

CONSERVING BIODIVERSITY SUSTAINING LIVELIHOODS

*Experiences from
GEF-UNDP BIOLOGICAL DIVERSITY PROJECTS*





GEF-UNDP Biological Diversity Projects:

- **Conserving Biodiversity**
- **Sustaining Livelihoods**

Biodiversity: the Earth's fundamental living resources on which humans have been dependent from ancient to present times, and on which future generations will continue to depend.

Biological diversity is the variety and variability of all species of plants, animals and microorganisms, as well as the ecosystems they compose. It serves and sustains our lives in countless ways by providing food, fuel, shelter, and medicines. Conserving biodiversity is in our self-interest.

When most people think of the dangers besetting the natural world, they usually think of the threat to creatures such as pandas, tigers, elephants, whales and various species of birds. While the extinction of individual species represents a loss of incalculable dimensions, it is the fragmentation, degradation, and wholesale loss of forests, wetlands, coral reefs, and other ecosystems that poses the gravest threat to biodiversity.

Ecosystem: an interconnected community of living things—including humans—and the physical environment within which they interact to form a life support system.

All of the land and water environments on Earth can be classified into ecosystems such as grasslands, hot deserts, cold deserts, tropical rain forests, coral reefs, mangroves, and tundra zones. Life-giving services that are often taken for granted—the maintenance of clean water, clean air, and fertile soils—all flow from the every-day functioning of healthy ecosystems. Regions that contain a great variety of ecosystems are particularly rich in biodiversity, while individual ecosystems that contain endangered species or species found nowhere else also represent areas that are important for global biodiversity.

HUMANITY AT A CROSSROADS: EXTINCTION OR EQUILIBRIUM?

Retaining the productive capacity of ecosystems in the face of trade-offs marks the difference between good and bad management—between the march toward extinction or the sustenance of life on earth.

The diversity of species on Earth constitutes a natural heritage and life-support system for every country and all people. Despite its crucial importance, biodiversity is being lost faster today than at any time since the dinosaurs became extinct 65 million years ago. Species are disappearing at 50-100 times the natural rate largely due to human activities including the over-exploitation of biodiversity, habitat degradation and fragmentation, global climate change, pollution, and invasion by introduced species. As species and their habitats disappear, humanity risks losing the ecological systems that make human life itself possible.

The choice between extinction or equilibrium is in our hands since ecosystems and human social systems are interrelated and interwoven with each other in evolutionary processes, so the most important threats to biodiversity can be stopped. Harvesting ecosystem goods and services while respecting the production rate and the regenerative capacity of each species can provide sustainable benefits. In fact, under the right circumstances the presence of people can actually improve ecosystem values.

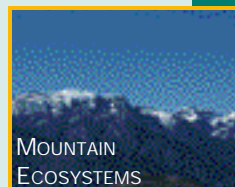
GLOBAL ENVIRONMENT FACILITY PROGRAMME AT UNDP

Local poor people typically suffer the most from ecosystem decline since they are the most directly dependent upon ecosystems for their immediate survival. Therefore, the ecosystem approach to conserving biodiversity must be integrated with measures to alleviate poverty in ways that respect the regenerative thresholds of species and habitats. Projects implemented by the Global Environment Facility team, that operates within UNDP's Environmentally Sustainable Development Group, Bureau for Development Policy, help local communities realize sustainable long-term benefits by protecting species and ecosystems. This report presents an introduction to the major ecosystems in peril, and highlights a few of the more than 200 GEF-UNDP biodiversity and international waters projects now underway.

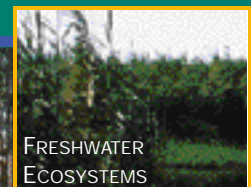
These projects are partially, or in some cases, fully funded by the Global Environment Facility (GEF). The GEF forges international cooperation and finances actions to address four critical threats to the global environment: biodiversity loss, climate change, degradation of international waters, and ozone depletion. Related work to stem the pervasive problems of land degradation and persistent organic pollutants is also eligible for GEF funding. While each project in the portfolio offers several lessons, a few key points have emerged time and again across various ecosystems and project types. The following projects show how specific lessons helped project team members achieve important impacts.

UNDP'S ROLE IN ENVIRONMENT

AS THE DEVELOPMENT ARM OF THE UNITED NATIONS SYSTEM, UNDP HELPS COUNTRIES PURSUE INTEGRATED STRATEGIES FOR POVERTY REDUCTION AND ENVIRONMENTALLY SOUND AND SUSTAINABLE DEVELOPMENT. UNDP PROVIDES COUNTRIES WITH THE GLOBAL KNOWLEDGE AND RESOURCES ESSENTIAL TO BUILDING CROSS-SECTORAL CAPACITIES AND PROMOTING EFFECTIVE POLICIES AND INSTITUTIONS NEEDED TO PROTECT THE ENVIRONMENT AND REDUCE POVERTY. UNDP'S BIODIVERSITY SUPPORT TO COUNTRIES IS INTEGRATED INTO ITS CORE WORK, MAINSTREAMING BIODIVERSITY CONCERNS INTO ACTIVITIES SUCH AS GOVERNANCE AND POVERTY REDUCTION IN MORE THAN 120 COUNTRIES.



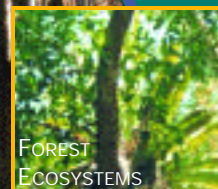
MOUNTAIN ECOSYSTEMS



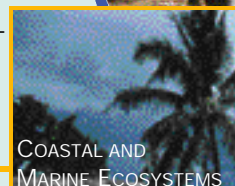
FRESHWATER ECOSYSTEMS



AGRO-BIODIVERSITY



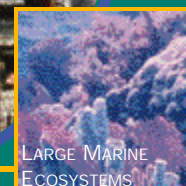
FOREST ECOSYSTEMS



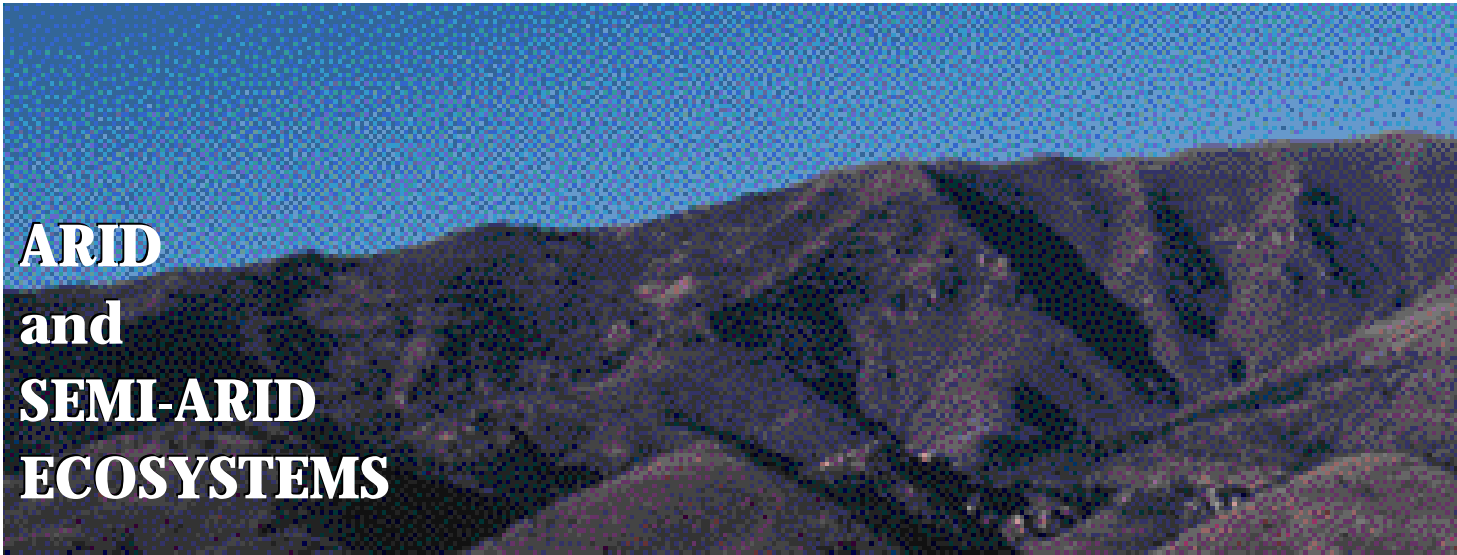
COASTAL AND MARINE ECOSYSTEMS



ARID AND



LARGE MARINE ECOSYSTEMS



ARID and SEMI-ARID ECOSYSTEMS

Arid and semi-arid ecosystems, or Drylands, go by many names: plains, grasslands, savannas, steppes, or pampas. Almost 40% of the Earth's total land surface is dryland, and this variation leads to the great diversity of landscapes possible. Water is the defining resource for all the drylands, and the amount of water present determines the type of ecosystem. With sufficient water, drylands can support a mosaic of land use including farming, ranching, settlements, transportation and recreation.

