

The World Bank and Biodiversity

1988–2005

35302

Mountains  
to  
Coral Reefs



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Note: All dollars are U.S. dollars

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# The Bank Biodiversity Portfolio



## Introduction

The World Bank's overarching mission is to alleviate poverty and support sustainable development. The conservation and sustainable use of natural ecosystems and biodiversity are critical elements of this mandate. Biodiversity is the foundation and mainstay of agriculture, forests, fisheries, soil conservation, and water quality. Biological resources provide the raw materials for livelihoods, sustenance, trade, medicines, and industry. Genetic diversity provides the basis for new breeding programs, improved crops, enhanced agricultural production, and food security. Natural habitats and ecosystems provide services—such as water flow, flood control, and coastal protection—that reduce human vulnerability to natural hazards, including drought, floods, tsunamis, and hurricanes. Forests, grasslands, freshwater and marine and other natural ecosystems provide global environmental benefits such as carbon sequestration, biodiversity conservation, and nutrient and hydrological cycling. Sound ecosystem management provides countless streams of benefits to, and opportunities for, human societies, while also supporting the web of life. Biodiversity conservation contributes to environmental sustainability, a critical Millennium Development Goal (MDG) and a central pillar of World Bank assistance.

The World Bank Group has a rich portfolio of biodiversity projects. Through lending and grant support to client countries, it is one of the largest international funding sources for biodiversity (World Bank, 2004a). This portfolio review and update shows that between July 1988 and June 2005, the World Bank approved 492 projects that wholly or partially support biodiversity conservation and sustainable use. This biodiversity portfolio represents a \$5-billion investment, including Bank contributions and leveraged co-financing. Although this investment is a very small part of the Bank's overall lending, this biodiversity funding has made a substantial contribution to helping client countries meet their obligations under the Convention on Biological Diversity (CBD) and to implementing work programs and priorities agreed by the CBD. A substantial amount of that investment has been dedicated to protected areas (World Bank, 2003a) but there is an increasing focus on improving natural resource management and mainstreaming biodiversity into forestry, coastal zone management, and agriculture. Beyond these "traditional" biodiversity sectors, the Bank is also supporting innovative modalities for protection and improved management of natural habitats through Bank-funded energy and infrastructure projects, Carbon Fund projects, and Development Policy Lending (DPL).

Bank projects directly support biodiversity conservation and sustainable use in a range of natural habitats, from



mountains to coral reefs and from tropical evergreen and monsoon forests to savanna grasslands and unique dryland, limestone, marine, and freshwater ecosystems. Many are in centers of recognized global importance for biodiversity: megadiversity hotspots, remaining wilderness areas, the Global 200 Ecoregions described by World Wide Fund for Nature (WWF), and Endemic and Important Bird Areas (EBAs and IBAs). By promoting investments in these locations the Bank is helping countries to meet the 2010 targets of the CBD.

This portfolio review is a report for the Eighth Conference of the Parties to the CBD in Brazil in March 2006 and to the GEF Assembly in South Africa in August 2006. It provides an update on previous reviews, which focused on specific ecosystems (forests and mountains) and themes (protected areas), as well as previous overviews of the whole portfolio (World Bank, 2004a). It includes information on some of the most recent highlights of the portfolio, including initiatives to mainstream biodiversity into regional and national development programs as well as innovative financing mechanisms for biodiversity conservation.

## Methods

This paper is based on the most recent update of the World Bank biodiversity portfolio and summarizes the efforts of the World Bank Group (alternatively, WBG, the World Bank, or the Bank) over the past 17 years (1988–2005) to promote the conservation and sustainable use of biodiversity. This period spans ratification and implementation of the Convention on Biological Diversity as well as two major Earth Summits in Rio de Janeiro and Johannesburg, and more than a decade of experience with implementation of the Global Environment Facility (GEF). As an Implementing Agency of the Global Environment Facility, the Bank has played a major role in supporting the objectives of the Biodiversity Focal Area program, especially in promoting

the sustainability of protected area networks and in mainstreaming biodiversity in production landscapes.

This portfolio update incorporates both stand-alone biodiversity projects and biodiversity-related sectoral projects—for example, a hydropower project in Lao PDR, an irrigation project in Iran, and ship-generated waste management project in the Eastern Caribbean—that clearly describe and include biodiversity activities. It includes all such projects financed through the International Bank for Reconstruction and Development (IBRD), the International Development Association (IDA), the Pilot Program to Conserve the Brazilian Rainforest (RFTF), and GEF projects executed through the World Bank. The Bank's private sector arm, the International Finance Corporation (IFC), contributes to biodiversity conservation through private sector lending and GEF grants; only the latter are included in this analysis. In addition to projects and project components with specific and direct biodiversity objectives (the biodiversity portfolio), the Bank funds many other development projects that may also have positive, albeit indirect, impacts on biodiversity. For example, pollution abatement, sewage treatment, and cleaning up pollution discharge may enhance water quality in freshwater ecosystems and benefit freshwater biodiversity. This update, however, does not cover such indirect support.

Additionally, a small but growing source of funding for protected areas and other biodiversity activities comes from special World Bank trust funds (see Box 1.1). The Bank contributes to biodiversity conservation through innovative programs funded by the Development Grant Facility (DGF) and the Bank Netherlands Partnership Program (BNPP). The Development Grant Facility, sourced from Bank income, provides support to global partnerships such as the World Bank/WWF Alliance for Forest Conservation and Sustainable Use, the Critical Ecosystems Partnership Fund (CEPF), and the Global Invasive Species Programme (GISP). It has also contributed approximately \$50 million annually to the Consultative Group for International Agriculture Research (CGIAR)



## BOX 1.1

### Laying the Foundation for Biodiversity Conservation in Mongolia

Toward the end of 2004 the Bank was approached by the Netherlands Embassy in Beijing with the offer of \$6 million to be used for environmental reform. A detailed proposal was assembled with feedback from the Mongolian and Netherlands governments, and a trust fund, known as NEMO, was established. Activities included a revision of legislation for toxic chemicals, understanding environmental conditions in secondary cities, tourism development impacts on the environment, and promoting heating efficiency; approximately \$1.1 million was allocated for biodiversity activities, including the following:

**Reporting on Wildlife Trade** — The Wildlife Conservation Society office in Ulaanbaatar was contracted to prepare a major report on the illegal wildlife trade in Mongolia, looking especially at effective means of preventing the trade and suggesting initiatives for the sustainable management of certain valuable natural resources. Staff in China and Russia collaborated to provide regional data.

**Biodiversity Database** — The Zoological Society of London, together with the Mongolian Steppe Forward Programme, helped to establish a Mongolian Biodiversity Databank, starting with mammals and fish. Involving an active Steering Committee from government, academics, and NGOs, a week-long workshop resulted in assessments of all mammal and fish species against IUCN Red List criteria and a range of action plans for the most threatened or commercially important species, such as wild camel, wild ass, musk deer, and snow leopard. The database is hosted at the National University and will soon be expanded to include other vertebrates and certain plant groups.

**Faiths and Conservation** — A remarkable Conference on Northern Buddhism and the Environment (see [www.buddhistecology.org](http://www.buddhistecology.org)) was held in the capital, Ulaanbaatar, in June 2005 with the support of the President's Contingency Fund. The President of Mongolia took a very active role and NEMO funds are being used to follow up recommendations through the Alliance of Religions and Conservation (ARC). An "association" of northern Buddhists is being created to link monasteries and monks through information networks with NGOs and other entities working in the environmental and development fields. Representatives from monasteries, NGOs, government, and tour companies will share information and ideas concerning the management of sacred sites for faith and conservation. A workshop will be held in cooperation with WWF Mongolia with monastic, government, and NGO participation to discuss the potential for monks to help with the official curriculum on environmental education.

**Small Grants Program** — Finally, NEMO funds were used to set up a \$1 million small grant facility for conservation. Out of over 100 proposals, nearly 30 were approved to support work in national parks, environmental education (one by an environmental sumo wrestling team), and monitoring wildlife trade.

networks for critical research to improve crops and increase agricultural productivity. The DGF also provides cofunding to projects such as the Millennium Ecosystem Assessment, Global Coral Reef Targeted Research project, and the International Assessment of Agricultural Science and Technology for Development (IAASTD).

Since 1998 the Bank-Netherlands Partnership Program has contributed \$50 million through its Environment Window to mainstream the environmental dimension of sustainable development into overall World Bank

assistance by supporting the implementation of the Corporate and Regional Environmental Strategies of the World Bank. Currently, the Environment Window of BNPP has a total of 49 active or recently approved projects. For CY04, 17 projects were approved totaling \$ 7.2 million, for CY05, 23 projects totaling \$10.13 million and for CY06, 9 proposals totaling \$3.39 million. More than 50 percent of these projects are in Africa. The BNPP funding has supported upstream analytical work to strengthen poverty-biodiversity linkages and Bank lending; provided resources to strengthen new partnerships, e.g. with Global Witness



and the Alliance on Forest Governance; and resourced capacity building through initiatives to address invasive alien species and local language field guides. Another Bank program, the Development Marketplace (DM), is providing seed funding for innovative development ideas. An increasing focus on environment in the Development Marketplace has afforded the opportunity to support new biodiversity initiatives and small grants in some of the poorer countries. Several projects in 2004 and 16 of the 2005 winners were biodiversity projects (see Box 1.2).

The Annex lists all Bank biodiversity projects included in the portfolio for the fiscal year in which they were approved by the Bank Board or, in the case of GEF medium-size projects (GEF MSPs), by the country management unit. The source of funding, whether WBG (loans, credits, or grants) or co-financing from non-Bank sources, is noted for each project. Where there is more than one source of WBG financing in a project, these components are assessed separately to avoid double counting. Co-financing amounts include contributions from borrower governments, local beneficiaries, non-governmental organizations, bilateral donors, regional development banks, and United Nations agencies. As in previous reviews, biodiversity costs are determined by itemizing each activity component. For each project, figures have been estimated for total project cost, total biodiversity costs (WBG funds plus associated co-financing), and Bank biodiversity funding. The Annex provides a listing, by region, of all biodiversity projects with their funding and key activities.

## Investment Trends

The biodiversity portfolio of the WBG has shown steady growth over the past 17 years, especially since 1992 when GEF funding became available. Between 1988 and 2005, the Bank approved 492 projects that fully or partially supported biodiversity conservation and sustainable use. These biodiversity initiatives are taking

place in 105 countries and through 39 multi-country efforts. More than half of these projects (255) were approved since 2000, with 43 projects in FY05 alone. Many of these projects benefit from GEF funding.

Bank biodiversity projects directly support biodiversity conservation in a range of natural habitats, from temperate forests to freshwater rivers and lakes, from large marine ecosystems to high mountain habitats, and from some of the most expansive tropical forest wildernesses to some of the most unique limestone landscapes. During the period between 1988 and 2005, the WBG committed over \$2.8 billion in loans and GEF resources and leveraged almost another \$2.3 billion in co-financing, resulting in a total investment portfolio exceeding \$5 billion.

Table 1.1 shows the total World Bank commitments for biodiversity projects by year and funding source from 1988 to 2005. Cumulative WBG biodiversity funding for biodiversity projects during that period totaled over \$5.1 billion. Figure 1.1 summarizes biodiversity investments from all funding sources.

Figure 1.1 gives an indication of the normal fluctuation of the funding cycles. Apparent surges in funding between years are explained by bunching of a few large projects in some years or postponements of Board approval dates. Apparent decreases in overall funding levels in one year are usually compensated in the next. Longer preparation times due to the particular pace of country dialogue and the intricacies of biodiversity projects are also contributors to these fluctuations. Estimated 2005–07 figures lead us to believe that this characteristic pattern of annual variability in WBG biodiversity investments will continue. Comparisons between years are thus difficult to interpret and necessitate a longer-term view of biodiversity portfolio trends. Preliminary qualitative assessments of the portfolio suggest that funding reflects and responds to the diverse strategic conservation priorities of Bank clients.

Partner governments have borrowed 32 percent (down from 39 percent in 2000) of the \$5 billion investment

**BOX 1.2****Innovation in Conservation — The Development Marketplace Way**

Development problems often require new solutions. The Development Marketplace provides seed funding for innovative, small-scale development projects that offer creative, cutting-edge solutions to some of the most pressing social, economic, and environmental concerns of our time. Winning projects in 2005 ranged from providing nest sites to encourage rodent-eating barn owls in Chile to livelihood projects linked to protection of Ugandan gorillas and Russian tigers. Examples of DM projects include:

**Ha Tien: Habitats and Handbags** — The acid soils of the Ha Tien Plain in Vietnam support a mosaic of grassland and wetland ecosystems, which are being destroyed due to increased shrimp pond development and subsistence rice farming. The Khmer people live in poverty in the area—although they may work at the shrimp ponds, they see little of the profit. A DM project in 2003 sought to improve the benefits the Khmer people receive from woven household goods while encouraging the sustainable harvesting of rushes. The project has had direct positive impacts on the Sarus crane, an important symbol to the Buddhist Khmer people. The project established a wetland protected area of 2,890 ha in Phu My commune, Kien Luong District, Kien Giang Province, conserving the last remnant of *Lepironia* (*Lepironia articulata* – Cyperaceae) grassland in the Mekong Delta. Human disturbances and encroachment in the new protected area have been reduced and cranes are on the increase. The annual Sarus crane count, carried out in March 2005 in Cambodia and Vietnam by the International Crane Foundation, recorded 45 cranes in the project area, significantly more cranes than the year before. The project area is now included in the Kien Giang Biosphere Reserve being nominated to UNESCO by the Government of Vietnam.

**Chilis: Cash and Crop Protection** — Rural farmers in many parts of Africa suffer severe losses when wildlife such as elephants and buffalos raid their crops. Current farming practices serve to increase the risk of crop damage, as many crops are highly palatable to wildlife. Current crop protection is often ineffective, and killing problem animals is an option that both farmers and conservationists want to avoid. Chili peppers have proved to be a valuable cash crop that also effectively repels wildlife, including elephants and buffalo. A DM 2003 project has helped over 250 household farms in Zimbabwe, Zambia, and Mozambique to cultivate chili as a robust, and affordable, system of crop defense that is controlled by the community. At all the sites, crop depredations went down by at least 37 percent from the previous farming seasons. At the same time, on average each participant in the project reported an increase in income by as much as 52 percent owing to the sale of chili peppers.

