary and links: http://pubs.wri.org/pubs_content_text.cfm?ContentID=2129.

CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES OF WILD FAUNA AND FLORA (CITES)

CITES entered into force in 1975. As of 2004, 166 countries were parties to CITES. The fundamental goal of this treaty is to protect endangered 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. More than 33,000 species of animals and plants are accorded varying degrees of protection. 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 in Appendix I, and trade is tightly controlled and generally limited to scientific purposes. Appendix II lists species that are vulnerable 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 32,000 species listed 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 has lead responsibility for CITES implementation and enforcement within the U.S. government, including interagency coordination on all CITES matters.

CITES Web site: http://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 in New York City on 9 May, 1992 and opened for signature at the UN Conference on Environment and Development in Rio de Janeiro in June 1992. The Treaty entered into force on 21 March, 1994. The United States was the first industrialized nation to ratify the UNFCCC, which, as of May 2004, includes 189 nations.

SPECIFIC OBLIGATIONS OF PARTIES TO THE UNFCCC

The Convention sets an "ultimate objective" of stabilizing atmospheric concentrations of greenhouse gases at a level that would prevent dangerous anthropogenic interference with the climate system. 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 nonindustrialized, or developing, countries (so-called "non-Annex 1 Parties").

In order to strengthen the international response to climate change, The *Kyoto Protocol* to the Convention was adopted in Kyoto, Japan in 1997. The Kyoto Protocol establishes legally binding commitments for Annex I countries to reduce collective emissions by at least 5 percent below 1990 levels by 2008–2012. In addition to meeting emission reductions domestically, the Protocol allows countries to meet their targets in cooperation with other countries, through a variety of market-based mechanisms, including:

- *Joint Implementation:* Allows credits for emission reduction projects in other industrialized countries (such as economies in transition);
- *International Emissions Trading:* Would allow countries with explicit emissions reduction targets to trade greenhouse gas allowances among themselves; and
- *The Clean Development Mechanism:* Would allow credits for emission reduction projects in developing countries.

As of February 2005, 141 countries had ratified the Kyoto Protocol, and it entered into force. The U.S. has not ratified the Kyoto Protocol.

SOME KEY POINTS ABOUT THE UNFCCC

- The Framework Convention also established a process for future negotiations, known as Conferences of the Parties (COPs), which have been held annually since 1995.
- Globally, deforestation and other forms of land use change account for approximately 20 percent of total greenhouse gas emissions annually. For this reason, forest protection and restoration play a significant role in climate change mitigation. In addition, because forests regulate hydrologic systems, anchor soil, and prevent erosion, they can help in the adaptation to changing climatic conditions, where increased flooding from shifting precipitation patterns is expected.

- The UNFCCC recognizes the importance of forests and agriculture in Article 4.1, where it calls on Parties to promote conservation and enhancement of sinks and carbon reservoirs and to cooperate in preparing for adaptation to the impacts of climate change through protection and rehabilitation of natural areas.

CLIMATE CHANGE WEB SITES

- Environmental Protection Agency: http://www.epa.gov/globalwarming
- Intergovernmental Panel on Climate Change: www.ipcc.ch
- United Nations Development Program: http://www.undp.org/energyandenvironment/
- United Nations Environment Program: http://www.unep.org/themes/climatechange/
- United Nations Framework Convention on Climate Change: http://unfccc.int/
- U.S. Department of Agriculture: http://www.usda.gov/oce/gcpo/index.htm
- U.S. Department of Commerce/National Oceanic and Atmospheric Administration: http://www.noaa.gov/climate.html
- U.S. Department of Energy: http://www.energy.gov/engine/content.do?BT_CODE=ST_SS4
- U.S. Department of State: http://www.state.gov/g/oes/climate/
- U.S. Department of Transportation: http://climate.volpe.dot.gov/
- USAID: http://www.usaid.gov

UNITED NATIONS CONVENTION TO COMBAT DESERTIFICATION (UNCCD)

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 UNCCD, to which the United States became a party in 2000, is the development of national and subregional action programs by national governments in cooperation with donors, local populations, and NGOs. The UNCCD uses an innovative “bottom-up” approach, involving those people affected by desertification in decision making, to facilitate effective implementation of the Convention. The UNCCD 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 UNCCD:

- Developing country parties must report on progress in implementing their national action plans to combat desertification (if they are affected by serious drought and/or desertification);

- Developed country parties affected by drought and/or desertification must periodically report on their activities to combat desertification; and

- Donor countries must report on their activities to support the Convention and efforts to combat desertification.

SOME KEY POINTS ABOUT THE UNCCD

- 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 UNCCD 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 of supporting activities to combat desertification, particularly in Africa, including CBNRM for both agricultural and wildlife objectives, food security initiatives, improved farming methods, and famine early warning systems (FEWS).