Drylands are among the most important ecosystems. Early seed agriculture was based on wheat and barley cereals derived from wild drought resistant grasses, which still grow in the drylands and represent a priceless genetic stock for future crops.

Traditional dryland cultures are a repository of knowledge derived from centuries of responding to climactic variation. Many traditional land use systems successfully ensure food supply and access to water under extremely variable and adverse conditions. Drylands people are experts at risk management—their food security depends on maintaining the productivity of the land.

As the world's nations work towards ratification and implementation of the Convention to Combat Desertification, the drylands' heritage, beauty, and productivity are at risk. Soil degradation, loss of biodiversity, and the effects of climate change are causing major losses of productive land resources in the drylands. These impacts include potential alterations of carbon, water, and trace gas budgets, loss of vegetation cover, and increased wind-borne dust, all of which may affect global biogeochemistry, radiation balance and climate.

One billion people in more than 80 developing countries are facing hardships due to the fact that 65-70% of all drylands are now seriously degraded or desertified. Desertification can lead to economic instability and political unrest. It puts pressures on the economy and on the stability of societies outside the affected areas, and it impedes plans for long-term sustainable development in the affected areas.



ONE BILLION PEOPLE IN MORE THAN 80 DEVELOPING COUNTRIES ARE FACING HARDSHIPS DUE TO THE FACT THAT 65-70% OF ALL DRYLANDS ARE NOW SERIOUSLY DEGRADED OR DESERTIFIED.

LEBANON: MANAGING PROTECTED AREAS

The famous cedar forests of Lebanon are much more than just cedar trees—these coniferous forests provide critical habitat for a broad variety of animals, birds, and plants in a diversity of landscapes encompassing mountains, plateaus, valleys and coastlines. During the 16 years of war and instability, (1974-1990), Lebanon suffered drastic reduction in productive capacities, human resources, and the capabilities needed to properly manage natural resources. Desperate measures to revive the national economy—and to survive at the local level—led to wholesale felling of trees for charcoal, overgrazing of livestock, unbridled hunting of wildlife, and the pollution of air and water.

Strengthening of National Capacity and Grassroots in situ Conservation for Sustainable Biodiversity in Lebanon

The GEF-UNDP project promotes national reconciliation by strengthening the capacity of governmental agencies and NGOs to conserve endemic and endangered wildlife and

their habitats, and to incorporate wildlife conservation as an integral part of Lebanon's sustainable development planning. In collaboration with local communities, the project established three new protected areas, declared another four new protected areas, and helped draft a new Framework Law for Protected Areas. The new Managed Reserves/Wildlife Sanctuaries emphasizing collaborative management and sustainable livelihoods include the Al Shouf Cedar Reserve, the Horsh Ehden Reserve and the Palm Islands Nature Reserve.

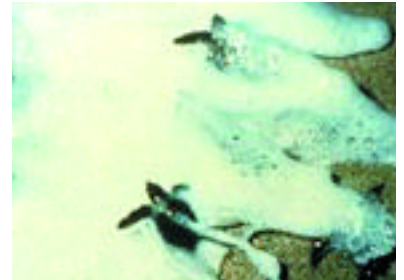
Lesson Learned:

Leveraging co-financing resources is a process that must continue throughout the project's life. In addition to the original co-financing commitment of US\$628,000 from the Government of Lebanon, this project has mobilized over \$1 million from a wide variety of sources including fund raising events, international organizations and governmental partners.

AL SHOUF CEDAR RESERVE—THIS SEMI-ARID MOUNTAIN RANGE IS ONE OF THE FEW REMAINING HABITATS FOR LARGE MAMMALS, BUT IT DREW LARGE NUMBERS OF PEOPLE DISPLACED BY WAR. NOW, 54 FAMILIES ARE PARTICIPATING IN THE JOINT EFFORTS OF THE AL SHOUF CEDAR SOCIETY AND THE RESERVE MANAGEMENT TEAM TO CREATE OPPORTUNITIES IN TRADITIONAL COTTAGE INDUSTRIES AND AGRICULTURAL PRODUCTS. THE FLAGSHIP SPECIES OF LEBANON CEDAR HAS BEEN REESTABLISHED ALONG WITH BREEDING POPULATIONS OF WOLF, BOAR, AND THE LOCALLY EXTINCT IBEX.



THE HORSH EHDEN RESERVE IS A GLOBALLY IMPORTANT SANCTUARY FOR MIGRATORY AND RESIDENT BIRDS, THE WILD CAT, HYRAX, A VARIETY OF REPTILES AND AMPHIBIANS, AND OVER 500 SPECIES OF FLOWERING PLANTS. THROUGH A SUBCONTRACT WITH THE FRIENDS OF HORSH EHDEN, THE PROJECT IS WORKING WITH LOCAL POPULATIONS TO CONSERVE THE AREA'S CULTURAL AND NATURAL INTEGRITY.



THE PALM ISLANDS NATURE RESERVE ENCOMPASSES THREE ISLANDS CLASSIFIED AS AN IMPORTANT BIRD AREA IN THE EASTERN MEDITERRANEAN. SAND BEACHES PROVIDE EGG-LAYING SITES FOR LOGGERHEAD AND GREEN SEA TURTLES, AND SEA CAVES SHELTER MEDITERRANEAN MONK SEALS. THE PROJECT WORKS THROUGH THE LOCAL ENVIRONMENTAL PROTECTION COMMITTEE FOR PALM ISLANDS, WHOSE MANAGEMENT EFFORTS HAVE INCREASED BREEDING SITES OF MARINE TURTLES FROM 6 TO 36 AND LED TO AN INCREASE IN THE FISH-CATCH FOR LOCAL FISHERMEN.

IMPLEMENTING AGENCY: UNDP

EXECUTING AGENCIES: LEBANON MINISTRY OF ENVIRONMENT, IN PARTNERSHIP WITH IUCN AND LOCAL NGOS.

FUNDING PARTNERS: GEF, GOVERNMENT OF LEBANON, AL SHOUF CEDAR SOCIETY, FRIENDS OF HORSH EHDEN, ENVIRONMENTAL PROTECTION COMMITTEE FOR PALM ISLANDS.



COASTAL and MARINE ECOSYSTEMS

Coastal ecosystems include estuaries, coastal waters, and lands located at the lower end of drainage basins, where stream and river systems meet the sea and are mixed by the tides. Shorelands, mangrove salt marshes, dunes, offshore islands, barrier islands, headlands, coral reefs, and freshwater wetlands within estuarine drainages are all interrelated features crucial to coastal fish, wildlife, and their habitats. All together, the biological diversity of the ocean exceeds that on land, yet scientists estimate that less than 10 percent of ocean species have been catalogued.

Coral reefs are among the most diverse ecosystems on Earth. In addition to providing food and shelter to fish and invertebrates, reef dwelling organisms produce biologically active compounds that possess antimicrobial and antiviral qualities. Coastal mangroves are a vital nursery habitat for countless species, and they also help secure coastlines from extreme weather events, which in some cases are correlated with climate change. These and many other water and land forms of the coastal zone interact as integrated ecological units to provide fish, shellfish, and seaweeds vital to populations living in these areas and beyond.