**Duck Rangers** — Rice farming and raising mallard ducks are important livelihoods in the Philippines. Snails are an important food source for the ducks; otherwise farmers must rely on expensive commercial feed. In rice-growing areas, infestations of the invasive golden snail can destroy up to 60 percent of a crop. Rice farmers rely on chemical inputs like molluscicide (snail killer), fertilizer, insecticide, and herbicide, resulting in environmental degradation and significantly increasing the cost of production. Traditionally, rice and ducks are raised separately, but significant gains can be realized by raising both in the same field. The ducks can control the golden snail population, which will in turn improve rice field productivity. Duck farmers will benefit from cheaper duck feed, while rice farmers will gain from an environmentally friendly and inexpensive way to fight the destructive snail. The production of the “Duck Ranger”—a movable duck shed that will house the free-ranging ducks as they move from one place to another—will facilitate this integrated farming model. The project estimates that 17,340 farm families will benefit from this innovation.

through IBRD loans or IDA credits, representing a total of \$1.6 billion. Grants comprise 23 percent (\$1.2 billion) and were facilitated through Bank-executed

GEF projects (\$1.1 billion) and several trust funds (\$87 million). The remaining 45 percent of total funding (\$2.3 billion) represents co-financing and parallel financing,



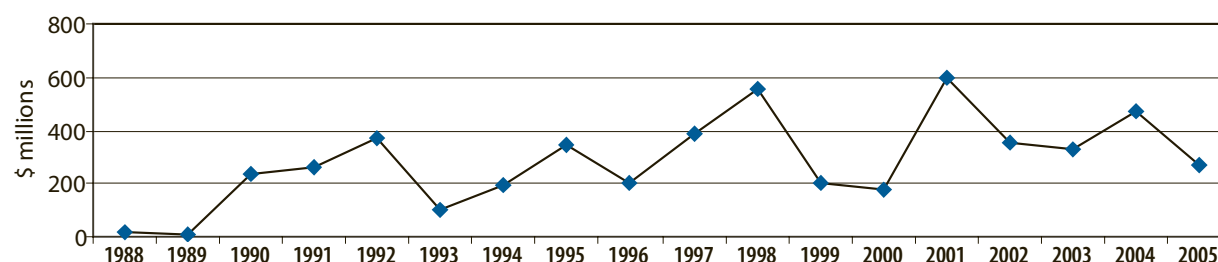
**Table 1.1** Total biodiversity investments by year and funding source (\$ millions)

	Total GEF	IDA	IBRD	Trust Funds	Total Bank Funding	Total Co-financing	Total Biodiversity Funding
1988	0.00	2.86	3.79	0.00	6.65	8.95	15.60
1989	0.00	3.93	3.16	0.00	7.09	5.21	12.30
1990	0.00	14.22	129.26	0.00	143.48	91.00	234.48
1991	0.00	35.48	97.17	0.00	132.65	129.94	262.59
1992	23.20	125.97	91.21	0.00	240.37	130.17	370.55
1993	29.75	28.37	17.13	0.00	75.25	42.93	118.18
1994	51.27	54.01	27.94	0.00	133.21	63.75	196.97
1995	44.06	34.80	55.61	36.66	171.13	176.26	347.40
1996	73.95	5.07	40.89	0.00	119.91	79.98	199.89
1997	89.88	99.54	38.86	0.00	228.28	160.75	389.03
1998	90.47	132.30	39.02	0.20	261.99	290.79	552.79
1999	45.10	40.15	15.87	3.00	104.11	98.57	202.68
2000	52.11	13.85	49.68	6.90	122.54	53.58	176.12
2001	164.15	24.06	72.28	27.00	287.48	330.56	618.04
2002	144.55	38.99	21.35	4.33	209.22	144.57	353.79
2003	100.98	37.09	33.33	0.00	171.40	157.70	329.10
2004	100.81	57.32	38.95	4.39	201.47	269.72	471.19
2005	89.64	55.45	49.40	4.78	199.27	67.44	266.70
<b>Totals</b>	<b>1,099.92</b>	<b>803.44</b>	<b>824.89</b>	<b>87.25</b>	<b>2,815.50</b>	<b>2,301.87</b>	<b>5,117.37</b>

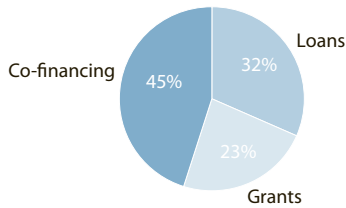
approximately equivalent to an additional 82 cents for every dollar the World Bank invests in biodiversity (up from 70 cents per dollar invested by FY99). Figure 1.2 presents the total biodiversity investment by funding source. Figure 1.3 represents the total annual biodiversity investments by the Bank including the leveraged co-financing.

The total number of biodiversity projects or projects with biodiversity components funded by IBRD and IDA is 99 and 106 projects, respectively. Some \$272

million of IDA funds (34 percent) and \$247 million of IBRD funds (30 percent) are linked to GEF financing; this is a trend that has become more common over time. This indicates that a wide range of economies, including the poorer IDA-eligible countries, are borrowing for biodiversity conservation and sustainable use. It is expected that in the coming years countries will remain interested in using IDA credits and grants to supplement grant-based conservation.

**Figure 1.1** Annual biodiversity investments, including co-financing, FY1988–2005

**Figure 1.2 Biodiversity investments by type of funding, FY1988–2005 (\$ 5.1 billion total)**

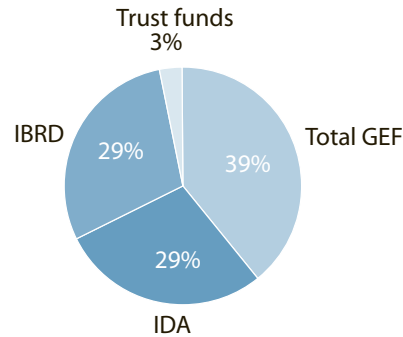


In the early stages of the review period (1989–1992), IBRD funded a few large projects. This is well illustrated by the Latin America and Caribbean (LAC) region, where funding in the early period focused on large environmental projects such as the Brazilian Rondonia Natural Resource Management, Mato Grosso Natural Resource Management, and National Environmental projects, whose cumulative biodiversity investment totaled \$200 million. The emphasis has since shifted to lending for a larger number of smaller-sized projects or components within larger projects, which indicates improved mainstreaming of biodiversity conservation into broader development lending.

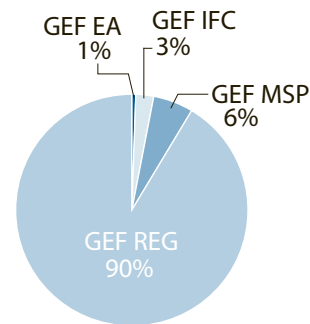
The number of biodiversity projects as a whole has steadily increased over the review period, with 43 added in 2005, worth over \$266 million. While the number of projects has increased, the average investment per project has become smaller. Much of the increase is attributable to an increase in the number of GEF projects. More than half of all projects are GEF-funded or projects with GEF components blended with IBRD and IDA lending. GEF accounts for

39 percent of all financing (see Figure 1.4), with most of the financing going to full-sized projects (see Figure 1.5).

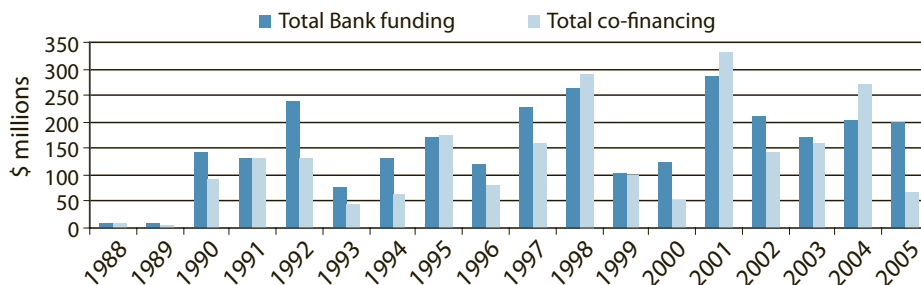
**Figure 1.4 Percentage of total Bank biodiversity investments, excluding co-financing, by funding source (1988–2005)**



**Figure 1.5 Percentage of GEF funds by type of project**



**Figure 1.3 Annual biodiversity investments and leveraged co-financing**



## Regional Trends

The WBG is supporting conservation and sustainable use of biodiversity worldwide. Table 1.2 and Figure 1.6 show the cumulative biodiversity funding (\$5.1 billion) from all sources by region. The major share (39 percent) of all funding for biodiversity projects went to Latin America and the Caribbean (\$2.0 billion), with 9 percent to South Asia (SAR), 26 percent to Africa (AFR), 14 percent to East Asia and the Pacific (EAP), and 6 percent to Eastern Europe and Central Asia (ECA). Just over 2 percent of total biodiversity funding went to the Middle East and North Africa (MNA). A further 4 percent represents biodiversity financing through global initiatives, such as the IFC Small and Medium Enterprise Fund, the Critical Ecosystems Partnership Fund, Coral Reef Targeted Research, and projects funded under the BNPP Forests and Biodiversity windows. Over 65 percent of all biodiversity funding has gone to the LAC and AFR regions.

**Figure 1.6 Total biodiversity investments by region (1988–2005)**

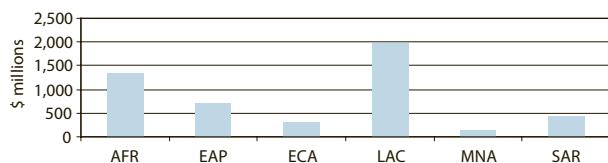


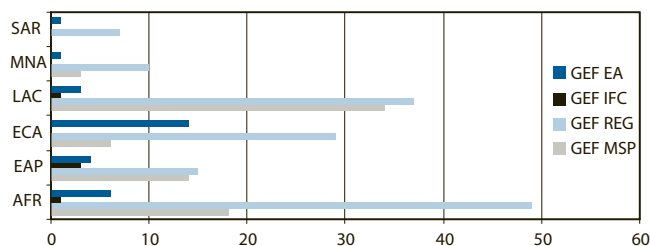
Table 1.3 shows IBRD and IDA funding by region, totaling \$825 million and \$803 million respectively. Among the regions, LAC still has the largest share of IBRD biodiversity funding with \$559 million (68 percent). Many of the LAC countries are among the mid- to higher-income developing countries and are not eligible for IDA credits. Conversely, the relatively poorer sub-Saharan African countries have received the largest share of IDA funding, corresponding to 47 percent (or \$376 million) of total IDA biodiversity funds.

As an implementing agency for the GEF, the WBG channels GEF grants for enabling activities (EAs),

medium-sized projects, and regular GEF grants, both through the Bank and the IFC. The Bank’s biodiversity investments through GEF grant windows have more than doubled over the last five years to \$1.1 billion in all regions. By the end of FY05, the Bank had 148 full or regular GEF projects, as well as 29 biodiversity EAs (up from 19 in FY99) and 75 MSPs (up from 17 by FY99), spread across all Bank regions (see Figure 1.7). As shown in Figure 1.8 GEF funding for biodiversity mirrors regular lending. Together the Africa, EAP, and LAC regions jointly absorb 73 percent of all biodiversity investments made through the GEF windows. Latin America and the Caribbean is the region with the highest GEF funding overall, a reflection of the high biodiversity value of the region’s ecosystems and country capacity to prepare and implement projects.

More than half of these GEF investments have gone toward protected area projects, but the Bank is increasingly seeking to promote the GEF mandate on mainstreaming biodiversity in production landscapes, especially where there are opportunities to integrate GEF-funded activities within Bank sector lending. To date the Bank has given less attention to the biosafety agenda of the GEF, though pilot projects have been developed for India and Colombia. The Bank is also increasingly looking at best practice and lessons learned, to improve both the effectiveness of the GEF portfolio and overall Bank lending efforts.

**Figure 1.7 Number of Bank-GEF biodiversity projects by project type and region (1988–2005)**

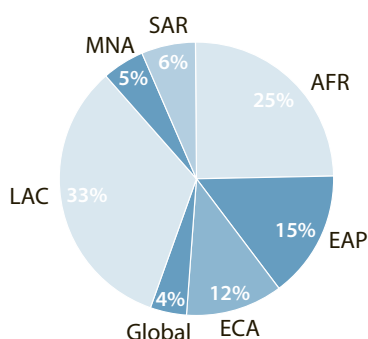


The introduction of GEF MSPs in 1997 made mid-sized grants more readily available to NGOs

**Table 1.2** Total biodiversity investments by region (1988–2005)

Region	Total Bank Investments (\$ millions)	Total Co-Financed Investments (\$ millions)	Total Biodiversity Investments (\$ millions)	Percent of Total Investments (percentage)
AFR	664.06	691.28	1,355.34	26
EAP	475.84	240.44	716.28	14
ECA	203.47	107.3	310.76	6
LAC	1,034.82	941.42	1,976.24	39
MNA	77.41	51.71	129.12	2
SAR	277.34	167.85	445.19	9
Global	82.55	101.88	184.43	4

**Figure 1.8** Bank-GEF investments by region (1988–2005)



and non-governmental stakeholders and as a result allowed a rapid expansion of the biodiversity portfolio. LAC is also the region with the most MSPs (34). The MSPs

have proved to be useful and cost-effective instruments under the Biodiversity Focal Area to test new management models and demonstrate tangible biodiversity impacts at key sites even though it may be difficult to scale up successful pilots into larger programs. MSP activities with an effective local partner (e.g., NGOs) have proved especially useful for site-based conservation even within countries riven by civil strife and weak governance. The MSP grants have also provided the opportunity for greater community involvement in biodiversity management.

Fourteen of the 29 EAs implemented thus far have been in the Eastern Europe and Central Asia region. In ECA, many of the client countries came into being with the breakup of the former Soviet Union; in those countries the Bank had little previous lending history. Assistance

**Table 1.3** Biodiversity investments by region and funder, excluding co-financing (1988–2005) (\$ millions)

	GEF MSP	GEF REG	GEF IFC	GEF EA	GEF total	IBRD	IDA	Trust funds	Total
AFR	12.80	256.62	0.48	0.95	270.83	16.73	376.07	0.43	664.06
EAP	12.71	136.66	15.19	1.22	165.78	175.52	133.32	1.23	475.84
ECA	5.03	118.61	0.00	3.15	126.79	47.68	28.42	0.59	203.47
Global	0.50	36.00	7.00	0.00	43.50	3.00	0.00	36.05	82.55
LAC	27.51	335.69	5.00	0.86	369.07	559.13	57.66	48.96	1,034.82
MNA	2.24	49.73	0.00	0.89	52.86	22.84	1.71	0.00	77.41
SAR	0.00	70.88	0.00	0.20	71.08	0.00	206.26	0.00	277.34

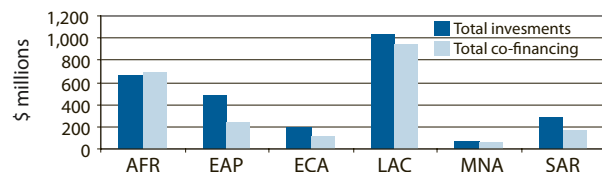


for drafting biodiversity EAs was important in developing a dialogue, which has often led to Bank investment in broader biodiversity or natural resource management projects, often focusing on sustainable forest management.

As a result, the Bank has become the largest financier of biodiversity conservation in the ECA region, mainly through investment projects. A recent review lists 54 Bank biodiversity projects in ECA for the period 1991–2002 (World Bank 2003b). The total financing for these projects is \$1.23 billion, of which the biodiversity investments from all sources totals \$255 million (20 percent). GEF has been the major source of financing for biodiversity conservation (42 percent), with smaller but equal (29 percent) financing from IBRD/IDA and other sources, which includes the borrowers/recipients, bilateral organizations, and communities. Forest ecosystems received nearly half of the investments, with substantially less but still important financing for biodiversity in wetland and marine ecosystems. Investments in grassland and desert ecosystems and in agrobiodiversity have been relatively modest, though it is expected these will increase in the future.

Overall, co-financing from client governments and other donors makes up 45 percent of the total biodiversity investment; this reflects strong commitment for biodiversity conservation at the national level and good support from other donors. Figure 1.9 shows total regional investments including co-financing.

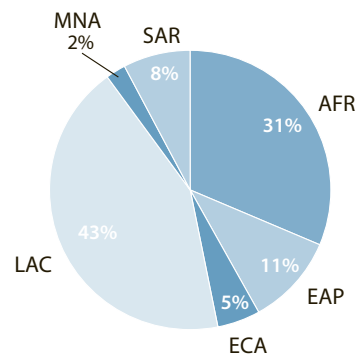
**Figure 1.9 Total investments and co-financing for biodiversity projects by region (1988–2005)**



In line with the findings for total investments, 74 percent of the \$2.3 billion parallel and co-investment funding supports biodiversity conservation and sustainable

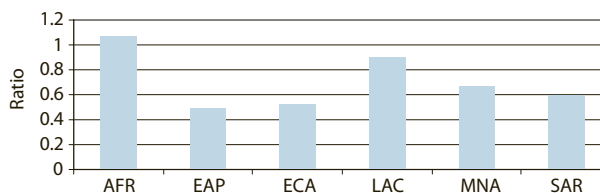
use in the LAC and Africa regions (see Figure 1.10). This is consistent with previous portfolio reviews.