UNCCD Web sites:

http://www.unccd.int/main.php,
http://www.iisd.ca/process/forest_desertification_land-ccdintro.htm, and
http://www.undp.org/drylands/.

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, and to conserve these valuable ecosystems by recognizing their fundamental ecological functions and their economic, cultural, scientific, and recreational values. Currently, 144 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 the List of Wetlands of International Importance.
- Accept the responsibility for conservation, management, and wise use of wetlands and their resources
- Promote the wise use of wetlands through land use planning and the establishment of natural reserves, cooperate in the exchange of information, and train personnel for wetlands management.

The treaty currently lists 1,421 wetland sites, totaling 124 million hectares, identified as Ramsar Wetlands of International Importance. Twenty-one of these are in the United States.

SOME KEY POINTS ABOUT THE RAMSAR CONVENTION

- It provides a forum for information exchange among countries.
- It maintains a focus on conservation through sustainable use.
- Private and public lands can be designated 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.

Ramsar Convention Web site: http://www.ramsar.org.
Convention on Migratory Species: http://www.cms.int/.

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. These chemicals 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.
- The FAO estimates that there may be as much as 500,000 tons of obsolete pesticide stockpiles worldwide. Examples of stockpiles of obsolete pesticides in storage in Africa include:
  - Ethiopia (2,400 tons),
  - Morocco (2,265 tons),
  - Tunisia (882 tons),
  - Sudan (657 tons),
  - Eritrea (223 tons), and
  - Central Africa Republic (238 tons).
- There is an acknowledgement of the importance to the Convention's success of having the developed countries provide "timely and appropriate" assistance to the developing countries and countries with economies in transition. Thus, capacity-building assistance will be focused on the needs of the recipient countries.

Convention on POPs Web sites:

http://www.pops.int/,
http://worldwildlife.org/toxics/basic.cfm, and
http://www.ciel.org/POPs/programpops.html.

28.0 U.S. 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 resources 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. 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.

BRUCE BYERS, ARD, INC.

Ecotourism guides holding Malagasy boa, Madagascar.

Compliance with FAA Sections 118 and 119 can be assessed using a variety of mechanisms (see Chapter 26, *Implementing Mechanisms and Partners*). Information on which to base these assessments may be plentiful or 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 outline the country's priorities in terms of biodiversity conservation and action plans for the UNCCD as well as national poverty alleviation plans to determine concerns for land degradation and human needs.

Information from reviews carried out to satisfy Sections 118 and 119 may be useful background for choosing conservation priorities and targets (see Chapter 6, *Choosing Conservation Priorities*) and selecting the scale and sites at which to work (See Chapter 3, *Issues of Scale*). They can also help to identify threats (see Chapter 7, *Designing Activities*), stakeholders, and potential partners (see Chapter 4, *Involving Stakeholders*). Because of their potential usefulness—both in planning biodiversity conservation activities and activities related to agriculture, democracy and governance, and conflict—analyses of Sections 118 and 119 should be conducted at an early stage in the strategic planning process for USAID programs. Environmental 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 anti-poaching 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]).

29.0 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 statues and regulations to ensure that its programs and projects are environmentally sound. In this section, we do not 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 the 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; and
- 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, 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 nonnative species as an alternative food source. 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 planning activities that involve agriculture, mariculture, aquaculture, apiculture, hunting, or harvesting—along with policy and infrastructure improvement—it is important to think of all possible ramifications and consider "how this activity might this backfire and ultimately be more destructive?" This question should also be raised when reviewing annual work plans. Many potential adverse impacts may not be apparent or clear, and it may be useful to ask mission environmental officers, other USAID colleagues at missions, or the EGAT Bureau, to review planned activities, conduct IEEs, or review 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."

ABBREVIATIONS AND ACRONYMS

AAAS	American Association for the Advancement of Science
ADS	Automated Directives System
AEEB	Assistance for Eastern Europe and the Baltic States
AHEAD	Animal Health for the Environment and Development
AIDS	Acquired Immune Deficiency Syndrome
ANE	Asia and Near East Bureau (USAID)
APS	Annual Program Statement
ASEAN	Association of Southeast Asian Nations
AWF	African Wildlife Foundation
BIOFOR	Biodiversity and Sustainable Forestry Indefinite Quantity Contract
BOLFOR	Bolivia Sustainable Forest Management Project
BSP	Biodiversity Support Program
CARPE	Central African Regional Program for the Environment
CBC	Community-Based Conservation
CBD	Convention on Biological Diversity (United Nations)
CBNRM	Community-Based Natural Resources Management
CBO	Community-Based Organization
CCA	Community Conserved Area
CCT	Cooperativa Café Timor
CFR	Code of Federal Regulations
CI	Conservation International
CIDA	Canadian International Development Agency
CIEL	Center for International Environmental Law
CIFOR	Center for International Forestry Research
CIPTA	*Consejo Indigena del Pueblo Tacana*