As human population increases, so does the harvest of resources from the sea. Due to overfishing and pollution, many coral reef ecosystems of the world have become unbalanced and organisms such as algae, once controlled by larger fish populations, have taken over the reefs. Decreased yields have led fishermen in some areas to use fish traps with small mesh diameters that catch even small juvenile fish, or to use explosives or poisons, with devastating results for the entire ecosystem.

Shoreline development is another great threat to coastal ecosystems. As development eliminates wetlands and alters coastal habitats, the amount of freshwater runoff increases, carrying large amounts of sediment from land-clearing, and high levels of nutrients from agricultural areas, septic systems, and water treatment plants. Sediments, nutrients, toxins such as petroleum products and insecticides, and extremely hot water discharged by power plants, destroy the coastal environment's productivity, and cause coral death known as bleaching. Half of the world's coastal mangroves have already been razed, and one third of all the coral reefs face collapse over the next 10 to 20 years.

BELIZE PROVIDES IMPORTANT
HABITAT FOR THE THREATENED
ANTILLEAN MANATEE.



BELIZE: PROTECTING A VITAL BARRIER REEF

The Belize coastal zone includes a 220 kilometer barrier reef, thousands of cays, three offshore atolls, wetlands and mangrove forests that are home to many endangered species such as the West Indian manatee, American crocodile, Hawksbill turtles and several species of birds. Most citizens of Belize depend directly upon their coastal zone for food, materials, and livelihoods. However, the combination of uncontrolled construction along the coast, overfishing, dredging, industrial effluents, agricultural runoff, and unregulated marine tourism poses an imminent threat to the ecosystem's health and productivity. Belize faces the challenge of protecting its tremendous marine biodiversity, but at the same time allowing for the use of these resources.

Conservation and Sustainable Use of the Belize Barrier Reef Complex

Phase I of the project successfully:

- Formulated legislation that established an intersectoral Coastal Zone Authority to coordinate several agencies vested with management responsibilities for the coastal zone.
- Generated scientific data for baseline coastal zone management assessments that also led to the designation of seven areas of the reef as World Heritage Sites.
- Identified detailed cost options for various revenue-generating alternatives to support the

integrated coastal and marine resource management programmes.

- Developed guidelines governing coastal development, cruise ship activity, fisheries management, and oil spill contingency.
- Created a Technical Institute that provides ongoing information to the CZM Authority.
- Enhanced public awareness through environmental education programs.

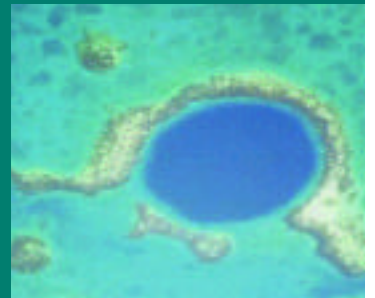
Phase II project initiatives now underway include:

- Creating a demonstration model of development planning and marine biodiversity conservation principles on Caye Caulker;
- Enacting and implementing a national Coastal Zone Policy Framework;
- Strengthening management of the network of seven marine protected areas;
- Supporting widespread environmental education and information dissemination;
- Supporting protection of watersheds and pollution control;
- Establishing a self-sustaining financial mechanism for the Coastal Zone Management Authority and Institute;
- Creating the legal and regulatory capacities needed for bioprospecting.

Lesson Learned:

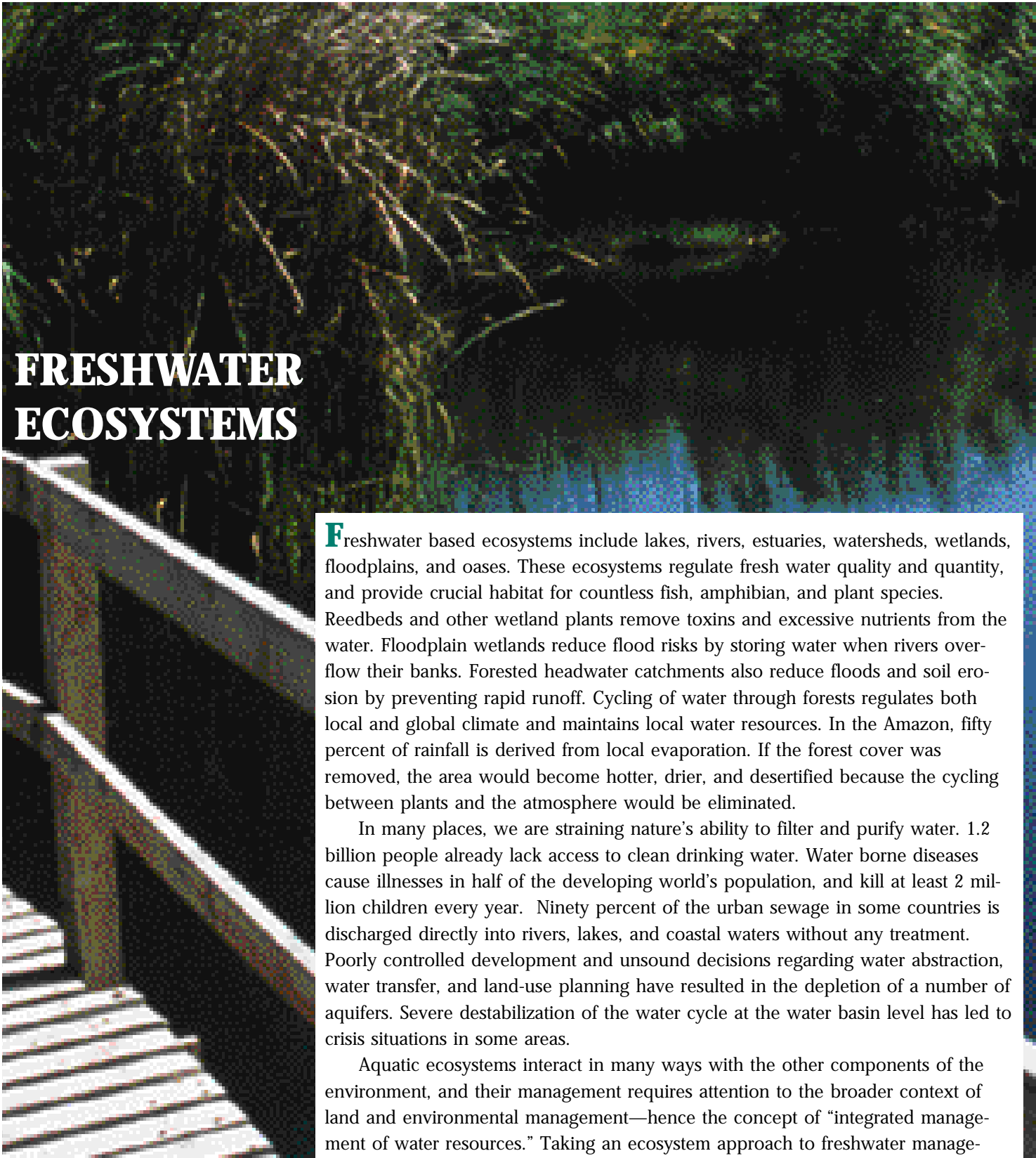
Human and institutional capacities must be strengthened in order to implement policies and initiatives that will conserve biodiversity while generating sustainable livelihoods.

THE GEF-UNDP PROJECT WILL HELP BELIZE MANAGE THE MANY THREATS TO THE ECOSYSTEM'S HEALTH AND PRODUCTIVITY. THE UNIQUE BLUE HOLES ARE LOCATED OFFSHORE BELIZE.



BELIZE HAS THE LONGEST CORAL BARRIER REEF IN THE AMERICAS.