**Figure 1.10 Co-financing by region (1988–2005)**



Though co-financing amounts differ, it is clear from Figure 1.11 that LAC and AFR regions attract over 80 percent of co-financing for total Bank investments, whereas EAP and ECA attract about 50 cents for each Bank dollar invested. This probably reflects greater government contributions in LAC and greater access to other donor funds in Africa. Overall, for GEF projects the ratio of leveraged funding against grant resources is 1 to 1.3. Specifically for MSPs, the ratio of leveraged co-financing is even higher, with \$1.54 leveraged for every dollar of GEF grant.

**Figure 1.11 Ratio of co-financing to Bank investments by region (1988–2005)**



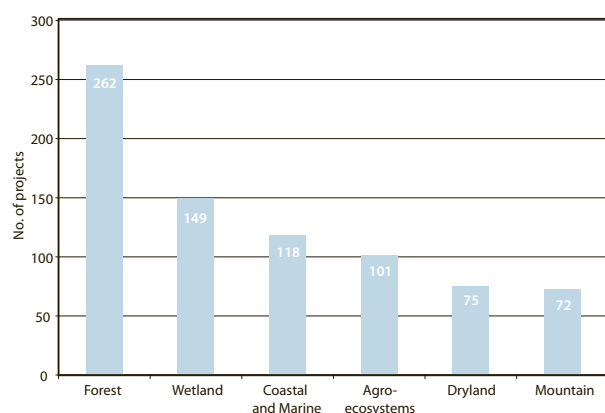
Support in WBG-funded projects covers the entire range of globally important ecosystems (see Figure 1.12). Forest ecosystems received a majority of the investments, with more than half of all projects (262) focused on forest systems, including dry forests and rain forests. Fewer projects dealt with wetland ecosystems (149), coastal and marine ecosystems (118), drylands (75), and mountain ecosystems (72). Many projects provide



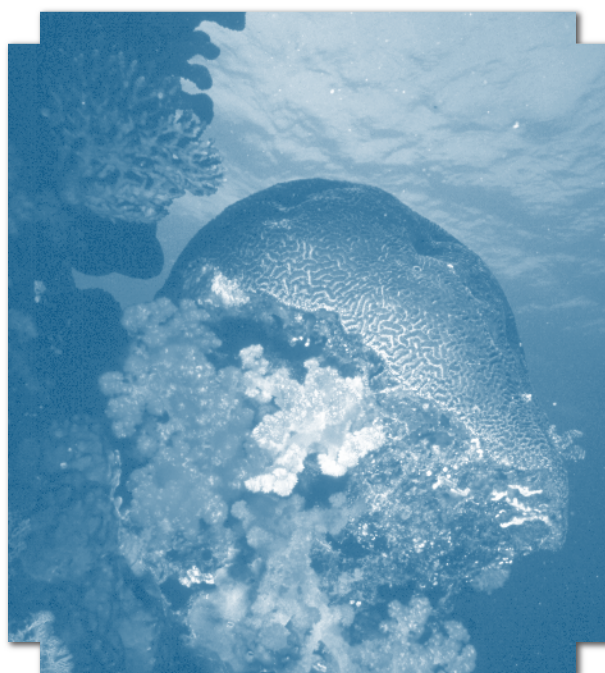
support to protected areas and other conservation initiatives across more than one major ecosystem. Over the whole biodiversity portfolio, the largest amount of funding and support has gone to projects that include expansion and strengthening of protected areas, including conservation activities in park buffer zones. The Bank is committed to maintaining support for protected areas, but increasingly is seeking opportunities to link such support to sectoral development programs and biodiversity activities in the wider landscape.

complemented by access to trust funds and lending resources, can help to introduce biodiversity within national agendas as a critical part of sustainable development. To date, the Bank is the major international funding source for biodiversity projects as well as a source of technical knowledge and expertise. Additionally the Bank has the convening power to facilitate participatory dialogue between client countries and networks of other relevant stakeholders on matters of regional biodiversity concern, such as forest law enforcement and governance, wildlife trade, and overharvesting of natural resources.

**Figure 1.12** Ecosystem occurrence in WBG biodiversity portfolio (1988–2005)



The scale and variety of Bank financing instruments provides multiple opportunities to integrate biodiversity concerns into development assistance and to address the root causes of biodiversity loss. The Bank’s leadership and coordinating role within the donor community,





# Implementing the Biodiversity Convention



## Supporting Protected Area Networks

The 168 nations that are signatories to the Convention on Biological Diversity (CBD) recognize that protected areas (PAs) are the cornerstones for biodiversity conservation. Accordingly, at the Seventh Meeting of the Conference of the Parties in Kuala Lumpur in 2004, they adopted an ambitious work program for protected areas. The goal is to support a global network of representative and effectively managed terrestrial protected areas by 2010 with a similar target for marine protected areas by 2012. The WBG has an important role to play in helping client countries achieve these targets (World Bank 2003a, 2004). Bank projects have financed creation of new reserves and expansion and strengthening of protected areas in forests, mountain, and dryland systems with increasing attention being paid to freshwater and marine ecosystems. This WBG support is targeted at both individual reserves and whole protected area systems with particular emphasis on piloting innovative models of protected area management and financing to ensure their sustainability.

Protected area support includes conservation planning and establishment of new protected areas to create effective and representative protected area networks (e.g., Brazilian Amazon, Laos, Madagascar); improved management of “paper parks” and existing protected areas (e.g., India, Pakistan, Uganda, Bolivia, Ecuador, Venezuela, Russia); buffer zone activities to reduce pressure on conservation areas (India, Indonesia); control of invasive exotic plants

and animals that threaten native species and habitats within protected areas (India, Mauritius, Seychelles, South Africa); and, where appropriate, promoting greater community involvement in conservation management, through community management areas, indigenous reserves, and sacred groves (Colombia, Ecuador, Ghana, Peru). Other projects target landscape-level efforts to strengthen linkages between protected areas and surrounding forest, mountain, and production landscapes, including transboundary projects in the West Tien Shan of Central Asia and the Maloti-Drakensberg mountains of southern Africa. Several national and regional initiatives are under way to encourage more sustainable land use and strengthened forest protection in biological corridors that link parks in the Mesoamerican Biological Corridor (MBC). In the forests of the Brazilian Amazon, Congo Basin, and the Russian Far East, the Bank is supporting investments in some of the world’s most extensive, and biologically rich, remaining wilderness areas. Offshore, the Bank is supporting community management of coral reefs and marine protected areas in Samoa, Vietnam, and Indonesia, as well as conservation efforts in large marine ecosystems along the Mesoamerican Barrier Reef, the coast of East Africa, and in the Indonesian seas.

Many of these PA projects target areas recognized as global priorities for biodiversity, including World Heritage sites, such as Komodo (Indonesia), Cape Peninsula (South Africa), Galapagos (Ecuador), and wetlands of international importance and Ramsar sites, such as Berbak-Sembilang (Indonesia) and Sultan Salzig wetlands



## BOX 2.1

### Conservation Production Landscapes — Ecology and Economics

There is growing recognition that sustainable development and protected areas are both necessary and reinforce one another. This is especially true in Brazil, which is a mega-diverse country with globally critical ecosystems, yet which has a large population of poor people who depend on natural resources for their livelihoods. The concept of conservation mosaics is relatively recent. It involves creating large areas that combine different types of protection regime—for example, a national park next to a private game reserve, a large farm employing ecologically friendly practices, an indigenous reserve, and a small factory employing sustainable techniques.

Systematic conservation planning requires strategies for managing whole landscapes, including areas allocated to both production and protection. Protected areas alone are not adequate for nature conservation, but they are the cornerstone on which regional strategies are built. They must be complemented by off-reserve management. The combination of areas with different usage regimes can meet the needs of a wide range of actors while ensuring the conservation of critical habitats and species.

Conservation mosaics are especially important in the Brazilian Amazon and Atlantic Forest ecosystems. These ecosystems are of critical global importance but under pressure from numerous demands for land use by a variety of stakeholders. In the Atlantic Forest, the Ecologic Corridors Project was an early pioneer in testing the mosaic approach to conservation and has achieved important successes in building conservation corridors utilizing a range of protection regimes. Based on this experience, the Bank has supported the mosaic approach in the Amazon through the Amazon Region Protected Areas Project (ARPA).

ARPA was established in 2004 with the catalytic support of the GEF, World Wildlife Fund (WWF)/World Bank Alliance, federal and state authorities, NGOs, and the Pilot Program to Conserve the Brazilian Rain Forest. KfW later joined as a major donor. ARPA works with federal, state, and municipal governments, local communities, protected areas management, and NGOs to ensure that a mix of strict protection and sustainable use areas address the needs of local people while effectively conserving Amazonian ecosystems and species. Strict preservation areas are dedicated to conservation and scientific research. Sustainable use protected areas have the twin goals of biodiversity conservation and livelihood provision for the communities living in them. The overall goal of the project is to add 25 million hectares in new protected areas over the next 10 years, helping to consolidate the protected areas system. Within a decade, the project will result in a total of 70 million hectares, nearly 30 percent, of Amazon forested ecosystems under some form of effective protection and sustainable use.

To date, the first phase of ARPA has created over 15 million ha of new protected areas, far exceeding expectations. A Protected Areas Fund has been established and endowed with \$8.5 million. These funds will be dedicated to covering the recurrent costs of the protected areas created under ARPA, so that protection of these critical sites continues. Perhaps just as important, ARPA has established relationships with diverse stakeholders throughout the Brazilian Amazon and created processes that allow funding to reach isolated protected areas, permitting much-needed conservation and development activities. The partnerships established under ARPA tie together numerous actors that might otherwise have been in conflict over conservation and land use strategies. Because the mosaic approach addresses the needs and priorities of many different stakeholders, and because all actors form an integral part of the decision making process, ARPA has contributed to a coalition dedicated to conserving the Amazon forest, one of the greatest natural resources on earth.

(Turkey). Many sites lie within the Biodiversity Hotspots identified by Conservation International, the Global 200 Ecoregions promoted by World Wide Fund for Nature and/or Endemic Bird Areas (EBAs) and Important Bird Areas

(IBAs) recognized by BirdLife International. In Colombia the 10,019 hectare Selva de Florencia, an IBA, was declared a national park, marking the first time in Colombia that an IBA has received formal protection under this designation.

## BOX 2.2

### Conservation Achievements in Protected Areas in Honduras

The Honduras Biodiversity in Priority Areas Project (PROBAP) was funded by GEF but linked to the IDA-financed Rural Land Management Project (PAAR) to promote conservation of biodiversity within the Honduran segment of the Mesoamerican Biological Corridor. At the local level, it was expected that sustainable natural resource management would generate increased income, particularly for marginalized rural communities, as well as protect important environmental services. The project was expected to boost ecotourism, thereby diversifying local incomes and supporting the financial sustainability of the protected areas system. Then the unexpected happened. Honduras was ravaged by Hurricane Mitch, one of the worst natural disasters in Latin America in the twentieth century, and this was followed by a financial crisis as Honduras struggled to rebuild a devastated economy.

In spite of these setbacks, the project achieved significant results in the Atlántida, La Mosquitia, and Olancho regions, including departments, where development assistance has traditionally been scarce. PROBAP made specific investments in 12 important protected areas, 38 percent of the total protected areas under SINAPH. The second and third-largest protected areas in the country were established (Patuca National Park and Tawahka Indigenous Reserve, respectively) and important advances were made in protecting biodiversity in all the key Honduran sites of the Mesoamerican Biological Corridor.

Capacity was developed at the Department of Protected Areas and Wildlife (DAPVS) and the Honduran National Council of Protected Areas (CONAPH) for strategic planning, priority setting, and identification of co-funding. During the life of the project, PROBAP constituted more than half of the national government's operational budget for the management of the entire SINAPH system, but the project also laid the foundation for financial sustainability by establishing a Protected Areas Fund that will finance a decentralized PA system.

Collaborative networks of partners were established to work toward the protection and sustainable use of biological corridors in Atlántida, along the northern Caribbean coastline, and in the area of the proposed Corazón Transboundary Reserve. Deforestation rates in the Patuca, Tawahka, and Rus-Rus Reserves have stabilized at 0.81 percent per annum, well below the national average of 1.21 percent. The project increased community participation in protection of selected protected areas and introduced biodiversity-friendly natural resource management practices through local community organizations and NGOs. Many of the local communities which benefited from the project are located in remote areas with high levels of poverty and little institutional presence of the national government.

Two of the greatest challenges for protected areas are lack of capacity and lack of sufficient financing, especially for regular operations. Most of the protected area projects, in all regions, are investing in early capacity building for strengthened PA management. In Vietnam, Pu Luong-Cuc Phuong Limestone Conservation has significantly raised staff capacity of the two nature reserves as well as the conservation consciousness of neighboring communities. The Cambodia Biodiversity and Protected Areas Management Project has been able to strengthen PA capacity so that there have been no major illegal logging activities within Virachey National Park in the last six–eight months. At the national level in Cambodia, preparation of a protected

area management and financing strategy are well advanced and will further strengthen national capacity.

Financial sustainability for long-term protection and management is a challenge for protected areas worldwide. Several projects provide innovative financing mechanisms, both for protected area management and conservation activities for buffer zone communities (Bhutan, Bolivia, Peru, Vietnam, Uganda, and the Table Mountain Fund in South Africa). Endowment funds and other financing mechanisms have helped to cover recurrent operational costs (see Box 2.3) but it is clear that few protected area networks can be self-sustaining from tourism or other direct revenues and that most protected areas will always



require a basket of funding sources, including some government support. Enlisting public support will also depend on increased awareness of the multiple goods and benefits from protected areas and their relevance to sustainable development: ecosystem services, research, recreation, and even spiritual values (see Box 2.4).

Southern Africa offers an almost unique opportunity to link biodiversity conservation and protected areas with sustainable economic development through tourism. Tourism investment is growing rapidly, particularly involving “bush and beach” packages that

depend on healthy natural ecosystems and abundant wildlife. Moreover, much of the best remaining wildlife areas are poorly suited for alternative uses such as agriculture. The Bank and other development partners are assisting southern African countries to realize this potential by establishing transfrontier linkages aimed at creating a diverse and integrated regional tourism circuit to rival any tourism attraction in the world. To ensure environmental sustainability and poverty alleviation impacts, the emphasis is on spatial planning and management at an ecosystem level and on community participation and benefits.

### **BOX 2.3**

#### **Vietnam Conservation Fund — Supporting Protected Areas Network**

Most of Vietnam’s protected areas are underfinanced and struggle to meet operational costs. The Vietnam Conservation Fund (VCF), launched in 2005, is a pilot financing mechanism for conservation areas or special use forests (SUF) nationwide. The fund will provide small grants (\$20,000–25,000 annually) on a competitive basis to improve management in SUFs of high biodiversity value. Grants from the VCF can be used to support a wide range of conservation-related activities, including engaging with local communities, developing co-management agreements, developing environmental education and awareness, habitat and species management, strengthening the implementation of laws and regulations for SUF management, capacity-building, management planning, and ecological monitoring. A linked Dutch-funded technical assistance fund will provide the necessary and complementary technical assistance to support the conservation and management activities in selected SUFs. The VCF is a sinking fund, initially expected to be utilized over six years, but it is being established as an efficient long-term conservation financing mechanism (with the expectation that donors and government will replenish the fund if it proves successful).