CITES	United Nations Convention on International Trade in Endangered Species of Wild Flora and Fauna
COICA	Coordinating Body for the Indigenous Peoples Organizations of the Amazon Basin
COP	Conference of Parties
CRM	Coastal Resources Management
DA	Development Assistance
DAW	United Nations Division for the Advancement of Women
DDT	Dichlorodiphenyltrichloroethane (insecticide)
EA	Environmental Assessment
EAPEI	East Asia and Pacific Environmental Initiative
EGAT	Bureau of Economic Growth, Agriculture, and Trade
EIA	Environmental Impact Analysis
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
EPIQ	Environmental Policy and Institutional Strengthening IQC
ESF	Economic Support Funds
ESP	Environment and Science Policy
FAA	Foreign Assistance Act
FAO	Food and Agriculture Organization of the U.N.
FAST	Finance Alliance for Sustainable Trade
FEWS	Famine Early Warning System
FSA	Freedom Support Act
FWS	U.S. Fish & Wildlife Service
FY	Fiscal Year
GDP	Gross Domestic Product
GEF	Global Environment Facility
GNP	Gross National Product
GreenCOM	Environmental Education and Communication Project
GTZ	*Gesellschaft für Technische Zusammenarbeit* GmbH (German society for technical cooperation)
HIV	Human Immunodeficiency Virus
IAA	Interagency Agreements

IADB	Inter-American Development Bank
ICDP	Integrated Conservation and Development Program
ICRT	International Center for Responsible Tourism
IEE	Initial Environmental Examination
IIED	International Institute for Environment and Development
IPG	Interagency Planning Group on Environmental Funds
IPR	Intellectual Property Right
IQC	Indefinite Quantity Contract
ISDR	International Strategy for Disaster Reduction
IUCN	World Conservation Union (formerly the International Union for the Conservation of Nature and Natural Resources)
IUFRO	International Union of Forestry Research Organizations
IWRM	Integrated Water Resources Management
LIFE	Living in a Finite Environment Project
LMO	Living Modified Organisms
MAB	Man and the Biosphere Program
MERGE	Managing Ecosystems and Resources with Gender Emphasis Project
MDG	Millennium Development Goal
MPA	Marine Protected Area
NAAEE	North American Association for Environmental Education
NCBA	National Cooperative Business Association
NEPA	National Environmental Policy Act
NGO	Nongovernmental Organization
NRM	Natural Resources Management
NTFP	Non-Timber Forest Product
ODI	Overseas Development Institute
OECD	Organization for Economic Cooperation and Development
OTI	Office of Transistion Initiatives
PASA	Participating Agency Service Agreement
PCB	Polychlorinated Biphenyls
PES	Payment for Environmental Services
POP	Persistent Organic Pollutant

PRSP	Poverty Reduction Strategy Paper
PVO	Private Voluntary Organization
RAISE	Rural and Agricultural Incomes with a Sustainable Environment IQC
RCSA	Regional Center for Souther Africa
REA	Rapid Environmental Assessment
RFA	Request for Applications
RFP	Request For Proposals
RSSA	Resources Support Services Agreement
SFM	Sustainable Forest Management
TBCA	Transboundary Conservation Area
TBPA	Transboundary Protected Area
TEK	Traditional Ecological Knowledge
TFCA	Transfrontier Conservation Area
TNC	The Nature Conservancy
TRAFFIC	Joint wildlife monitoring program of WWF and IUCN
TRIP	Trade-Related Intellectual Property Right
UNCCD	United Nations Convention to Combat Desertification
UNEP	United Nations Environment Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNHCR	United Nations High Commissioner for Refugees
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
USGS	United States Geological Survey
WCPA	World Commission on Protected Areas
WCS	Wildlife Conservation Society
WHO	World Health Organization
WRI	World Resources Institute
WSSD	World Summit on Sustainable Development
WTO	World Trade Organization
WWF	World Wildlife Fund (US) or Worldwide Fund for Nature (WWF International)

GLOSSARY

Adaptive management: emphasizes 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. According to the Biodiversity Support Program: "Adaptive management is fundamentally a framework to experimentally test assumptions, adapt project activities, and learn from project impacts."

Acquisition: involves buying or contracting for goods or services to achieve "results," in most cases through contracts with for-profit, private-sector organizations. Through this mechanism, consulting firms implement much of USAID's support for biodiversity conservation.