IMPLEMENTING AGENCY: UNDP
EXECUTING AGENCIES: BELIZE MINISTRY OF AGRICULTURE, FISHERIES AND COOPERATIVE THROUGH THE COASTAL ZONE MANAGEMENT AUTHORITY.
FUNDING PARTNERS: GEF, GOVERNMENT OF BELIZE, EUROPEAN UNION, WILDLIFE CONSERVATION SOCIETY, INTER-AMERICAN DEVELOPMENT BANK



FRESHWATER ECOSYSTEMS

Freshwater based ecosystems include lakes, rivers, estuaries, watersheds, wetlands, floodplains, and oases. These ecosystems regulate fresh water quality and quantity, and provide crucial habitat for countless fish, amphibian, and plant species. Reedbeds and other wetland plants remove toxins and excessive nutrients from the water. Floodplain wetlands reduce flood risks by storing water when rivers overflow their banks. Forested headwater catchments also reduce floods and soil erosion by preventing rapid runoff. Cycling of water through forests regulates both local and global climate and maintains local water resources. In the Amazon, fifty percent of rainfall is derived from local evaporation. If the forest cover was removed, the area would become hotter, drier, and desertified because the cycling between plants and the atmosphere would be eliminated.

In many places, we are straining nature's ability to filter and purify water. 1.2 billion people already lack access to clean drinking water. Water borne diseases cause illnesses in half of the developing world's population, and kill at least 2 million children every year. Ninety percent of the urban sewage in some countries is discharged directly into rivers, lakes, and coastal waters without any treatment. Poorly controlled development and unsound decisions regarding water abstraction, water transfer, and land-use planning have resulted in the depletion of a number of aquifers. Severe destabilization of the water cycle at the water basin level has led to crisis situations in some areas.

Aquatic ecosystems interact in many ways with the other components of the environment, and their management requires attention to the broader context of land and environmental management—hence the concept of “integrated management of water resources.” Taking an ecosystem approach to freshwater management means assessing water availability (quantity and quality), identifying interrelationships at the ecosystem level, predicting the environmental and social impact of any proposed action, and evaluating the consequences before making any decision on use. One challenge lies in deciding how much water should be used to maintain the natural goods and services provided by freshwater ecosystems, and how much water should be used for agriculture, industry and domestic services.

Azraq Oasis, Jordan

JORDAN: RESTORING AN OASIS WETLAND

The Azraq Oasis was a spring fed wetland ecosystem with few parallels in the world. Designated as a RAMSAR site in recognition of its importance as a desert stopover for millions of migratory birds, the Oasis was also home to Nubian ibexes, blue-necked ostriches, wild horses, and many endemic fish and amphibian species. But increased demand for water in the city of Amman and on local farms resulted in massive water extraction from the oasis that, after 20 years, left the springs dry and the wetlands on the verge of ecological collapse. Soil and water salinity soared, wildlife disappeared, and local people could no longer graze cattle or rely on the springs to water their fields. An oasis that was used by humans for thousands of years was all but destroyed in 25.

Final Consolidation & Conservation of Azraq Wetlands and Dana Wildlands by RSCN to Address New Pressures

Project accomplishments include:

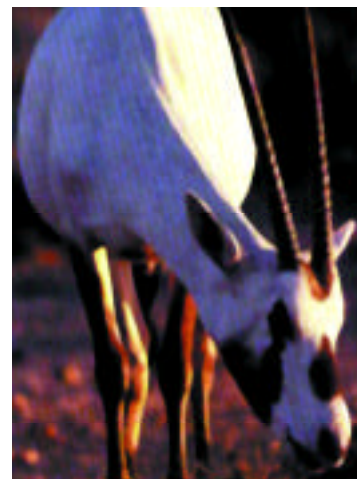
- A new system tapped middle level aquifers and pumped water back into the wetlands, which allowed a mosaic of critical habitats to recover throughout the core of the Oasis.
- 160 species of birds, including duck and cranes, have now returned.
- Local people formed the Friends of the Azraq Oasis as a vocal grassroots movement built on the understanding that pover-

ty alleviation and biodiversity conservation must be pursued simultaneously in order to generate sustainable benefits that are equitably distributed. Dozens of new jobs linked to preservation of the oasis were created in the community.

- Jordan's first Environment Impact assessment focused on Azraq.
- A cleanup operation swept through the springs, lakes, and wetlands.
- Workshops in the production of handicrafts from locally sustainable materials have engaged broad participation among Bedouin and Druse people.
- A visitor center was built complete with educational rooms and a nature shop for locally produced handicrafts and foods.
- An old British field hospital was converted into a lodge, and a raised wooden trail leads visitors through the oasis's lush marshes and pools.
- Water buffalo have been reintroduced to control the growth of reeds which choked out other plants as the waters receded.

Lesson Learned:

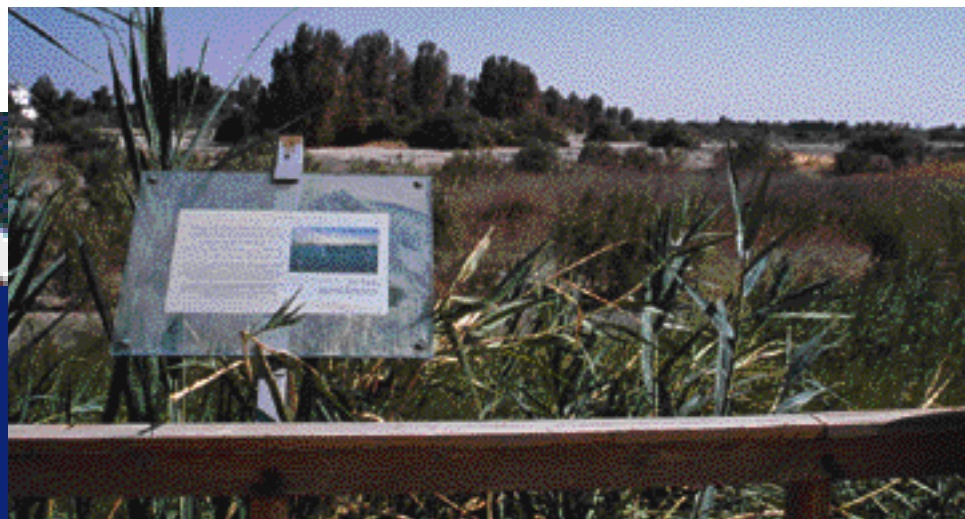
Achieving project goals often requires the development of national policies, plans, and regulatory frameworks that are informed by scientific, social, and economic studies. Further, the Azraq project has demonstrated that it is possible to successfully restore ecological systems and bring them back from the brink of extinction and to regain their previous splendor.



ONE OF THE RAREST ANIMALS IN THE WORLD, THE ARABIAN ORYX, IS BEING BRED NEARBY AT THE SHUMARI WILDLIFE RESERVE—JORDAN'S FIRST WILDLIFE RESERVE.



THE AZRAQ WETLANDS PROJECT HELPS LOCAL PEOPLE PURSUE BIODIVERSITY CONSERVATION IN WAYS THAT GENERATE EQUITABLY DISTRIBUTED AND SUSTAINABLE BENEFITS.



IMPLEMENTING AGENCY: UNDP
EXECUTING AGENCY: JORDANIAN ROYAL SOCIETY FOR THE CONSERVATION OF NATURE
FUNDING PARTNERS: GEF, GOVERNMENT OF JORDAN



FOREST ECOSYSTEMS

Forest ecosystems, including tropical, subtropical, temperate, boreal and woodland, have the highest species diversity of any ecosystem. Forests catch water and originate major rivers. They protect soil, remove air pollutants, generate oxygen, and sequester carbon from the atmosphere—forests hold forty percent of all carbon stored in terrestrial ecosystems. More than half of all prescription drugs are either taken directly from forest plants, modeled on plant compounds, or represent chemically modified versions of plant substances. Millions of people in tropical countries depend on forests to meet their every need, and many developing countries in the humid tropics rely heavily on timber for much of their export earnings.