The VCF is expected to provide support throughout Vietnam to the management of around 50 national parks (*vuon quoc gia*), nature conservation areas (*khu bao ton thien nhien*) and species/habitat conservation areas (*khu bao ton loai/sinh canh*) that meet specific eligibility criteria. Initially it will be tested in around 20 SUFs, including all eligible SUFs in the provinces of Thua Thien Hue, Quang Nam, Binh Dinh, and Quang Ngai. To access funds from the VCF, SUF management boards must submit proposals for activities that address priority issues defined in their operational management plans. Screening will ensure that funds are focused only on sites supporting biodiversity of global importance, priority conservation activities and cost-effective proposals with high likelihood of impact. Sites will be eligible for additional grants based on performance. It is expected that most funding will go to provincially managed SUFs since centrally managed SUFs already have access to considerable funding. An Operational Manual guides the operations of the VCF and describes the procedures for grant proposal review, approval, disbursement of funds, and reporting.

The fund is designed to avoid the current “feast or famine” situation of short-term donor funding targeted at just a few sites. It will provide small grants for operations, more consistent and manageable within “normal” PA budgets. The monies are for essential conservation operations, not infrastructure, and will go directly to the PA management. The competitive nature of the fund and performance-basis for additional grants are designed to provide incentives to PA managers to use funds effectively. If this pilot fund proves successful, it could provide a useful model for strengthening other national PA networks.

The multi-phase, multi-donor Mozambique Transfrontier Conservation Areas (TFCA) program builds on the fact that Mozambique has large areas of rich biodiversity (but high poverty) adjacent to well-established conservation and tourism areas in neighboring Zimbabwe and South Africa. A first phase project, financed by the GEF, laid the political and institutional groundwork for the multi-sectoral and inter-state cooperation needed for the TFCA approach. A second phase, supported by IDA, GEF, and bilateral partners, will focus on implementing improved management of the TFCAs, including embedded protected areas, and tourism development on the ground. Similarly in Mozambique a project focusing on coastal and marine biodiversity management is helping

to provide the crucial “beach” element by promoting environmentally and socially sound tourism in the context of integrated coastal zone management, including marine protected areas. The Swaziland Biodiversity Conservation and Participatory Development project will provide support for participatory spatial planning within two broad “tourism and biodiversity” corridors whose endpoints fall within transfrontier conservation areas. The success of these initiatives should be considerably enhanced by an IFC-supported South East African Integrated Tourism Investment Program (SEATIP), which will help to create incentives for appropriate tourism investment based on environmental sustainability and partnership with local communities.

#### **BOX 2.4**

### **Making Protected Areas Relevant to the Development Agenda**

Increasingly conservationists are seeking ways to convince policy makers of the relevance of protected areas to sustainable development. Thus many mountain protected areas can be justified through provision of ecosystem services such as water, soil conservation, and protection of downstream and vulnerable communities from natural hazards such as floods and unstable hillsides. Except for cloud forests, it is not always possible to demonstrate clear linkages between forest cover and water quantity, but there does seem to be a direct relationship between forests and water quality. A number of Bank biodiversity projects have provided funding to protected areas in forest watersheds that safeguard the drinking supplies for some of the world’s major cities. Thus a panda reserve in the Qinling mountains, China, protects the drinking water supplies for Xi’an. The Gunung Gede-Pangrango in Indonesia safeguards the drinking water supplies of Jakarta, Bogor, and Sukabumi and generates water with an estimated value of \$1.5 billion annually for agriculture and domestic use. Similarly, Kerinci N.P. in Sumatra safeguards water supplies for more than 3.5 million people and 7 million hectares of agricultural land, while two of the Andean protected areas in Ecuador provide drinking water supplies for 80 percent of Quito’s population. In South Africa the recognized value of the mountains of the Cape Peninsula and Drakensberg in providing water supplies for Cape Town, Johannesburg, and Durban has led to serious national investments in the Working for Water programs as well as biodiversity investments through the World Bank.

Economic analysis can be a useful tool for demonstrating the benefits of PAs and conservation. A World Bank study showed that the economic benefits of biodiversity conservation far outweigh costs in Madagascar. Sustainable management of a network of 2.2 million hectares of forests and protected areas over a 15-year period was costed at \$97 million (including opportunity costs forgone in future agricultural production) but would result in total benefits of \$150–180 million. About 10–15 percent of these benefits are from direct payments for biodiversity conservation, 35–40 percent from ecotourism revenues, and 50 percent from watershed protection (primarily from averting the impacts of soil erosion on smallholder irrigated rice production). The study considers the political economy of potential winners and losers from forest conservation and points to the needs for equitable transfer mechanisms to close this gap, but it emphasizes that conservation will help to maintain or improve the welfare of at least half a million poor peasants.



## Maintaining Biodiversity in Threatened Ecosystems

Although the global area in official protected areas has increased in recent years, it has become increasingly clear that protected areas alone will be insufficient to conserve all of the world's biodiversity. Growing human populations, continued expansion of agriculture, and increasing natural resource use will greatly limit the possibility of strict protection in the future. Even where species are limited to a particular area that can be strictly protected, the ecological processes that support them—fire, flood regimes, migration routes of seed dispersers—require management at a broader landscape scale. Effective biodiversity conservation across all ecological regions will require greater conservation efforts beyond the boundaries of protected area networks. This is especially true for some of the most threatened, fragmented, and remnant terrestrial habitats, such as limestone habitats and Mediterranean-type vegetation, but even more significant for wetlands and freshwater and marine ecosystems that are often neglected or poorly represented in protected area networks.

In the Cape Floristic Region (CFR) in South Africa, the Bank is supporting explicit efforts to integrate biodiversity issues into land use decisions and bioregional planning to better protect the unique fynbos vegetation and endemic flora. Landscape conservation planning efforts hinge upon a combination of social, economic, and political factors and cooperation between multiple stakeholders. The Cape Action Plan for the Environment (C.A.P.E.), created through a partnership between government agencies, NGOs, research institutes, individual landowners, and the private sector, is the first bioregional plan to identify conservation priorities for an entire floral region, including the marine, terrestrial, and aquatic environment. This includes the development of a system of large and smaller formally protected areas as well as buffers and corridors in order to ensure that evolutionary processes can continue in the CFR. Key to this program is the mainstreaming of

biodiversity conservation into sectoral programs as well as through integrated development planning (see Box 2.5).

## Freshwater Ecosystems, Wetlands, Rivers, Lakes, and Regional Seas

The conservation of aquatic or freshwater biodiversity has lagged considerably behind conservation of biodiversity in terrestrial or even marine sites even though freshwater habitats are key providers of food and livelihoods to many of the world's poorer communities. Expanding agriculture destroys, degrades, and fragments habitats, modifies hydrological systems, degrades aquatic ecosystems with runoff of agricultural chemicals, depletes freshwater supplies through irrigation, and introduces invasive alien species. Wetland drainage and infrastructure development destroy key natural habitats. The Red River Delta in the north of Vietnam once supported a highly productive fishery but is now almost devoid of fish due to extensive flood control infrastructure and the closure of floodplain fish breeding and nursery areas. Freshwater biodiversity is poorly studied in many areas of the world, and impacts on water bodies near major cities have probably been so severe that much biodiversity has been lost before it was even identified. Lakes are particularly sensitive, due to the long time period required for water to circulate through them. Lakes without outlets, such as Lake Victoria in East Africa, are doubly threatened due to high rates of endemism combined with an inability to flush out pollutants or dilute the impacts of exotic invasive species.

The threats to freshwater biodiversity and wetlands are often very difficult to address because of the diffuse nature of water resources and the impact of activities far beyond the immediate boundaries of the water body. Non-point sources of pollution, particularly agricultural runoff, are notoriously complex to control. Even point sources, such as factory discharges or untreated municipal sewage,



**BOX 2.5****Mainstreaming Conservation in the Cape Floristic Region**

The Cape Floristic Region, is the smallest of the world's six floral kingdoms, protecting unique Mediterranean-type vegetation known as fynbos. It covers an area of 90,000 square kilometers and is the only floral kingdom to be located entirely within the geographical confines of a single country. The CFR is rich in species, with 9,600 species of vascular plants, many of them endemic. Some 127 mammal species, 300 birds, 142 reptiles, and 144 amphibians have also been recorded and the region is considered an endemic bird area. The invertebrate fauna is also very rich and notable for containing an assemblage of ancient taxa that have largely been extirpated elsewhere.

The rich biodiversity of the CFR is under serious threat as a result of the conversion of natural habitat to permanent agriculture and to rangelands for cattle, sheep, and ostriches, inappropriate fire management, rapid and insensitive infrastructure development, overexploitation of marine resources and wild flowers, and infestation by alien species. Some important habitats have been reduced by over 90 percent, and less than 5 percent of land in the lowlands enjoys any conservation status. The region has therefore been identified as one of the world's "hottest" biodiversity hotspots.

The C.A.P.E. Biodiversity Conservation and Sustainable Development Project is building institutional capacity and collaboration between multiple stakeholders, including government agencies, private landowners, and local communities to mainstream biodiversity conservation into the area's economic activities and enhance conservation of the Cape Floristic Region. The project will support the design of market-based mechanisms for conservation management, such as payment for environmental services, as well as micro-enterprise opportunities for conservation-related businesses, including small enterprises that improve livelihoods and social conditions for local communities. Biodiversity concerns will also be integrated into the activities of five watershed management agencies. On the protection side, management capacity will be strengthened for more effective management of protected areas, tourism development plans will be implemented, and stakeholders will receive direct and indirect benefits from protected areas. The project aims to expand the conservation area of the CFR by over 4,000 square kilometers, both in formal protected areas and through partnerships and conservancy agreements with private landowners.

have their greatest impacts downriver from the origin of the problem, so that the costs are borne by others than the polluters. Downstream communities may demand action on issues such as water quality, but the impacts of pollution on aquatic biodiversity are both poorly recognized and have a very small constituency to demand redress. Some impacts of development on hydrological systems, such as modified flood regimes or changes in water temperature, have little or no impact on human health but can alter aquatic and riparian ecosystems enormously. For all these reasons, the conservation of freshwater biodiversity is a challenging field that is often overlooked in the general conservation landscape.

Several projects in the Bank's portfolio have begun to address these complex issues, for instance by changing

agricultural practices to better address agricultural pollution from fertilizers and agricultural waste as in the Bulgaria wetlands. Others are targeting agricultural practices in important watersheds in Rwanda and Turkey or attempting to integrate freshwater biodiversity concerns into regional policies and programs (see Box 2.6).

Several projects have focused on wetland protection and wetland restoration. The Indonesia Berbak-Sembilang Ecosystem project helped to establish the new Sembilang National Park, which protects some of the most important freshwater and mangrove swamps in Sumatra. The park adjoins the Berbak N.P., Indonesia's first Ramsar site, protecting the area of swamp forests available for populations of endangered Sumatran rhino, tiger, and tapir. Coastal mudflats provide critical



feeding sites used by migrating waterbirds. Coastal mangroves protect nursery sites for marine fishes and prawns. Forest fires and encroachment in the park area have been reduced and the project helped to establish good working relationships between local NGOs and local government, which increases the likelihood of sustaining conservation outcomes.

In Yunnan, China, a team from the provincial university is working to restore and manage habitats around Lake Dianchi to secure the conservation of the remaining endemic species of the lake and its immediate tributaries. The Dianchi basin is a “hotspot” of freshwater biodiversity with 24 indigenous fish species, at least 11 of which are endemic, and dozens of endemic mollusk and crustacean species, found both in the lake itself and adjacent springs, often next to Buddhist temples. Since the 1950s, however, some 31 exotic fish species and a variety of plant species have been introduced, although not all of these have persisted. Declining water quality (especially high phosphorus and nitrogen), loss of

natural habitats, competition for food and living space, and possibly introduced diseases and parasites have combined to threaten the indigenous fauna and flora, resulting in the apparent extinction of some endemic species. Environmental improvements in Lake Dianchi and its watershed are a major national priority, with water quality data reported to the State Environmental Protection Agency (SEPA) on a monthly basis.

An integrated wetland restoration plan and baseline survey and monitoring program have been prepared including detailed activities for habitat restoration, bivalve restocking, endemic fish re-introduction, and monitoring. Emergent macrophyte species have been planted in the pilot sites under a small works contract. While searching throughout the province for endemic and indigenous aquatic species for reintroduction to Lake Dianchi, the team recorded two invasive species (golden apple snail and Louisiana crayfish) for the first time in Yunnan. With support from the Water Resources Agency of Yunnan Province, steps are being taken to eradicate the snail from the most sensitive areas. Monitoring of lake ecosystem health will include surveys on fish, macrophyte, bivalves, and plankton species as well as water quality.



A project supported under the Critical Ecosystem Partnership Fund (CEPF) in Madagascar focused on the Madagascar fish eagle and the wetland habitat it shares with indigenous people. The eagle, one of the rarest birds of prey, is making a tentative comeback thanks to the guardianship of local fishing communities. The Peregrine Fund is assisting with the legal transfer of control and management of natural resources from the Malagasy government to indigenous communities and the associations created to represent their interests. Recent surveys in the three adjoining freshwater lakes of Ankerika, Befotaka, and Soamalipo have identified 18 male and 9 female Madagascar fish eagles and now also 7 fledglings. Two community associations recently won approval from the government of Madagascar to manage wetland sites that provide important natural resources for their local villages and habitat for the fish eagle. The official handover from the Ministry for Environment, Water

**BOX 2.6****Management of Aquatic Resources in the Amazon Region**

From a biodiversity perspective, the Amazon basin is unequalled; it is home to the world's richest assemblages of freshwater flora and fauna, including 3,000 fish species, approximately one third of the world's entire freshwater ichthyofauna. Many of the region's economic activities are based on the use of these freshwater resources, but they are increasingly at risk due to the uncontrolled and poorly planned expansion of high-impact activities in the basin. Such unchecked developments affect water quality, biodiversity, and the availability of fish resources. In addition, they lead to a growing number of conflicts among resource users, with fewer income generation opportunities for riverine dwellers (*ribeirinhos*), reduced employment, and impacts on health and quality of life of local communities, especially indigenous groups, from water contamination and poorer nutrition due to reduced availability of fish.

The AquaBio project will support involvement of multiple stakeholders in an integrated management approach to the conservation and sustainable use of freshwater biodiversity through public policies and programs in the Brazilian Amazon River Basin. The objective is to reduce threats to the integrity of freshwater ecosystems in the Brazilian Amazon and to assure the conservation and sustainable use of its freshwater biodiversity. Lessons and results generated would identify good practices to mainstream aquatic biodiversity concerns into production landscapes and sectors and ensure proper attention to conservation and sustainable use of freshwater biodiversity in the decisionmaking processes of local watershed or sub-basin committees.

A few activities will target all the states in the Brazilian Amazon, but most would focus on parts of three sub-basins selected to illustrate the main problems that afflict freshwater ecosystems in the Brazilian Amazon: (a) the lower and middle Negro River (high fishing pressure and presence of ornamental fisheries trade); (b) the headwaters of the Xingu River (impacts of land degradation on freshwater ecosystems); and (c) the lower Tocantins River, where construction of the Tucuruí hydropower dam has impacted freshwater fisheries. The AquaBio Project will promote the adoption of a decentralized approach to ecosystem management, including support for participatory development and partial implementation of action programs in the three sub-basins, with institutional arrangements negotiated with users of natural resources. A strong training and environmental education program will strengthen capacity and improve stakeholder participation in implementation monitoring. The project will provide opportunities to better understand problems related to aquatic biodiversity and water resources management, to establish information and dissemination systems, and to set priorities and determine social and technical measures for handling water, biodiversity, and land and soil-related issues. Small investments and technical assistance for demonstration projects to promote sustainable land use and fishing practices will engage farmers, fishermen, indigenous people, and other resource users, to test new methodologies and technologies and determine what works and what does not.

and Forests for a 10-year period marked a major success for both the communities and The Peregrine Fund.