Assistance mechanisms: include grants and cooperative agreements. These are mainly awarded to non-profit partners. Although there are no payback requirements with grants, USAID may set conditions on the design and implementation of activities; require monitoring, evaluation, and other kinds of reporting; and generally require a financial "match" from the grantee.

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.

Charismatic species: attractive, appealing, cute, unique, or otherwise attention-getting species; if threatened or endangered may serve as "flagship" species. Examples include cheetah, lion, orangutan, gorilla, sea turtles, and whales.

Community Conserved Area: areas of natural or semi-natural habitat that have been conserved by local communities for a variety of ecological and cultural reasons. They may or may not be legally recognized by national governments, designated for management and protection. Thousands of small sites are conserved as village forests and pastures, sacred groves, and restricted hunting or fishing areas by communities worldwide.

Conservation concession: a relatively new mechanism 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.

Conservation trust fund: used to provide more sustained, long-term funding of conservation, 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.

Cooperative agreement: an agreement between USAID and implementing partners, awarded to provide funds or other resources. This type of agreement dictates "substantial involvement" between the parties during the performance of the proposed activity. "Substantial involvement" is statutorily

limited and does not allow the Agency to exercise a high level of control over the cooperating organization.

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.

Development alliance: an agreement between two or more parties to jointly define a development problem and jointly contribute to its solution.

Ecoregion: an ecological region, which as defined by WWF is "a relatively large area of land or water that contains a geographically distinct assemblage of natural communities," or ecosystems. 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.

Ecosystem: a dynamic system of interactions between all of the species inhabiting an area and the non-living, physical environment. Ecosystems vary spatially and change with time, and no ecosystem is closed with respect to exchanges of organisms, matter, and energy. Priority areas or sites for conservation exist within ecosystems.

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 do not know enough to accurately predict the behavior of those systems.

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: responsible travel to natural areas that conserves the environment and improves the well-being of local people. According to the Ecotourism Society ecotourism is: "Purposeful travel to natural areas to understand the culture and natural history of the environment, taking care not to alter the integrity of the ecosystem while producing economic opportunities that make the conservation of natural resources beneficial to local people."

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 monetary value of natural resources and environmental services used and depleted.

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, the flagship species used as WWF's logo.

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

Genes: the smallest elements of biological diversity. They combine in unique patterns to form individuals and populations of each species.

Grants: gifts of funds or other resources.

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.

Indigenous and traditional peoples: groups of people who have resided in a region for generations, and can be distinguished from the rest of the national community based on social, cultural, and economic conditions. Indigenous areas are those areas traditionally inhabited by these peoples. Indigenous and traditional peoples have unique cultures that may be closely integrated with the local natural environment. These communities typically have a strong stake in the natural resources around them due to their dependence on these resources to sustain their livelihoods and cultures. These groups are often marginalized.

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: 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. The African elephant is one example of a keystone species.

Loans: the temporary use of funds or resources with interest charges levied for their use.

Marine protected area: an area of sea especially dedicated to the protection and maintenance of biodiversity, and of natural and associated cultural resources, and managed through legal or other effective means. MPAs range from small, locally managed and enforced fisheries or ecological reserves (no-take reserves) to larger national marine parks that are zoned for multiple use.

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.

Private protected area: refers to an area that is managed for biodiversity conservation objectives; protected with or without formal government recognition; and owned or otherwise secured by individuals, communities, corporations or NGOs. Private conservation areas, like publicly protected areas, vary greatly in terms of management objectives, allowable activities, and level of protection. These may include formally declared private areas, lands subject to conservation easements, game ranches, mixed commercial operations based on sustainable use, and land trusts.

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

Rapid Environmental Assessment: provides relief workers and disaster-affected communities with a simple and straightforward analytical and decision-making framework to identify significant environmental issues in relation to the prime humanitarian objectives of saving lives and reducing damage.

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.

Species: an identifiable group of (potentially) interbreeding organisms that is able to produce viable offspring.

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 regimes applied to forestland that maintain the productive and renewal capacities as well as the genetic, species and ecological diversity of forest ecosystems" according to the U.S. Forest Service.

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, overexploitation of valuable species, introduction of invasive species, and environmental change, such as climate change, desertification and pollution.

Threats-based approach: emphasizes the development of a logical plan for determining which threats will be addressed, and how. The plan must clearly identify the linkages between threats and proposed activities.

Traditional ecological knowledge: the knowledge, practices, and beliefs that traditional cultures use to conceptualize and interact with their environments

Transboundary conservation area: refers to cross-border collaboration to achieve biodiversity conservation and development goals. Transboundary conservation areas can include two or more contiguous protected areas across a national boundary; a cluster of protected areas separated by other land uses; a cluster of separated protected areas without intervening land; a transborder area including proposed protected areas; or a protected area on one side of the political boundary along with complimentary land use across the border.

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 include the elephant and tiger.

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