About 45 percent of the Earth's original forests are gone, cleared mostly during the past century. Despite vigorous reforestation programmes in some countries, the total global area of forests is still shrinking rapidly, particularly in the tropics. Deforestation results in major losses of biodiversity, releases of stored carbon, and air and water pollution. Many forest dwelling large mammals, half of the forest-dwelling large primates, and nearly nine percent of tree species are at risk of extinction. Deforestation rates are now so high that more carbon dioxide is released by forest clearing than is absorbed by the world's remaining forests. Huge sums are being spent in response to flood and storm damage exacerbated by deforestation, and such damage is expected to increase due to climate change. Nearly thirty percent of the world's major watersheds have lost a majority of their original cover, severely affecting water quality.

The greatest threats to forests are conversion to agriculture, logging, and road construction. Logging and mining roads fragment the forests and open up intact interior areas to pioneer settlement. This leads to increases in hunting, fires, pest outbreaks and introductions of invasive species. Forest fires set intentionally for land conversion have particularly devastating effects.

Yet the the potential of forests to yield benefits is unlimited if they are actively managed by extracting sustainable yields and protecting forest habitat and forest species. To take one example of the highly interdependent nature of forest species, elephants in some tropical regions are vital to forest regeneration and seed dispersal because they consume the fruit and subsequently deposit the seeds of up to 90 different tree species.

PHILIPPINES: CONSERVING A TROPICAL RAINFOREST

The Philippines is listed by the World Wildlife Fund as one of the Earth's 200 most biologically valuable ecoregions. 2,400 flowering plants, 197 species of birds, and rare animals such as the Flying Lemur and Philippine Cockatoo inhabit this spectacular 360,000 hectare tract of lowland tropical rainforest on Samar Island. Samar's biodiversity remains under threat from agricultural encroachment at the forest edges, unregulated hunting, and habitat fragmentation.



ENDANGERED BUKAW OWL OF SAMAR ISLAND

Samar Island Biodiversity Project

An innovative strategy calls for forest-edge communities to work in partnership with park management to prevent further



ONE OF SAMAR'S SPECIAL FEATURES IS A VAST LABYRINTH OF LIMESTONE CAVES THAT HARBOR UNIQUE AND UNDISTURBED CAVE FAUNA.

deterioration of biodiversity by acting as a social fence against illegal encroachment and forest use by outsiders. Under direction of Village Conservation Committees, these households are being encouraged to sustainably harvest nontimber products, and engage in surveillance and enforcement of resource management regulations.

Major project accomplishments include:

- Established the 347,000 hectare Samar Island National Park, and a surrounding buffer zone of 123,000 hectares for the sustainable use of all 6,500 local households.
- Constructing a park headquarters facility and visitor interpretation center, 30 ranger posts, demarcation posts, 10 village conservation resource centers for community education, and 90 kilometers of trails for ecotourism and enforcement operations.
- Funding biological inventories to inform conservation values, the status of critical natural habitats, and the process of land use zoning and management planning.
- Social assessments gauging success of sustainable harvest plans and the equitable distribution of benefits.
- A participatory planning framework engaging all primary stakeholders through public hearing and reviews.
- A model management program for rattan and other renewable products and 10 agricultural demonstration sites are building on indigenous agro-forestry and linking farmers with sources of micro-credit.
- To fund recurrent costs, the project established an Integrated Protected Areas Fund capitalized by visitor fees, road user fees, concession fees for harvests of rattan, bamboo, and other products, and financial penalties for breaches of regulations.

Lesson Learned:

The project design process is a critical part of the project itself—multiple stakeholder groups must be involved right from the beginning of the design process. The GEF-UNDP project actively sought out stakeholders with doubts or dissenting views and engaged them in an extensive dialogue with the larger group until options emerged that were acceptable to all. The result was a high level of cooperation between civil society, NGOs, local and national governments.



2,400 FLOWERING PLANTS, 197 SPECIES OF BIRDS, AND RARE ANIMALS INHABIT THIS SPECTACULAR LOWLAND TROPICAL RAINFOREST.

IMPLEMENTING AGENCY: UNDP
EXECUTING AGENCY: PHILIPPINE DEPT. OF ENVIRONMENT AND NATURAL RESOURCES IN COLLABORATION WITH LOCAL NGOS.
FUNDING PARTNERS: GEF, UNDP, GOVERNMENT OF PHILIPPINES, FOUNDATION FOR THE PHILIPPINE ENVIRONMENT, USAID.



MOUNTAIN ECOSYSTEMS

In mountain ecosystems, the compression of climate zones along elevational gradients creates a great diversity of habitats within a relatively small area. Differences in altitude, sun exposure, rainfall and soils make a unique environment of each valley, slope and plateau. Mountain peaks often represent isolated islands of endemic species, and sanctuaries for plants and animals long since eliminated from the transformed lowlands far below. For example, the last of the world's mountain gorillas, now numbering less than 300, survive among the volcanoes of Rwanda, Uganda and Congo.

Over half of humanity depends on fresh water that originates in mountain watersheds. In an era of increasing water scarcity, perhaps no other ecosystem holds greater value for geopolitical and environmental security. Steep terrain and mountain climate in combination with severe land use pressure cause mountain ecosystems to rank among the world's most endangered landscapes.

The integrity of mountain watersheds are threatened by the loss of vegetation on slopes caused by numerous erosive activities, including inappropriate forms of agriculture, logging, grazing, mining, and road construction. Ecosystem integrity on high elevation landscapes is primarily a function of soil stability, which in turn depends on plant cover and rooting patterns.

Grazing and fire management are major components of mountain land use at or above treeline. Both can enhance or reduce biological richness and system integrity. In many cases, traditional land use has been found to increase mountain biota, but mountain communities are increasingly marginalized and impoverished by mainstream development activities that either ignore them, or worse, are imposed at their expense. These include granting mineral and natural resource extraction licenses that do not benefit local inhabitants, or tourism development with no long term planning or local reinvestment of revenues. Many mountain regions have histories of large-scale natural resource extraction with little return for local people. Access to education, decision-making power, financial resources, and land rights are inequitably distributed between upland and lowland communities. Though often wealthy in natural resources, mountain communities typically do not receive benefits from their use.

PAKISTAN: PRESERVING BIODIVERSITY AT THE TOP OF THE WORLD

Some of the highest mountain ranges in the world—the Karakoram, Hindu Kush, and Western Himalayas—meet in Northern Pakistan at elevations above 8,000 meters. This terrain has an extremely high diversity of habitats, plus large numbers of endemic species and endangered mammals such as the Snow Leopard, Himalayan Ibex, and Woolly Flying Squirrel. There are over 1000 species of plants including wild relatives of apricots, walnuts, and a host of medicinal plants with potentially useful pharmaceutical applications. This biological heritage is threatened by over-hunting, competition for rangeland between wildlife and livestock, and degradation of high pastures and forest stands. It is not feasible to establish traditional protected areas here since the landscapes support large and rapidly growing human populations.

Mountain Areas Conservancy Project

The project's pilot phase sponsored participatory planning that identified local needs and concerns in 12 different valleys within a representative sample of regional biomes. At each site, village organizations rethought their development strategies and produced Village Conservation Plans that integrate conservation with community development. The current project has clustered the sites into four Conservancies covering a total of 16,300 square kilometers, and begun implementing the Village Conservation Plans. Communities are collaborating across village jurisdictions to improve management of ecological landscapes



THE HIMALAYAN IBEX, AN ENDANGERED MAMMAL, MAKES ITS HOME IN THE MOUNTAIN ECOSYSTEMS OF PAKISTAN.