In the Hovsgol region of Mongolia, the IFC is supporting a private conservation initiative in the Eg-Uur watershed, working with Sweetwater Travel to promote an ecotourism project with many dimensions, including species conservation of the six-foot taimen fish, river protection, angling tourism, scientific research, and conservation education. Support and participation of the nomadic herders grazing their livestock in the valleys of the upper Eg-Uur drainage is critical to conservation success. In

addition to ensuring that communities benefit from some of the revenues from the ecotourism lodges, the company is encouraging donations from sport fishermen and other partners to fund restoration of ancient monasteries. This unique project, funded through the GEF, IFC, and the Bank's Development Marketplace, was featured in *National Geographic Adventure* magazine in December 2005.

The Eastern Europe and Central Asia (ECA) region includes six major regional seas, many highly polluted but still sustaining a high number of endemic fish species, as well as over 152 Ramsar sites (wetlands of



high international significance) covering an area of 13.6 million hectares. The Bank has supported several programs and projects that have targeted some of these high biodiversity areas. A major program focuses on the Black Sea and its coastal wetlands, which are important resting and feeding sites for migratory birds and include the Danube delta wetlands, one of the world's best temperate wetlands. On the opposite shore of the Black Sea, as part of the Georgia coastal management project, GEF is providing support to strengthen management of the Kolkheti wetlands, a Ramsar site that contains a mosaic of sphagnum and reed bed marshes and humid forests, which provide critical habitat for nearly 400 species of migratory and wintering birds.

Four of Russia's freshwater ecosystems and three of its marine ecosystems are Global 200 Priority Areas, including Lake Baikal, the planet's oldest and deepest lake (1,637 m) and with a surface area of 31,500 km<sup>2</sup> one of the largest. It contains 20 percent of the world's fresh water, sustaining 2,635 species of plants and animals, two-thirds of which



are endemic. Underwater "reefs" of giant sponges, a unique biological phenomenon, support a great diversity of fish, crustaceans, mollusks, and other invertebrates. Several large endemic fish inhabit the waters and form part of the prey of the endemic Baikal seal, the only land-locked seal species in the world. The diversity of adjacent landscapes, from alpine tundra, mountain, and boreal coniferous forests to steppe and semi-desert, together with the lake itself, constitute an area of exceptional biological diversity, with 800 species of vascular plants and over 200 species of terrestrial vertebrates.

Under the Russia Biodiversity Conservation project, a common biodiversity policy and action plan was developed and implemented for three administrative units within the Baikal Natural Territory (BNT). Among the program's innovations was the establishment of an environmental services market in the Baikal region, the first time in Russia that the value of ecosystem services had been estimated in terms of carbon sequestration and recreational value. A successful competitive small grants fund engaged more than 110,000 participants in 750 conservation-focused projects, ranging from replanting of riverine forests to restoration of grayling spawning grounds. The engagement of civil society has created a constituency for conservation that is likely to sustain project outcomes into the future. A specially established and publicly accessible ecotourism site, <http://baikal.net/travel>, provides information on nature-based tourism that is expected to provide new livelihood options in the region.

The Aral Sea and surrounding wetlands provide important habitat for many endemic species and migratory waterbirds in Central Asia as well as those in the deltas and river valleys of the Amu Darya and Syr Darya that feed it, which are now severely degraded by excessive diversions of river water for irrigation. The reduction of the Aral Sea, from 67,000 km<sup>2</sup> to 30,000 km<sup>2</sup>, and a rise in salinity have led to collapse of the fisheries and desiccation of the river delta wetlands and have adversely affected the livelihoods of 3.5 million people living around the sea. To address this problem, the Syr Darya Control and Northern Aral Sea Project is financing



infrastructure to improve water flows to the Aral Sea and thereby restore the ecology of the Syr Darya delta and its associated wetlands and wildlife. The Kazakhstan Forest Protection and Reforestation project is accelerating the spread of vegetative cover by planting up to 79,000 hectares of dry seabed in the southern section of the Aral Sea, thereby stabilizing the sands and creating additional habitat for native wildlife (see Box 5.5).

## Marine Conservation

The Bank is addressing marine conservation issues through a portfolio that covers all aspects of resource management—from integrated coastal zone development (Black Sea, Mozambique, Tanzania) to targeted interventions to support community-managed fisheries (Philippines, Samoa), marine

protected areas (MPAs) (Indonesia, Vietnam, Yemen), public-private partnerships for park management (Komodo, Indonesia), and international transboundary cooperation (Mesoamerican Barrier Reef). Projects directly contribute to the objectives of the Convention on Biological Diversity, including the Jakarta mandate, and to COP work programs on marine ecosystems, protected areas, islands and invasive alien species.

The World Bank's Board recently approved a \$51-million IDA Credit and \$10-million GEF Grant for the Tanzania Marine and Coastal Environmental Management Project. This project aims to strengthen sustainable management and improve governance and use of Tanzania's 200 nautical mile Exclusive Economic Zone (EEZ), territorial seas, and inshore coastal resources. It will result in enhanced revenue collection, reduced threats to the marine environment, and better livelihoods for communities living in coastal districts and improved institutional arrangements. Linked to project preparation,



the Bank prepared a book, *Tanzania: Blueprint 2050: Sustaining the Marine Environment in Mainland Tanzania and in Zanzibar*. The blueprint helped to raise awareness at all levels of government and on both the mainland and Zanzibar of the value of marine biodiversity and the links between poverty, growth, and ecosystem management. This enhanced awareness led to strong support for the project and mobilization of the \$61-million funding. The project will help to develop an ecologically representative and financially sustainable network of marine protected areas, building on a pledge that the government made at the Durban Parks Congress. This network will comprise government-supported MPAs, privately-run MPAs, co-managed MPAs, and community-based marine conservation areas, with an innovative Marine Legacy Fund to ensure the sustainability of these conservation areas. The project will also build capacity in the United Republic of Tanzania to monitor and manage transboundary fish stocks. A coastal village fund will promote diversification of livelihoods to ease the pressure on the near-shore ecosystem and to promote enterprise development to reduce poverty in coastal communities.

In the Middle East and North Africa Region, the GEF provided funding for the preparation of the Strategic Action Program (SAP) for the Red Sea and Gulf of Aden, involving the nations of Djibouti, Egypt, Jordan, Saudi Arabia, Somalia, Sudan, and Yemen. The SAP developed a regional framework for the sustainable development of coastal and marine resources by identifying both preventative and curative measures required at the regional, national, and local levels to maintain the rich and diverse coastal and marine resources of this unique region. The Bank was responsible for implementing two components: improvement of coastal and marine environments by reducing navigation risks and integrated coastal zone management (ICZM). The ICZM model has been used to develop the Master Plan for Aden ICZM, being prepared under the Bank's Yemen Port Cities Development Program.

Elsewhere in Yemen support has been provided for conservation of coastal and marine biodiversity in

the two pilot sections of Balhaf-burum and Sharma-jethmun along the Gulf of Aden, with development of site-specific participatory management plans and community development plans. The project has also supported technical assistance and participatory workshops to strengthen the national framework for coastal zone management, including the legal and regulatory framework and a cooperating network of organizations. Training included development of a curriculum for Yemeni universities and increasing the capacity and awareness of government and non-government institutions and local stakeholders.

A new Bank- and GEF-funded project for protection of marine and coastal resources of the Gulf of Gabes, Tunisia, addresses both site-specific and regional threats to biodiversity. Part of the southern Mediterranean Sea, the Gulf of Gabes is a large shallow bay with relatively warm waters and high marine diversity, including extensive and unique sea grass beds that covered most of the seabed until the late 1970s. In the last decades, destructive fishing practices, over-fishing, and urban and industrial pollution have been the main threats contributing to the decline of the general sea grass cover. This is having negative implications for the entire ecosystem, as sea grass beds provide habitat to numerous bottom-dwelling species and help to stabilize the sediments. Four Tunisian institutions will collaborate to ensure inter-sectoral cooperation on marine and coastal management issues. Collaboration will be enhanced through common training and field experiences, as well as by integrated policy and strategic studies. A regional program will improve baseline scientific knowledge, including inventory of sea grass beds, assessment of the status of marine species of national and international significance, and an assessment of the impacts of alien invasive species. Six pilot sites will benefit from participatory preparation of management plans to address integrated coastal management issues. These management plans will focus on protecting natural resources while promoting socioeconomic development of local communities. New information on sea grass beds will be used to delimit the boundaries for one site which will be closed to fishing. Guidelines

will be prepared for improved fishing practices, and for dealing with vessel ballast waters and their risks for the introduction of new alien species (see also Box 2.7).

A growing body of empirical evidence suggests that marine reserves and “no fishing” zones can rejuvenate depleted fish stocks in a matter of years when they are managed collaboratively with the resource users and form the core of a wider multi-use marine protected area. Based on this premise, the Bank is supporting a national effort in Indonesia to manage and restore coral reefs in the world’s richest marine hotspots. Many of the archipelago’s coral reefs and the small-scale fisheries they support have reached a level and mode of exploitation where the only way to increase future production and local incomes is to protect critical habitats and reduce fishing

effort. A six-year, \$80-million program, COREMAP, will be implemented in 12 coastal districts, including 1,500 coastal villages and more than 500,000 residents. The centerpiece of these efforts will be collaboratively managed marine reserves, many within existing marine parks of recognized global value. The Government of Indonesia has committed to a target of 30 percent of the total area of coral reefs in each participating district to be set aside as collaboratively managed and fully protected areas. The project will target some of the richest coral reefs off Sulawesi, the Aru islands, and Indonesian Papua and builds on lessons learned from an earlier project which also focused on marine protected areas and community management of coral reefs.

Elsewhere new marine protected areas have been established and existing MPAs strengthened. Although

## BOX 2.7

### Management of Marine and Coastal Invasive Species

For the first time in East Africa, a pilot training course on the management of marine and coastal invasive species was held in Tanzania in November 2005. The course was run under the auspices of the Global Invasive Species Programme (GISP) with Bank funding from the BNPP program and in collaboration with the UNEP Regional Seas Programme. The training was attended by 24 participants from all the contracting parties to the Nairobi Convention (Comoros, Reunion, Kenya, Madagascar, Mozambique, Mauritius, Seychelles, Somalia, South Africa, and Tanzania) and included scientists and managers as well as representatives from ports authorities. Participants from non-IDA countries were sponsored by the Nairobi Convention.

The training course consists of eight modules covering an introduction to invasive alien species (IAS), goals and principles, detection, prevention, response, incursion management, international response, national strategies, and communication and awareness. Each module included exercises. A field trip visited three sites at possible risk from marine and coastal invasives in the Bagamoyo area north of Dar es Salaam: a seaweed farm run by a community co-operative and using a seaweed species introduced from the Philippines; a fishing boat harbor where there is the risk of bio-fouling; and a salt pan, with the risk of pathogenic invasion carried in migratory birds, e.g. bird flu. The participants were also given the opportunity to discuss national cases of IAS and were asked to bring documentation, publicity documents, legal provisions, etc., on IAS in their respective countries.

This course is the latest in a series of capacity building initiatives in East Africa on the prevention, management, and eradication of invasive alien species through the GISP secretariat. GISP has a mandate from the CBD to raise awareness of IAS issues and build capacity to address IAS at the national and regional level. The Bank has been supporting the work of GISP since 2003 with funding from the BNPP and Development Grant Facility (DGF). Training modules, regional reports on national IAS priority needs, and other information can be found on the GISP Web site [www.gisp.org](http://www.gisp.org). GISP has also released three reports to highlight the issue of IAS in Africa, Asia, and South America. The latest *South America Invaded* was released at the Eighth Meeting of the Conference of the Parties to the CBD in Brazil in March 2006.



## **BOX 2.8**

### **Marine Resources Are Big Business in the Philippines**

The Philippines is an archipelago of 7,100 islands, with a coastline of more than 39,000 km and a coastal population of more than 65 million. The marine and coastal ecosystems provide goods (fish, oil, gas, minerals, salt, construction materials) and services, such as shoreline protection, biodiversity, transportation, and recreation). Total fisheries yields are estimated to be worth \$2.5 billion a year, 4 percent of the gross domestic product (GDP), with more than 1 million people employed in the fishing industry. The Philippines' beautiful beaches and rich coral reefs are favorite tourism and diving sites, with 2.43 million tourists generating almost \$2 billion in tourist receipts in 2004 and providing employment for 6.2 million people.

The economic values of these natural assets are considerable. Coral reefs are estimated to contribute at least \$1.064 billion annually to the Philippine economy through sustainable fisheries, coastal protection, tourism, and recreation. Marine turtles provide an average revenue of \$580,000 per year for consumption (meat, shell, eggs, bones, and leather for handicrafts) as compared to revenue of \$1.6 million a year from turtle tourism, so turtles are worth far more alive. Direct benefits from mangroves (fish nurseries, construction materials) are estimated to be worth \$600/ha annually or a total of \$83 million. Sea grass beds are vital feeding grounds for fish, shrimps, crabs, sea urchins, sea cucumbers, dugongs, and marine turtles.

All of these assets are threatened by degradation, overexploitation, and mismanagement. Annual catch per fisherman has probably declined by 30 percent since 1991. Economic costs of degradation and unsustainable harvesting are estimated at \$125 million annually from lost catch due to overfishing and low recruitment. Net losses due to overfishing of 1 square kilometer of coral reef over 25 years is estimated to be \$108,900. Costs of restoring the reef in Apo Reef N.P. were estimated at \$517,000 after the MV Island Explorer ran aground.

the Cape Peninsula Biodiversity Conservation Project focused primarily on strengthened management of the Cape Peninsula national park, it also established a pilot marine protection program and MPA, after detailed scientific and socioeconomic studies and extensive public consultation. As part of the Mozambique Coastal and Marine Biodiversity Management Project, macro-zoning plans have formed the basis for strategic analysis of the districts' natural resource-based potential and to initiate the investment activities based on biodiversity conservation and private sector development. An integrated development planning process has identified pilot micro-projects that combine poverty reduction and coastal and marine biodiversity conservation, as part of sustainable development. A manual has been prepared for sustainable use of coastal resources and two NGOs are assisting communities to identify, design, and implement demonstration projects. It is expected that two new conservation areas will be gazetted. A first draft of the management plan for

Matibane Reserve has been produced, and construction of a field station for biological monitoring and other scientific and academic activities has begun.

Bank and GEF support helped to establish the first MPA in Vietnam. A key feature of the Vietnam Hon Mun Marine Protected Area Project, financed through a GEF MSP, has been effective coordination between the community and municipal, provincial, and national governments. This has led to the establishment of a sustainable Marine Park Authority for the Nha Trang Bay MPA. The MPA covers 16,000 hectares and includes Hon Mun and eight other islands. Vietnam's coral reefs contain almost 400 species of reef-building corals with 90 percent of the hard coral species of the IndoPacific found in Vietnamese waters. The greatest species richness is in the south, and the waters of Nha Trang bay have more than 300 species. Village advisory committees have been established in each village in Nha Trang Bay, and regular meetings are held to discuss management approaches and changes in access to



fishing grounds. A conservation fee has been introduced for every visitor to the MPA. These fees will be used to provide operational funds for the MPA but at least 10 percent of all fees collected will be re-allocated to villages within the MPA for appropriate development activities.

Spanning national borders, the Mesoamerican Barrier Reef System (MBRS) project, involving Mexico, Belize, Guatemala, and Honduras, has put in place a highly participatory process to address use of shared resources and conservation of valuable transboundary ecosystems. Multi-sectoral National Barrier Reef Committees reflect diverse stakeholder interests in the sustainable use of the MBRS, while technical working groups at the regional level oversee project implementation, review annual work plans, promote exchange of regional expertise, and sustain regional coordination. Transboundary commissions have been established on the border areas of the MBRS (between Mexico and Belize, and between Belize, Guatemala, and Honduras) to address marine resource management concerns. A training program has been established for marine protected area managers, enabling them to design and implement participatory management plans and monitor results using a common monitoring protocol.

Local fishermen have been trained for alternative livelihoods in the tourism and fisheries subsectors (e.g., sea kayaking, recreational diving, catch-and-release sports fishing, and sustainable mariculture) to relieve pressure on marine protected areas. The project is supporting monitoring of Spawning Aggregations (SPAGs) of economically important and threatened reef fish, like Nassau grouper and snapper. Recommendations for restricted fishing during spawning events have been implemented through the collaborating fisheries departments. Sustainable tourism centered on the MPAs is being promoted through a regional tourism forum, as well as development and adoption of a regional certification system for marine-based tourism enterprises.

In the Pacific, the Aleipata and Safata Marine Protected Areas in Samoa were established as community-based

marine protected areas. The MPAs have been planned and managed by village committees working with the World Conservation Union (IUCN) under a GEF MSP. Though it is too early to quantify biodiversity gains, there is general agreement that the abundance and size of fish and turtles, and the health of coral reefs and mangroves have substantially improved since the MPA establishment. Local fishermen now report being able to fish closer to the shore. Effective partnerships, particularly with the Peace Corps, led to the inclusion of the MPAs in the national social studies curriculum and in expanding marine education programs in the two districts. The two District Committees have also shown for the first time that district-level governance can work in Samoa.

### **BOX 2.9**

#### **San Andreas Biosphere Reserve — Caribbean Jewel**

A medium-sized GEF grant to CORALINA (the local environmental corporation) for the Caribbean Archipelago Biosphere Reserve Project culminated in the establishment of a 65,000-square-kilometer marine protected area in Colombian waters. One of the largest MPAs in the world, it protects unique marine species and spectacular coral reefs. Comprehensive biodiversity and socioeconomic assessments of the Archipelago's northern, central, and southern sections provided essential inputs to the MPA's design. Participatory zoning agreements were obtained with local stakeholders, demarcating no-take, no-entry, special use, and artisanal fishing zones. Conservation action plans and monitoring action plans were developed with high levels of community involvement to support the conservation of key species and MPA enforcement. To build local capacity, the project team designed and taught a college-level MPA program, graduating 18 students from local communities, some of whom will work in the MPA's management. An International Advisory Board (IAB) with various experts on MPA management and design met annually to support the entire process of the MPA's design and establishment. The IAB contributed valuable expertise and lessons on best practices, as well as support through training and equipment donations and outreach to scientific circles.



The two MPAs are considered the model for a planned nationwide system of larger marine protected areas. The committee structure has also been used effectively by local chiefs to lobby the government for wider development services in the two districts. The committees have further been successful in banning sand mining and scuba fishing, influencing national policies on these issues.

Overharvesting of reef fish is a major threat to tropical coral reefs. An innovative project in the Philippines and Indonesia aims to reverse overharvesting and provide livelihoods through training local fisherman in the protection and sustainable harvesting of ornamental reef fish for the marine aquarium trade. The Marine Aquarium Market Transformation Initiative (MAMTI) project uses a combination of market-based incentives, scientific information, public-private partnerships, government policy and regulation, and active local community involvement to bring about certification of the entire supply chain on a global scale. There is unmet demand for certified reef fish for the aquarium trade, especially in Europe, so the project has focused on building up a critical mass of certified exporters. Community stakeholders learn to develop and implement certified collection area management plans and are organized by local NGOs into collectors groups to market their harvests. In November 1995, the first MAC certifications were awarded to two collection areas in Indonesia that had developed satisfactory management plans.

## Island Biodiversity

Islands play a critical role in the world's overall biological diversity, due to their high rates of endemism and unique ecosystems. Because of their isolation and restricted ranges, island species and habitats are especially vulnerable. Islands are prone to natural disasters such as hurricanes, whose impacts are exacerbated by climate variability and climate change. Invasive alien

species can be particularly devastating on islands, often wiping out a large part of the endemic species. Human habitation leads to problems with water use and waste management, as well as outright habitat destruction, and economic development in the form of mass tourism can have severe impacts on the very resources that attract tourists in the first place. Because of their unique contribution to global biodiversity and their extreme ecological vulnerability, the protection of island ecosystems has been given special emphasis under the CBD and in the wider conservation community.

The Indonesian archipelago consists of more than 17,000 islands spanning two biogeographical realms, the Indomalayan or Oriental and Australian realms. The Greater Sunda islands (Sumatra, Java, and Borneo) have strong biological affinities to mainland Asia whereas New Guinea has strong links to flora and fauna of the Australian continent. The islands in between, Sulawesi (formerly Celebes), Nusa Tenggara (Lesser Sundas), and the Moluccas (the fabled Spice Islands) lie in a special biogeographical region named Wallacea after the scientist Alfred Russel Wallace, a key contributor to the theory of natural selection. The numerous islands of Wallacea have been separated from one another and the mainland for a long time and show high levels of species endemism. The Bank is supporting several projects in this remarkable biogeographical region, helping to conserve island forests and the unique species they harbor. Two projects with BirdLife International focus on strengthening protection of conservation areas in Halmahera and the islands of Sangihe and Talaud, part of the stepping stone bridge of islands from Sulawesi to the Philippines. Off southern Sulawesi, Operation Wallacea is working with local communities to test a new model of forest governance on the island of Buton (see Box 2.10).

As noted, island ecosystems are especially vulnerable to invasive alien species. The Bank has supported several island projects designed to manage or eradicate alien species and restore native flora and fauna, for instance in the Seychelles (including Aldabra), Galapagos, and

**BOX 2.10****Conserving Lowland Forests on Buton Island, Sulawesi**

The Lambusango Forest Conservation Project focuses on the protection of 60,000 ha of lowland evergreen forests in central Buton, S.E. Sulawesi. These lowland rain forests include two conservation areas—the Kakenauwe Nature Reserve forest and the Lambusango Hunting Reserve forest (total 25,163 ha)—under the provincial-level Conservation Agency, as well as protected watershed and production forests (total 36,365 ha) under the jurisdiction of the District. The forests within this Lambusango Forest Management Area complex have been shown to have outstanding conservation value, with 21 vertebrate species new to science described here in the last three years. The proposed conservation area harbors populations of many threatened species, including one frog previously believed extinct plus numerous other reptile and amphibian species, 12 threatened birds, and two bats rarely recorded elsewhere. There also appear to be viable populations of flagship endemic species such as the Buton macaque and the anoa, a dwarf buffalo unique to Sulawesi.

Most of central Buton's forests remain intact and are not subject to the commercial logging and planned oil palm plantations that so threaten the forests in the rest of Indonesia. Even so, the District-managed forests are being encroached by local agriculturalists and resettled refugees, while the adjacent conservation areas are threatened by illegal, small-scale selective logging, rattan collection, and hunting. The Lambusango project is testing a new forest governance model by bringing both conservation and production forests together under a single management system, the Lambusango Community Forestry Forum formed in August 2005. With the support of the Head (Bupati) of Buton District, the Forum brings together representatives from government agencies, NGOs, universities, the media, and community coordinators for each of the six subdistricts encompassing the Lambusango forests.

A GEF MSP through the Operation Wallacea Trust is supporting development of management and enforcement schemes for the forests in collaboration with the Forum members. New legislation in Indonesia allows granting of 35 year leases to local communities for forest areas adjacent to their villages. The leases only permit exploitation of the production forest areas and are tied to reciprocal commitments that require sustainable forest management and no hunting or logging in the PA or limited production forests. A rattan licensing scheme is also being developed to ensure that extraction of this resource is sustainable. A training and mentoring program for the forest ranger team is linked to recruitment of community Forest Guardians, an education and outreach program, and a chain saw amnesty and buy back scheme to reduce illegal logging.

Operation Wallacea is a research tourism company involved in research at Lambusango since 1995. The research program is run by university academics and funded by visiting research students (primarily undergraduates or Masters students). This research program and annual surveys provide quantifiable economic, social, and biological performance indicators to assess the success of management. A grant system enables participation of Indonesian graduate students in surveys and monitoring alongside international specialists. This will contribute to building capacity within Indonesia to expand the forest monitoring programs to other districts.

Mauritius. The Mauritian Wildlife Foundation has successfully used a GEF MSP for restoration of the small Round Island ecosystem. Populations of endemic species on Round Island have increased through habitat improvement, erosion control, selective weeding, and re-establishment of populations of plants and animals that had vanished due to human intervention. Five hectares were restored (30 percent replanted), with 4 native species

reintroduced successfully, and 11 endangered plant species were also introduced to Round Island. Intensive monitoring programs have been put in place to monitor population dynamics, dispersal, and breeding success of key species such as boas and island petrels. To avoid further introduction of invasive species, a quarantine procedure was developed that is now also being used for other islands. Although the project closed in February





2005, both the local authorities and National Park and Conservation Service have extended funding for the island. Additionally, the Mauritian Wildlife Foundation (MWF), the implementing NGO, intends to continue the restoration of the island for another year. The good progress on Round Island was a direct result of a strong working relationship between the NGO, government departments, the private sector, and other partners.

## Madagascar — A Megadiversity Island

Madagascar is the world's fifth largest island, a unique natural laboratory of evolution. Once a part of the African continent, the island of Madagascar drifted into the Indian ocean millions of years ago, creating an evolutionary laboratory in the process. Today over 80 percent of the animals and plants found in this megadiversity hotspot are unique to the island nation. The World Bank and other donors have been supporting a three-phase, 15-year Environmental Protection Program to mainstream environmental management into Madagascar's development agenda. Under the second phase of this program, the Bank provided IDA and GEF funds to strengthen the country's new protected area system, including institutional support to the national park service (ANGAP). The project

helped to create 10 new protected areas and strengthen many "paper parks." Thirty-eight of these areas have been recognized as major tourist venues and 10 new ecotourism circuits have been laid out. Arrangements have been put in place for active participation of communities in park management and revenues. A third phase of the program, now under implementation, will further strengthen management in another 21 protected areas and strengthen linkages between conservation and development for local communities.

The Malagasy Minister of Environment, Water, and Forests officially created three new protected areas on December 30, 2005, bringing a further 875,000 hectares of unique natural habitat under protection. Makira in the northeast of the island, the Ankeniheny-Zahamena corridor in the east, and Anjozorobe in the central province of Antananarivo are home to some of the island's most threatened species of fauna and flora, including populations of many of Madagascar's endangered lemurs such as the Indri (*Indri indri*) and the black-and-white ruffed lemur (*Varecia variegata variegata*). These areas also play vital roles in connecting isolated habitat necessary for the survival and continued evolution of the species that make up some of the world's richest biodiversity.

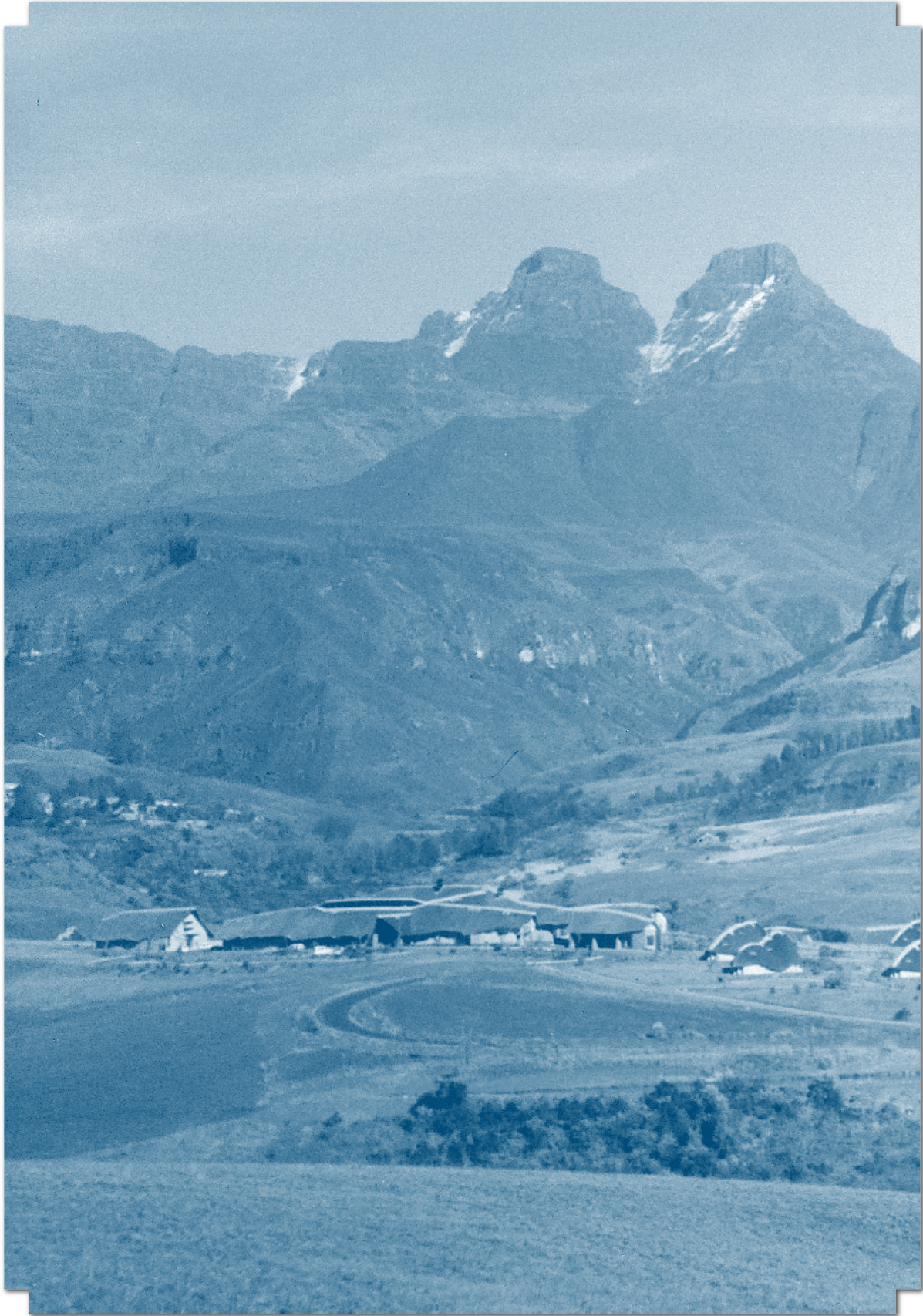
Madagascar is one of the 25 original biodiversity hotspots identified by Conservation International and one of the

first to receive grant funding under the Critical Ecosystem Partnership Fund (CEPF), a Bank partnership with Conservation International. Under this program grants to the Wildlife Conservation Society (WCS) and Conservation International supported participatory planning of two of the newest protected areas. Earlier in 2005, a CEPF grant to Association Fanamby helped in the creation of the 72,000-hectare Daraina reserve, officially known as the Loky-Manambato Forest Station. Together, these areas have helped the Malagasy government reach its 2005 target of 1 million hectares of new protected areas, an important milestone on the way to fulfilling President Marc Ravalomanana's pledge of bringing 10 percent of the country under protected area management by 2008.

CEPF's strategy in the region is to integrate local groups and individuals in the management of protected areas

and reserves to ensure that biodiversity conservation is integrated with the sustainable use of natural resources. The CEPF approach has been to complement protected area creation by enhancing private sector conservation initiatives that support small-scale enterprises. Around Zahamena National Park and the Daraina reserve, for example, grants to local NGOs MATEZA and Association Fanamby supported efforts to help local communities farm sustainably, improve public health, and manage their natural resource bases. Conservation groups working on the island are looking at different ways to support sustainable financing for conservation for parks and local people. An IDA grant from the Bank will contribute to the endowment of a conservation trust fund, while carbon financing from the Bank's biocarbon program is being used to maintain the Makira forest corridor, which links the major Masoala reserve to other important forest reserves.