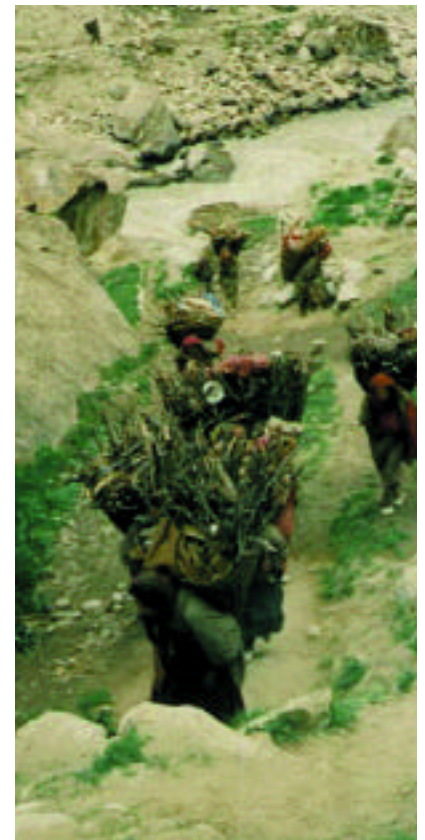
and shared resources. This includes developing Valley Conservation Plans that target viable sustainable use options such as ecotourism, trophy hunting, small game bird harvest, and non-timber forest products. The project has also established Village Conservation Funds to allow profits from sustainable harvest of wild resources to be invested for community services and small infrastructure projects. Through Village Conservation Committees, consultations are carried out as widely as possible, and on a continuous basis, to ensure that conservation benefits are distributed equitably.

Project accomplishments include:

- Income from a trophy hunting program is reinvested in community managed conservation to reward good stewardship. The program also provided incentive to set aside high pastures—pastures that have been found to have the highest levels of biodiversity at the invertebrate level.
 - Formalization of user rights for select communities, and establishment of sustainable use demonstration projects.
 - Creation of a conducive policy, legislative and financial framework for community-based conservation.
 - Development of conservancy level trust funds.
 - Training Natural Resource Specialists.
- Training in livestock husbandry and social forestry.
- Conservation education and awareness in schools, and through training workshops for religious leaders based on conservation related teachings of Islam.
 - Compliance monitoring and scientific assessments through Landsat 7 imagery of project areas analyzed for proportion of alpine pastures preserved.

Lesson Learned:

Achieving impacts over the long-term—long after project funding has ceased—requires careful planning to ensure social, financial, and environmental sustainability.



THE MOUNTAIN AREAS CONSERVATION PROJECT HELPED PAKISTANI VILLAGERS FORMULATE VILLAGE CONSERVATION PLANS THAT INTEGRATE CONSERVATION WITH COMMUNITY DEVELOPMENT.

IMPLEMENTING AGENCY: UNDP

EXECUTING AGENCY: PAKISTAN MINISTRY OF ENVIRONMENT, LOCAL GOVERNMENT AND RURAL DEVELOPMENT (MELGRD)

FUNDING PARTNERS: GEF, UNDP, GOVERNMENT OF PAKISTAN, LOCAL COMMUNITIES, INTERNATIONAL FUND FOR AGRICULTURE, EUROPEAN UNION, WORLD WILDLIFE FUND, INTERNATIONAL UNION FOR THE CONSERVATION OF NATURE, UNITED KINGDOM, AGA KHAN RURAL SUPPORT PROGRAMME



AGRO-BIODIVERSITY

Biodiversity is the foundation of global food security. New genetic material to increase yields or produce disease resistant varieties can only come from wild relatives. For example, a wild barley plant from Ethiopia provided a gene that protects the California barley crop from lethal yellow dwarf virus. Rice grown in Asia is protected from the four main rice diseases by genes found in a wild species from India. The sugar cane industry in the U.S. was saved from collapse by disease-resistance genes brought in from a wild Asian species.

The diminishing number of agricultural varieties grown worldwide is cause for alarm. In many places, responding to financial pressures and incentives, farmers now grow a limited number of high-yielding varieties of major food crops like wheat, rice and potatoes. The result is higher income in the short term, but also greater susceptibility to disease or environmental problems, and a dependency on high-cost inputs like fertilizer and pesticide, that also harm the environment. Diversity among crops, and diversity among varieties offers a buffering effect against such problems. Most traditional varieties, having been bred over many generations in traditional cropping systems, are adapted to low input cultivation, and thus are less likely to cause negative environmental impacts.



Traditional medicine in many developing countries is related to the field of agrobiodiversity since species of wild and cultivated plants form the basis of primary health care for up to 80 percent of the people. The rosy periwinkle was used in Cuba, the Philippines, and South Africa to treat inflammation, rheumatism, and diabetes. In the late 1950s, vincristine and vinblastine were isolated from the periwinkle, and treatment with these drugs

has led to a 99 percent remission rate for childhood leukemia. These drugs can also cure Hodgkin's disease in 70 percent of cases. Roughly 119 pure chemical substances extracted from some 90 species of higher plants are used in pharmaceuticals around the world. Of the top-selling 150 prescription drugs in the United States, 80 percent have their origins in biodiversity.

Agricultural diversity and cultural diversity go hand-in-hand. In many areas, different ethnic groups each grow their own particular assortment of varieties, and some are even continuing the process of domesticating wild plants. As habitats are lost, as cultural diversity is lost, and as monoculture farming spreads, genetic resources vital to the future of agriculture are being lost as well.

ETHIOPIA: SUPPORTING AN AGROBIODIVERSITY HERITAGE

Small farmers and farming communities in Ethiopia, as in many other African countries, work hard to maintain high levels of genetic diversity in the crops they grow. These farmers grow landraces—genetically diverse forms of cultivated plants that interface between wild and domesticated species—as repositories of traits resistant to pests, drought, diseases, and predators. While being exceptionally nutritious for both humans and livestock, landraces also serve as important genetic resources for breeding new crop types that allow low-input farming that is environmentally friendly. However, this genetic diversity is being rapidly lost as African farmers, hoping to solve short-term food shortages, are substituting indigenous landraces for genetically uniform varieties. These varieties grow better under optimal conditions but they are highly vulnerable to unforeseen environmental stresses. Projects undertaken to date to harbor agrobiodiversity have focused on collecting seeds in gene banks, but this practice arrests the complex interaction of diverse varieties with pests, predators, pathogens, and climactic variables necessary for the continued development of hardy traits.

A Dynamic Farmer-based Approach to the Conservation of Ethiopia Plant Genetic Resources

This GEF-UNDP project is helping small-

scale farmers utilize and conserve landraces of local and global significance for crops such as wheat, barley, sorghum, and lentil. In a unique in situ approach, the project brings together farmers and genetic research institutions for initiatives that allow the continued evolution of landraces through farmer selection, interaction with the environment, and genetic exchange with wild species.

Project accomplishments include:

- Conserved, in situ, 316 varieties comprising 22 different crops on a rotation basis in 49 sites;
- Established eight community gene banks in different ecoregions that annually turnover 10,000 kg of landrace seeds;
- Helped farmers organize nine Crop Conservation Associations;
- Supported agrobiodiversity training at all levels including three Ph.D.s, 109 “Farmer Conservators,” and 916 farmers;
- Developed community and market incentives for in situ conservation, including a program for reimbursing farmers for conserving landraces;
- Organized a community of scientists, extension agents, and farmers who are trained, equipped, and networked to pursue in situ conservation objectives;
- Promoted national awareness of biodiversity conservation and the Ethiopian National Policy on Biodiversity Conservation and Research;
- Helped establish the Ethiopian Institute of Biodiversity Conservation and Research.