# Mainstreaming Biodiversity in Development



The Convention on Biological Diversity requires state parties to integrate the conservation and sustainable use of biological diversity into relevant sectoral or cross-sectoral plans, programs, and policies. The mission of the World Bank is poverty alleviation. Consistent with that mission, the Bank recognizes that biodiversity underpins human welfare and economic development and that many production sectors within national and local economies depend on biological diversity and natural ecosystems and the environmental services they provide. Accordingly, the Bank is seeking to promote development that encourages both biodiversity conservation and

poverty alleviation, linking environmental protection to sustainable livelihoods. A major challenge is how to mainstream biodiversity into government programs, normal development assistance, and poverty alleviation programs (by promoting positive synergies), while minimizing the negative impacts to biodiversity of potentially damaging infrastructure and other investments.

## Natural Resource Management Programs

The Bank has developed several natural resource management and forest programs that promote sustainable use of biodiversity through more sustainable land management, establishment of biological corridors, and monitoring of harvests in mountain forests (Cambodia, Georgia); integrated livestock and pasture management of grasslands (China, Kyrgyz Republic); reforestation and natural regeneration of watersheds and degraded pastures (Morocco, Turkey, Colombia); promotion of agroforestry systems such as shade coffee (El Salvador, Mexico); improved fire management in forest landscapes (Russia), and sustainable harvesting of non-timber forest products and medicinal plants (Ethiopia, Peru, Uganda). Several



projects provide financial incentives to encourage forest regeneration and strengthen forest protection (Colombia, Nicaragua, and Costa Rica). A notable feature of many of these programs is the increasing involvement of local community organizations in implementation, providing communities with a key stake in sustainable resource management and biodiversity conservation.

The Albania Natural Resources Development Project (NRDP) built on lessons learned from the preceding Albania Forestry Project (AFP) and is leading to reconstruction of natural forests, as well as sustainably managed pastures and agriculture throughout most of Albania's upland areas, building on community-based forest and pasture management initiatives. The AFP piloted the formal return of usufruct rights to these lands to 28 communes in the context of agreed plans to reconstruct and manage forests and pastures on areas that had been severely degraded. The pilot was so successful that the AFP was able to establish such plans and initiate natural resource reconstruction in 130 communes. The NRDP will scale up this approach to include 218 communes, or most of the upland areas of Albania that are prone to loss of forest cover and resource degradation, bringing both development and biodiversity benefits.

Similarly, a community-based project in Namibia is promoting an integrated ecosystem management approach that will provide benefits to rural landholders from the rapidly growing and high-value ecotourism market. Namibia has highly diverse ecosystems, ranging from arid savanna systems and dry woodland to wetlands, coastal systems, and deserts. These habitats support high levels of biodiversity and populations of globally threatened species, including desert elephant, wild dog, wattled crane, and slaty egret. Some 14 percent of the country is included in state-run parks and reserves but many species of wildlife also range onto community lands. The project will support community-management of wildlife resources and restoration and protection of key ecosystem processes in targeted community conservancies to promote strengthened conservation and

sustainable use on community lands and more equitable sharing of benefits from the nation's rich biodiversity.

## Agriculture and Biodiversity

Agriculture is one of the greatest threats to biodiversity worldwide. Expanding agriculture destroys and fragments native habitat and impacts freshwater and marine biodiversity through the sedimentation and pollution of water bodies. The Millennium Ecosystem Assessment confirmed that agricultural land uses are both the dominant terrestrial influence on ecosystems and that without major changes in current farming practices and agricultural landscape management, many efforts to conserve biodiversity are likely to fail. At the same time, the Millennium Project concluded that in many rural areas with chronic hunger, achieving the MDG to reduce Hunger and Poverty will require significant increases in agricultural production and productivity, as well as the rehabilitation of natural resources critical for food security.

The Bank has a large and expanding agriculture portfolio but few of these projects explicitly target biodiversity interventions, although some make good use of agricultural practices, such as rotational cropping and soil conservation measures, that are more ecologically friendly and designed to increase harvest yields. More recently the Bank has become engaged in developing a suite of pilot biodiversity conservation projects that target agriculture in and around protected areas or in larger landscapes of conservation interest. Such projects usually try to change production practices to provide greater biodiversity benefits (e.g., promotion of shade coffee) or attempt to substitute other income-earning opportunities for harmful agricultural practices. A few projects have also targeted policies in the agricultural sector, such as promotion of integrated pest management. Recent work has focused on more precise specification of impacts of agricultural practices and on providing guidance at a global and





regional level on how to improve agricultural production while reducing its impacts on the natural world.

Following up on a commitment at the Earth Summit in 2002, the Bank with UNEP and other donors is supporting The International Assessment of Agricultural Science and Technology for Development (IAASTD). One of the focal areas of the assessment will be an analysis of the effects of agricultural policies, practices, technologies, and organizational arrangements on ecosystems and their goods and services, including biodiversity. Work began on the Global Assessment Report in December 2005. Some of the questions that are being addressed include:

- \* How can biodiversity be mainstreamed into the production landscape?
- \* How do initiatives, such as training in sustainable harvesting or pest ecology, affect the capacity of small-scale or subsistence producers to utilize threatened habitats without inflicting further harm?
- \* What are the economic and environmental (including species biodiversity) concerns surrounding biomass production?
- \* How are intellectual property rights important to conservation and the sustainable use of biodiversity?

- \* How have past changes in agricultural biodiversity affected rural livelihoods and nutritional security?
- \* What are the impacts of climate change on agricultural biodiversity and the impacts of loss of agricultural biodiversity on climate change?

The knowledge generated by the IAASTD will strengthen the capacity of institutions to design and implement integrated management approaches, appropriate policies, and incentive structures that could contribute to reducing the overall rate of natural resource loss and land degradation as well as enhancing landscape biodiversity in both production and protected areas. Sustainable agricultural practices will directly, and through improved natural resource management, contribute to improving livelihoods, food security, and health.

“Ecoagriculture” is an umbrella term for a diverse set of strategies for managing agricultural landscapes in ways that enhance both sustainable agricultural production and rural livelihoods and that also conserve or restore biodiversity and ecosystem services at a meaningful landscape scale. The Bank is working with Ecoagriculture Partners, a new NGO that is mobilizing partnerships among farmers, conservationists, agriculturalists, public land managers, agribusiness, and researchers to support,



develop, and promote ecoagriculture innovations. The Bank is supporting work led by Ecoagriculture Partners to document and evaluate the social, economic, and ecological “case” for ecoagriculture. The project will develop indicators and methods for documenting ecoagriculture at a landscape scale, and test these through in-depth case studies. A draft “Toolkit” set of basic indicators and methods is now being developed.

In Central America, a BNPP-funded project is looking at cattle production and exploring the relationships between silvopastoral systems, biodiversity conservation, and farmer livelihoods to determine how silvopastoral systems can contribute to both conservation and development goals. The large-scale conversion of forests to pastures in Central America has resulted in the loss of biodiversity and the disruption of ecological processes. Pastures are often poorly managed and quickly become degraded, with reduced pasture productivity. Currently, at least 30 percent of the region’s pastures are considered to be degraded and are of little economic and ecological value.

Silvopastoral systems combine trees and shrubs with livestock and pasture production and include dispersed trees in pastures, live fences, fodder banks, and young secondary forests. The BNPP-funded study is being implemented in Honduras and Nicaragua in partnership with the Tropical Agricultural Research and Higher Education Center (CATIE), an international non-profit, civil association that is a renowned leader in natural resource management and conservation in Latin America. Through this partnership, the Bank will learn what sorts of improved cattle management practices can contribute to biodiversity conservation while improving farmers’ livelihoods, as well as demonstrating how research on impacts can be built into project design. Interest in modifying agricultural practices so that they are more compatible with biodiversity conservation is growing, but there is still little solid data about the impacts of commonly recommended changes in practice. Building a research component into such projects is an important contribution to the body of knowledge about how to lighten the impact of agriculture on the natural landscape.

Development programs for agriculture, especially agroforestry programs and aquaculture, can facilitate both deliberate and unintentional introductions of invasive alien species (IAS). Such misjudgements and accidents are costly; indeed, their negative effects may be far greater and longer lasting than the positive impacts of the aid programs from which they arose. IAS accidentally introduced through development assistance programs include itch grass, a major weed in cereals in South and Central America, and a range of nematode pests. IAS problems resulting from intentional introductions under development assistance programs include water hyacinth, *tilapia* fish for aquaculture in Central America, and a number of agroforestry trees and shrubs. Ironically, in some cases the very characteristics that make a species attractive for introduction under development assistance programs (rapid growth, tolerance of a range of environmental conditions, etc.) are the same properties that increase the likelihood of the species becoming invasive.

The global spread of IAS as a result of international aid programs is poorly documented but merits further study. It is of particular concern since aid programs are directed at the most vulnerable human communities, where a loss of agricultural production or ecosystem services can have the most severe consequences for livelihoods. The Bank is working with the Global Invasive Species Programme (GISP) to better understand the implications of IAS on food production, food security, and health, including assessment of best practice guidelines for avoiding the introduction of species known to be invasive through Bank projects and programs.

## Mainstreaming Biodiversity in Infrastructure Projects

A major challenge for the Bank is how to minimize the impacts on natural habitats and biological resources

**BOX 3.1****Doing No Harm — World Bank Policies and Safeguards**

All World Bank projects must comply with a range of safeguard policies that cover important topics such as pesticides, indigenous peoples, dam safety, disputed areas, and resettlement.

The World Bank Policy on Natural Habitats (OP 4.04) defines “natural habitats” as: *land and water areas where (i) the ecosystems and biological communities are formed by native plant and animal species, and (ii) human activity has not essentially modified the area’s primary ecological functions and determines that the Bank does not support projects involving the significant conversion of natural habitats unless there are no feasible alternatives for the project and its siting, and comprehensive analysis demonstrates that overall benefits from the project outweigh the environmental costs.*

The Bank does not support projects that involve the significant conversion or degradation of critical natural habitats. These include existing protected areas and areas officially proposed by government as protected areas, areas initially recognized as protected by traditional local communities, and sites that maintain conditions vital for the viability of these protected areas. Additionally, the Bank recognizes globally important sites identified on supplemental lists prepared by the Bank or an authoritative source.

Under OP 4.01 on Environmental Assessment, the Bank requires the borrower to make all reasonable investigation into the proximity of a project site and its area of influence to all possible “critical natural habitats.” OP 4.04 also states that *the Bank supports, and expects borrowers to apply, a precautionary approach to natural resource management to ensure opportunities for environmentally sustainable development.*

The World Bank Policy on Indigenous Peoples (OP/BP 4.10) applies to all investment projects for which a Project Concept Review takes place on or after July 1, 2005. The new policy aims to *ensure that the development process fully respects the dignity, human rights, economies and cultures of Indigenous Peoples, and requires the borrower to engage in a process of free, prior and informed consultation with indigenous peoples in all projects that are proposed for Bank financing and affect indigenous peoples.* It also states that *such Bank-financed projects include measures to: (a) avoid potentially adverse effects on the Indigenous Peoples’ communities; or (b) when avoidance is not feasible, minimize, mitigate, or compensate for such effects. Bank-financed projects are also designed to ensure that the Indigenous Peoples receive social and economic benefits that are culturally appropriate and gender and inter-generationally inclusive.*

of development lending and poverty alleviation strategies. Bank environmental assessment procedures and safeguards require that Bank projects include activities to mitigate any negative environmental impacts. These policies recognize that the impacts of rural development and infrastructure programs and projects, as well as economic adjustment measures and development policy lending, must be carefully formulated to avoid serious negative impacts on biological resources and natural habitats and the communities who depend on them. In addition to the Bank’s current Operational Policy to protect Natural Habitats (OP 4.04), the Forests Operational Policy (OP 4.36) now ensures appropriate attention to forest ecosystems and forest-dependent peoples, placing increased

emphasis on issues of governance and participation. On May 10, 2005, the Executive Directors approved a revised policy on Indigenous Peoples (see Box 3.1).

It is often difficult to reconcile biodiversity benefits with local development needs, especially when working across sectors with multiple institutions and production-orientated stakeholders. During the last decade, however, there has been an increasing tendency for projects to go beyond the “do no harm” requirement to actively incorporate additional components that promote biodiversity conservation. Several large infrastructure projects for irrigation, flood control, water supply, and urban development financed by the Bank during the last decade have begun to implement innovative approaches



to natural habitat protection and compensation. These approaches range from supporting the establishment of new protected areas to restoring degraded wetlands and ex-situ protection of endangered species such as the Kihansi spray toad from Tanzania, as well as ecological research on affected species (see Box 3.2).

Traditionally the irrigation and flood control portfolio has emphasized bringing irrigation to croplands and improving flood control infrastructure to mitigate natural disasters. Several projects are now also including components that support habitat protection. Thus, the Croatia Reconstruction Project for Eastern Slavonia project, in addition to financing irrigation, wastewater, and flood control infrastructure, is also supporting protection of Kopacki Rit, a Ramsar wetland of global importance. Similarly, the Uzbekistan Drainage, Irrigation, and Wetlands Improvement project is mainstreaming

biodiversity by conserving one of the few remaining tugai (riverine) forests along the Amu Darya river. Water quality and energy projects are also contributing to biodiversity conservation by providing small additional funding to enhance habitat protection. In Estonia, the Haapsalu and Matsalu Bays project was designed to improve water quality and ecological conditions in the Baltic Sea, but also supported coastal land use planning and an ecosystem management program to maintain key wildlife habitats and reduce agricultural non-point source pollution. In Lao PDR, the Nakai Nam Theun 2 project is safeguarding the watershed of a new hydropower dam and providing financial resources to protect the forests and wildlife along the Lao-Vietnam border (see Box 3.3).

The application of the Bank's Natural Habitat policy has been a key element for mainstreaming natural habitat protection in infrastructure sectors (roads, water and

### **BOX 3.2**

#### **Water, Livestock, and the Mongolian Wild Ass**

Water in the Gobi desert region of Mongolia is a critical resource for human occupation, livestock production, and wildlife habitat. During the collective era, numerous mechanical wells were built and maintained by the government, greatly expanding both the temporal and spatial scale of human and livestock use. During the transition period (after 1990), most of these mechanical wells fell into disrepair, forcing herders and livestock to abandon large areas of Gobi pastureland.

The Sustainable Livelihoods Project in the Gobi is rehabilitating and replacing some of the old wells. During a Bank supervision mission it was noted that this rehabilitation might be having a negative impact on the threatened wild ass (*Equus hemionus* or khulan) found in the area. Although the khulan do not use the wells, they may be displaced from parts of their range by the presence of humans and livestock. A common perception among herders is that the khulan compete for food and water with livestock; consequently they take action against them. A succession of hard winters following summer drought has also apparently resulted in increased poaching pressure on khulan for meat.