Lesson Learned:

The diversity of traditional indigenous practices and knowledge systems actively maintain agrobiodiversity. The maintenance of landraces must take into account the diversity of traditional knowledge, genetic information, complex social

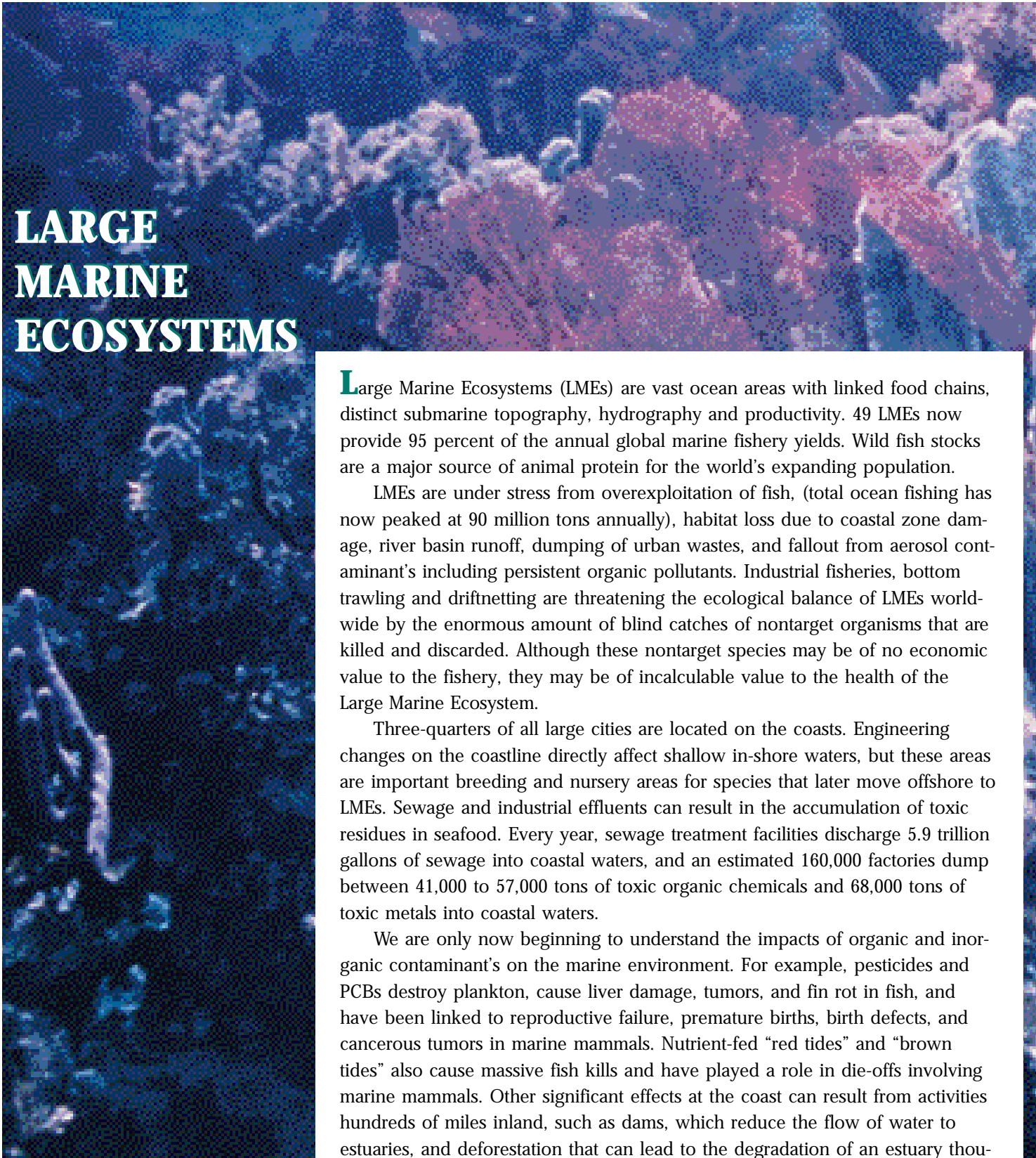


SMALL FARMERS ARE WORKING TO MAINTAIN HIGH LEVELS OF GENETIC DIVERSITY IN THE CROPS THEY GROW.

IMPLEMENTING AGENCY: UNDP
COUNTRIES: ETHIOPIA
EXECUTING AGENCIES: ETHIOPIAN AGRICULTURAL RESEARCH ORGANIZATION; INSTITUTE FOR BIODIVERSITY CONSERVATION AND RESEARCH
FUNDING PARTNERS: GEF, UNDP

DIVERSITY IN ETHIOPIAN SEEDS





LARGE MARINE ECOSYSTEMS

Large Marine Ecosystems (LMEs) are vast ocean areas with linked food chains, distinct submarine topography, hydrography and productivity. 49 LMEs now provide 95 percent of the annual global marine fishery yields. Wild fish stocks are a major source of animal protein for the world's expanding population.

LMEs are under stress from overexploitation of fish, (total ocean fishing has now peaked at 90 million tons annually), habitat loss due to coastal zone damage, river basin runoff, dumping of urban wastes, and fallout from aerosol contaminants including persistent organic pollutants. Industrial fisheries, bottom trawling and driftnetting are threatening the ecological balance of LMEs worldwide by the enormous amount of blind catches of nontarget organisms that are killed and discarded. Although these nontarget species may be of no economic value to the fishery, they may be of incalculable value to the health of the Large Marine Ecosystem.

Three-quarters of all large cities are located on the coasts. Engineering changes on the coastline directly affect shallow in-shore waters, but these areas are important breeding and nursery areas for species that later move offshore to LMEs. Sewage and industrial effluents can result in the accumulation of toxic residues in seafood. Every year, sewage treatment facilities discharge 5.9 trillion gallons of sewage into coastal waters, and an estimated 160,000 factories dump between 41,000 to 57,000 tons of toxic organic chemicals and 68,000 tons of toxic metals into coastal waters.

We are only now beginning to understand the impacts of organic and inorganic contaminants on the marine environment. For example, pesticides and PCBs destroy plankton, cause liver damage, tumors, and fin rot in fish, and have been linked to reproductive failure, premature births, birth defects, and cancerous tumors in marine mammals. Nutrient-fed "red tides" and "brown tides" also cause massive fish kills and have played a role in die-offs involving marine mammals. Other significant effects at the coast can result from activities hundreds of miles inland, such as dams, which reduce the flow of water to estuaries, and deforestation that can lead to the degradation of an estuary thousands of kilometers away.

Comprehensive conservation measures applied to Large Marine Ecosystems as a whole are known as Strategic Action Programmes (SAP). SAPs engage a host of countries in order to address the root causes of degradation of their shared marine resource, from preventing soil erosion to establishing mechanisms for the sustainable use of species within international waters.

COLLABORATING TO PROTECT THE PACIFIC MARINE ECOSYSTEM

The 38 million square kilometer Western Warm Pool Large Marine Ecosystem spans the tropical South Pacific region. It supports a spectacular array of species in habitats ranging from the most biologically diverse coral reefs in the world, to the deepest ocean trenches, to vast stretches of open ocean where the world's largest tuna fishery operates. Many of Oceania's six million people live subsistence lifestyles largely dependent upon marine resources. Increasing dependence on the cash economy, very high birth rates, and labor migration have impacted the quality of subsistence living on many islands. At the same time, unsustainable fishing practices, degradation of coastal habitats and water quality are decreasing fish yields and threatening the food security of local communities. Responsibility for managing vast ocean areas within their 200 mile exclusive economic zone is another major challenge facing these relatively small countries.

Implementation of the Strategic Action Programme of the Pacific Island Small Island States

This GEF-UNDP project developed a comprehensive Strategic Action Plan (SAP), endorsed by the Heads of Government of the South Pacific Forum, that proposes a regional framework and actions to address the root causes of international waters degradation. The SAP has two consultative processes:

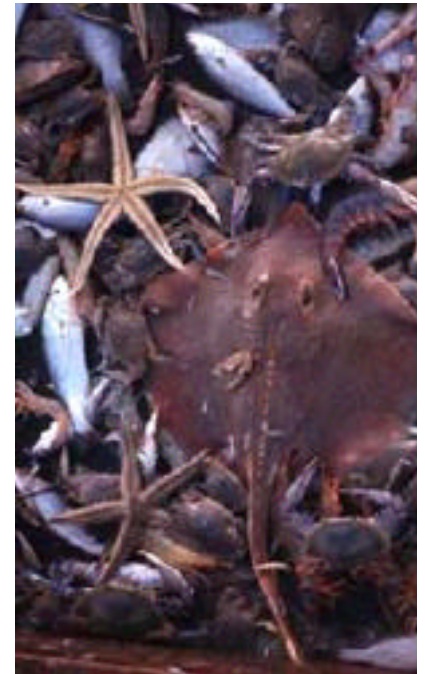
1-Integrated Coastal and Watershed Management focuses on quality and quantity of freshwater supplies, Marine Protected Areas, sustainable coastal fisheries, integrated coastal management, and waste reduction. 14 demonstration projects are providing lessons for community-based management of threatened habitats, and promoting options for the sustainable use of natural resources.

2-Oceanic Fisheries Management is building the capacity of Pacific Island States to responsibly manage their tuna resources and participate in a new tuna management organization currently being established for region. Currently, only one percent of the one million tons of tuna caught annually enters the local economy. The project is helping to improve national and regional management capability, stock and by-catch monitoring and research, and to enhance national and regional management linkages.

In a related initiative, GEF also financed the **South Pacific Biodiversity Conservation Project**, which established 17 community conservation areas on 13 islands and trained over 1000 Pacific islanders—the region's largest biodiversity undertaking.

Lessons Learned:

Building awareness of biodiversity conservation among civil society, the private sector, and governmental agencies requires a long-term commitment and substantial project resources—particularly on multi-country initiatives. Engaging private sector partners can be just as challenging and time consuming as engaging a diversity of local communities.



DIVERSITY OF SPECIES CAUGHT AS UNWANTED BYCATCH FROM BOTTOM TRAWLING.



UNSUSTAINABLE FISHING PRACTICES, DEGRADATION OF COASTAL HABITATS AND WATER QUALITY ARE DECREASING BIODIVERSITY AND THREATENING THE FOOD SECURITY OF LOCAL COMMUNITIES.

IMPLEMENTING AGENCY: UNDP

COUNTRIES: COOK ISLANDS, FEDERATED STATES OF MICRONESIA, FIJI, KIRIBATI, MARSHALL ISLANDS, NAURU, NIUE, PALAU, PAPUA NEW GUINEA, SAMOA, SOLOMON ISLANDS, TONGA, TUVALU, VANUATU

EXECUTING AGENCY: SOUTH PACIFIC REGIONAL ENVIRONMENT PROGRAMME (SPREP)

FUNDING PARTNERS: GEF, UNDP, FISHERIES FORUM AGENCY, SPREP, SECRETARIAT FOR THE PACIFIC COMMUNITY.

UNDP Country Offices and the GEF-UNDP Programme

GEF-UNDP projects address national priorities in response to requests from host governments. By virtue of their ongoing dialogue with government agencies, personnel within the 138 UNDP Country Offices throughout the developing world are crucial to preparing, implementing, and monitoring GEF-UNDP projects. Within UNDP, professional and technical experts dedicated to the GEF specialize in formulating the complex partnerships represented by each GEF project. GEF-UNDP personnel are distributed throughout all regions of the developing world, and at headquarters in New York.

Capacity Development

Building the human, institutional and system-wide resources needed to conserve biodiversity while sustaining livelihoods is a core goal of all GEF-UNDP projects. These capacity building components often assist governments integrate environmental protection into their national agendas, policy frameworks, and development plans.

Partnerships

Successful working partnerships provide the foundation for project success. Each project brings together a unique coalition of governments, NGOs, grassroots organizations, educational institutions, foundations, private sector interests, other UN agencies, regional development banks, and bilateral and multilateral donors. GEF also stresses partnership among funders. For each GEF dollar allocated, GEF-UNDP projects currently leverage another \$2.3 from other sources.

Small Grants Programme

The GEF Small Grants Programme (SGP) provides grants of up to \$50,000 directly to non-governmental organizations and community-based organizations for initiatives that conserve and restore the natural world while enhancing local well-being and livelihoods. Ten years since its establishment in 1992, the SGP is now a GEF Corporate Programme funded on an annual rolling basis available in 60 countries. Altogether more than 2300 SGP projects have addressed adverse environmental challenges and enriched the lives of tens of thousands of people. In each participating country, a national coordinator and a national steering committee are responsible for managing the programme, adapting it to local circumstances, deciding on grant allocations and nurturing multi-stakeholder participation and partnerships at every level. Over 600 organizations worldwide have joined in supporting SGP projects, including significant contributions by the UN Foundation, the European Commission, and the Governments of the Netherlands and Denmark. The United Nations Development Programme implements the Small Grants Programme, which is executed by UNOPS on behalf of UNDP, UNEP, and the World Bank. For more information visit www.undp.org/sgp, call (212) 906-5842; fax: (212) 906-6568.



BUILDING THE HUMAN AND INSTITUTIONAL RESOURCES NEEDED TO PRESERVE BIODIVERSITY WHILE SUSTAINING LIVELIHOODS IS A CORE GOAL OF ALL GEF-UNDP PROJECTS.

Country Dialogue Workshop

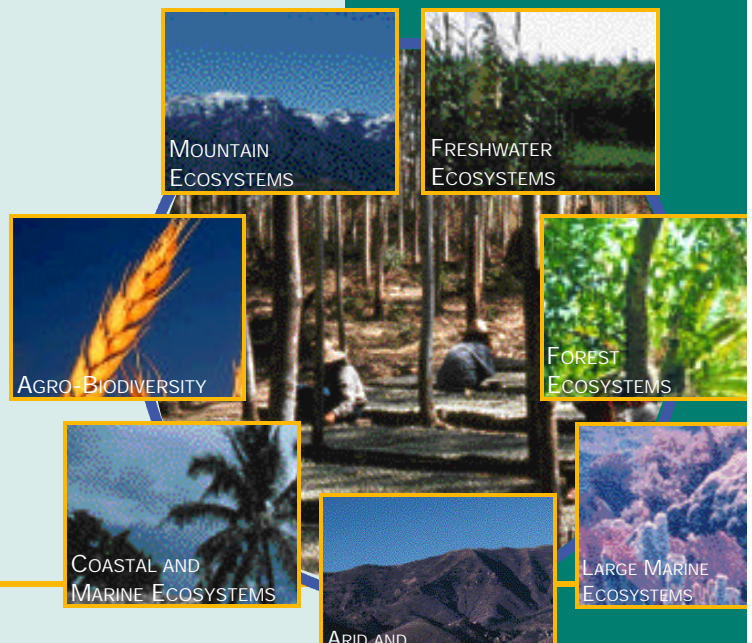
The GEF Country Dialogue Workshop (CDW) Programme is a UNDP-led joint initiative of UNDP, UNEP, the World Bank and the GEF Secretariat on behalf of Member States. The Programme promotes country ownership of the GEF, facilitates national coordination, and builds awareness through targeted, multi-stakeholder workshops that engage the countries in a direct dialogue on national priorities and the GEF. 51 countries and 2,500 participants participated in 26 GEF Country Dialogue Workshops from April 2000 through December 2001. On average, a Workshop has been conducted every three weeks since the Programme began. Workshop participants represent a wide range of stakeholders, including government representatives, non-governmental organizations, academic institutions, scientific communities, donor organizations, the private sector, and the media, as well as resource persons from the GEF Secretariat and its three Implementing Agencies. For more information visit the CDW website: <http://www.undp.org/gef/workshop/index.htm>, or call: (212) 906-5452; fax: (212) 906-6568.

Biodiversity Enabling Activity Support

Biodiversity Enabling Activities are special projects designed to assist Parties to the Convention on Biological Diversity (CBD) in fulfilling their commitments under the Convention. Through implementation of Enabling Activities, countries are developing National Biodiversity Strategies and Action Plans, participating in the Clearing House Mechanism and undertaking assessments of capacity building needs and priorities for implementing the CBD. UNDP has provided US\$25 million in GEF funds for Enabling Activities in 88 countries.

UNDP's Bureau for Development Policy (BDP)

In support of UNDP's mandate to promote sustainable human development and the eradication of poverty, the Bureau for Development Policy (BDP) ensures that the development content of UNDP's work reflects the priorities set by UNDP's Executive Board, programme countries and global trends by providing: (a) Global advocacy and analysis to generate knowledge, build alliances, and promote enabling frameworks on key development issues, (b) Policy advice, support and alignment across programmes, drawing on the global network of policy specialists, and (c) Knowledge-networking and sharing of best practices, drawing on UNDP's Sub-Regional Resource Facilities (SURF) system and communities of practice to support country and regional programming efforts.



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UNITED NATIONS DEVELOPMENT PROGRAMME
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