Using funds from the Mongolia Trust Fund (NEMO), a research project is under way to investigate the present and upcoming changes in land use patterns in this region, attitudes of the local population towards khulan and their management, wild ass habitat use and movements, as well as mortality factors affecting them. Satellite collars have been put onto seven wild ass to monitor their movements in the field. Initial observations already provide some important findings, for example that the railway tracks through the Gobi may be a barrier to movements of the wild ass populations, with animals unable to cross the lines. The satellite telemetry is being done at the same time as fecal profiling and measures of forage growth to determine the quality of dietary material available to large herbivores. This should lead to recommendations about current livestock grazing strategies. The results of this research can be used to design a management program to mitigate conflict between the wild ass and herders over habitat use for livestock.

sanitation, energy, municipal drainage) in the LAC region over the last decade. Approaches range from support for the establishment and management of protected areas to restoring deteriorated ecosystems and supporting in-situ protection of endangered species. Innovation in

the Argentina Flood Protection Project led to the creation of natural reserves in the floodplain of the Parana River, utilizing riverine forests as part of flood control measures. The Bolivia-Brazil Gas Pipeline Project created a \$1-million trust fund to support the long-term

### BOX 3.3

#### Nakai Nam Theun — Forest Conservation to Protect Hydropower

From the summer of 2008, the Nam Theun 2 hydropower project in central Lao PDR will inundate 450 sq km of the Nakai Plateau, including substantial areas of semi-natural forest habitat. To offset this impact, a Bank loan for the environment will provide an unprecedented level of support for conservation in the adjacent Nakai Nam Theun National Protected Area (NPA). At around 4,000 square kilometers including corridors, Nakai Nam Theun NPA is the largest single protected area in Lao with the most recorded species of birds (403 species) and a large number of mammals (89 species, excluding mice and rats). The PA sits upon the spine of Indochina, the Annamite mountain range, known for its network of paths, part of the Ho Chi Minh trail, and now renowned as a center of endemism and for recent discoveries of new mammals. The borders of Nakai Nam Theun stretch from wet evergreen forests along the Vietnamese border, home to the enigmatic Saola *Pseudoryx nghetinhensis* and other large mammals discovered in the 1990s, to the limestone karst formations of central Lao, from which the Kha Nyou *Laonastes aenigmamus*, the only known member of an entire family of rodents, was first described in 2005. Married to this biodiversity is an astonishing ethno-linguistic diversity. The people living in, and immediately around, the protected area include 28 linguistically distinct groups and can name a greater number of forest products than have been recorded from any other area in Lao.

Under a new conservation authority established during the preparation of the Nam Theun 2 hydropower project, the PA will be managed according to an integrated conservation and development model. Village agreements will detail resource use rules and regulations consistent with PA zonation including controlled use and totally protected zones. Village conservation teams provide a platform for management of village resources in compliance with resource use agreements, and for broader biodiversity monitoring and enforcement. Sustainable alternative livelihood options will mitigate negative impacts resulting from restrictions on resource use in key core conservation areas. Communities will be empowered through provision of secure land rights, capacity building, recognition of indigenous knowledge, and equitable distribution of benefits to ensure that the most vulnerable (and often most forest-dependent) groups are included in the process.

Previous conservation efforts in Lao have been undermined by lack of staff and long-term funding. Perhaps the most promising innovation in Nakai-Nam Theun is a new financial and administrative model. The protected area covers around 95 percent of the catchment for the Nam Theun 2 hydropower project. The hydropower developer will pay \$1 million annually for PA protection over the 30-year concession period. The Government of Lao is keen to apply similar financial models elsewhere as it exploits its abundant water resources to mobilize resources for poverty reduction while maintaining the biodiversity base critical to much of the rural population. The Nakai-Nam Theun Watershed Management and Protection Agency is operationally free to set salaries and administrative systems responsive to its needs, while remaining under the oversight of both national and local government and stakeholders. This funding for Nakai Nam Theun will be some two orders of magnitude greater than the total presently allocated from the central budget to the rest of the Lao protected areas system. The Bank is therefore establishing another fund for other local conservation areas to provide modest, demand-driven funding at a level appropriate to existing local capacity. Sustained support for the fund would also come from the revenues generated by natural resource industries. Through direct financing, and promotion of integrated development models, the Bank is providing biodiversity funding over a sufficient time frame for conservation success to become its own champion in Lao PDR.



management of the Kaa Iya National Park in the Gran Chaco of Bolivia. At 3.4 million hectares, this is one of the largest protected areas in Latin America. It was proposed and is co-managed by an indigenous group. The same project implemented a \$7-million protected area program in Brazil which supported 12 federal and state parks in five states, including land acquisition, demarcation, management plans, and park infrastructure. The project was a key promoter of the creation of a new park in Brazil, the Serra do Bodoquena National Park. It received the Bank's Green Award in 2000 and the International Association for Impact Assessment (IAIA) Corporate Award in 2001.

## Valuing Ecosystem Services

Protecting natural habitats and ecosystems can provide social and economic benefits, both directly through sustainable utilization of biological resources and indirectly through ecosystem services. Floodplain forests and coastal mangroves act as safety barriers against natural hazards such as floods, tsunamis, and hurricanes; coral reefs shelter and protect shorelines; natural wetlands filter pollutants and serve as nurseries for local fisheries.

An increasing number of projects are making explicit linkages between sustainable use of mountain and forest ecosystems, biodiversity conservation, carbon sequestration, and watershed values associated with erosion control, clean water supplies, and flood control. In Ecuador and Argentina, flood control projects utilize the natural storage and recharge properties of critical forests and wetlands by integrating them into "living with floods" strategies that incorporate forest protected areas and riparian corridors. The China Natural Forest Protection Program was designed to ensure the long-term protection of national forests in watershed catchments and to reduce the vulnerability of downstream villages and towns to flooding. Approximately 50 million hectares, more than half the country's natural forests, will now be

re-assessed for designation as nature reserves, forest parks, watershed forests, or areas for selective logging according to their biological and protection values. The program will promote biodiversity conservation, more sustainable forest management, and a better understanding of the critical ecosystem service role of watershed forests.

A regional project on Silvopastoral Approaches to Ecosystem Management provides technical assistance and payments to livestock producers who undertake biodiversity-friendly land use changes in Colombia, Costa Rica, and Nicaragua. The project's key objective is to demonstrate and measure the effects of payment incentives for environmental services on adoption of integrated silvopastoral farming systems in degraded pasture lands. Midway through execution, the project is contributing to improved soil and water quality of 12,000 ha of degraded pastures, improved biodiversity conservation and livestock production, and economic benefits to farmers from integrated management. Payments for environmental services (PES) have been successful in promoting land use changes, with increased abundance of bird and insect species found in agricultural lands and significant increases of carbon sequestered. Not only do the integrated silvopastoral systems lead to greater productivity, participating in the PES scheme has also fostered a greater environmental conscience among producers and promoted social recognition for their contributions.

A new project would address the widespread land degradation in Ghana by promoting sustainable land management through payments for environmental services (PES). Many individual farms are already using sustainable land management (SLM) practices but these are not widely adopted at the watershed/ecosystem scale. The project will identify and address the local barriers to widespread adoption of SLM, including knowledge, technological, financial, policy, and institutional barriers. The history of less than successful approaches in Africa to address land degradation based on input provision (such as seedlings) underscores the critical need to focus on outcomes through performance-based incentives for promoting SLM

**BOX 3.4****Ecomarkets in Costa Rica**

Costa Rica's program of payments for environmental services (known as PSA) is an innovative and highly successful effort to voluntarily enlist private landholders to maintain and protect their forests. Since its inception in 1997, the PSA Program has been applied to a total of nearly 500,000 ha of privately owned forests.

Since 2001, the program has received funding under the Bank/GEF Ecomarkets Project. More than 130,000 ha of priority biodiversity areas in the Costa Rican portion of the Mesoamerican Biological Corridor (MBC) have been included in the program, Another 70,000 ha have been contracted on privately owned lands within other priority conservation areas, thus further contributing to the achievement of conservation and sustainable management goals. In 2000, only 22 female landholders participated in the program; by 2005 there were 474 women participating. In 2000, there were 2,850 ha of indigenous-community-owned lands in the program; by 2005 this figure had risen to 25,125 ha, an eightfold increase.

The PSA Program has been funded primarily by allocating 3.5 percent of the national fuel tax to FONAFIFO. The PSA Program has also attracted significant co-financing from bilateral donors, including KfW, NORAD, and the Government of Japan. The Ecomarkets project has not only provided additional financing to expand the PSA Program, but also led to the re-focusing of the entire PSA Program on global and regional biodiversity conservation priorities, as well as on national social goals. National benefits include the maintenance of privately owned forests in important biological corridors; local conservation of biological diversity; major increases in the involvement of women landholders and indigenous communities with the PSA Program; direct payments to a relatively greater number of small rural landholders; and, most importantly, broad-scale public recognition that intact forests and their environmental services have value.

The success of the Ecomarkets Project is based on a strong institution (FONAFIFO) that is capable of effectively and efficiently managing a complex system of payments for environmental services; the strong legal framework and wide political support for the PSA Program through three successive administrations; and the nationwide support from civil society, particularly small- and medium-size landholders, as well as local and regional organizations (e.g., NGOs, cooperatives). The PSA Program and the Ecomarkets Project have attracted widespread international interest, spurring several replication efforts. FONAFIFO has hosted official delegations from many countries wanting to study the PSA Program. The project has led to more effective conservation by creating linkages between geographically isolated protected areas through privately owned lands where biodiversity is legally protected through PSA contracts.

(payments to farmers and communities on generation of environmental services such as lower sedimentation, less flooding, carbon sequestration, agro-biodiversity, etc.). The area of focus, the transitional belt and the watershed of the Volta River and lake basin, is critical both in terms of the cost of land degradation as well as the potential benefits from investment in sustainable land management.

In the Philippines, improved watershed management is being supported through a grant from the Critical Ecosystem Partnership Fund (CEPF) to a consortium of conservation NGOs—Yakap Kalikasan, First Philippine Conservation Inc., and Conservation International-

Philippines—working with a network of business partners, the Philippine Businesses for Social Progress (PBSP). This group plans to set up a Business and Environment Trust Fund, the first long-term, public-private funding mechanism for environmental projects in the country. One of its first projects is the “Water for Life” program to protect five watersheds in the southern forests of the Sierra Madre Corridor. The group set up an awareness campaign and a CEO Forum on Business and the Environment to advocate better corridor management and lobby against development harmful to conservation. PBSP is also supporting reforestation of 1,500 hectares within the proposed protected area



with native endangered dipterocarps and bamboo replanting along 30,000 kilometers of riverbanks. Conserving biodiversity and restoring ecological balance to the watersheds should go some way to providing a supply of clean water for the metro Manila area. Local businesses will benefit from a secure water supply, and the protected forests will provide habitat for rare species.

## Strengthening the Knowledge Base

Many Bank/GEF projects have created a wealth of scientific information to underpin conservation and development decisions. Support to InBio under the Costa Rica Biodiversity Resource Development Project has led to enhanced information dissemination and greater awareness of biodiversity issues and the value of the resources. InBio has identified more than 250,000 specimens, representing about 10,000 species, of which nearly 1,500 were new to science. The award-winning biodiversity conservation information system maintains a relational database with records on each specimen in its collection (more than 3 million, including non-Bank-funded collections). INBio's collecting, cataloguing, and information dissemination activities are world-class. The project has developed an inventory-based knowledge

platform, appropriate for replication in other countries. The information is useful both to Costa Rica and other countries in the region and contributes to the Global Taxonomic Initiative endorsed by the CBD. The project has produced a broad array of scientific, educational, and outreach materials that are in wide circulation and have generated revenues for INBio; built awareness among both the general public and decision makers; and attracted additional resources to support conservation and improved environmental management (see Box 3.5).

Elsewhere in LAC, a project focusing on conservation and sustainable use of biodiversity in the High Andes Region of Colombia has dramatically increased the biological knowledge base. Replicable methodologies have been designed for biodiversity assessment and monitoring, filling major knowledge gaps in the Andes region. Two hundred people were trained to undertake biodiversity inventories and another 50 people were trained in biodiversity collections management. A network (BIS Andes) with three regional Web sites has led to information exchange among regional entities and project stakeholders. In Honduras, the Biodiversity in Priority Areas Project has supported the preparation of a map of all ecosystems in the country, allowing the identification of critically important areas regarding protected areas and biodiversity; helped in the discovery of new species for Honduras; and produced concrete information on the





**BOX 3.5****Can Collecting Flies Benefit Conservation?**

In a rough kind of way, this was the question that the Costa Rican Institute of Biodiversity (INBio) set out to answer through this GEF-financed World Bank project of \$7.0 million. The project started in 1998 and closed in December 2005. The project's global objective was to demonstrate that increased knowledge about species leads to a benefit for conservation by enabling more sustainable use of biodiversity and increasing awareness of its importance. Although the project financed many diverse components, the bulk of financing went to support field inventories and taxonomic research and collections for four groups of insects: butterflies, beetles, wasps, and—yes—flies! Through the project, over 3,000 new invertebrate species were described and 600,000 specimens identified to species level and recorded in an on-line database.

So does it? The Bank and independent experts concluded that the answer is “Yes,” or rather “Yes, in a round-about way...” It was not possible to demonstrate a clear-cut link between flies in a vial and conservation but INBio has shown the world that taxonomy and inventories can be linked to improved conservation. The most obvious link is that INBio's pool of expertise and information allows them to reach out to the public and push across information on biodiversity and conservation. Maybe politicians don't call about flies, but they call INBio because they are “the experts” and INBio's information is being demonstrably used in almost every major conservation decision in Costa Rica. Interestingly, the public turns out to be interested in flies too. The project financed both a field guide to flies and a game for children on Dipteran biology and both have proved to be very popular.

At a more technical level, the wealth of biological inventory data at INBio is used for real decision making in Costa Rica in environmental impact analyses, decisions about park siting, and is factored into every park management plan. The key is not only having information but making it available. (INBio's biological database Atta can be found at [www.inbio.ac.cr](http://www.inbio.ac.cr).) Work on biological information systems throughout the Americas continues to be supported through the Bank's ongoing project to support the Inter-American Biodiversity Information Network (IABIN), found at [www.iabin.net](http://www.iabin.net). INBio is one member of that network and its lessons learned are being passed on to other countries in the Americas. By clearly establishing the links between taxonomy and conservation, the project has made an important contribution to addressing the issue of the “taxonomic impediment,” the widely recognized lack of basic taxonomic knowledge and research that limits many efforts to find applied uses for biodiversity.

management of indicator species and ecosystem health. The trustworthiness and the quality of the information that is being generated have caused greater interest in the national and international scientific community to promote further research. By sharing information among concerned organizations in Brazil, the PROBIO project has established key partnerships for conservation (see Box 3.6).

In Indonesia, the Bank and GEF, through the Biodiversity Collections project, supported upgrading and documentation of the most important botanical collections in South East Asia as well as restoration of the national zoological collections. The information and new generation scientific capacity generated under

this project provides the scientific underpinning for environmental assessments and development decisions.

Many Bank projects have explicit components for education and outreach to increase transparency and participation and to create greater environmental awareness among project beneficiaries and other stakeholders. In Nicaragua, for example, one of the most important additional impacts of the Atlantic Biological Corridor Project was the dramatic results in improving environmental awareness of the Mesoamerican Biological Corridor through environmental education and communication campaigns and countless publications (including atlases available in indigenous languages). Similarly, the Sangihe-Talud Forest Conservation project



### BOX 3.6

#### Partnerships for Progress — Brazil National Biodiversity Project

Launched in 1992, the National Biodiversity Program (PROBIO), which closed at the end of 2005, was fundamental in stimulating and consolidating Brazil's nascent strategy for biodiversity conservation. Over slightly more than a decade, the project, funded through the Rain Forest Trust Fund, succeeded in creating wide-ranging partnerships for conservation, producing and synthesizing information on Brazilian biodiversity and conservation strategies, incorporating biodiversity concerns into different economic sectors, contributing to the legal framework, serving as the basis for the National Biodiversity Policy, and establishing the institutional structure responsible for biodiversity in the Brazilian government. PROBIO is widely recognized as one of the most successful environmental projects in Brazil.

The key to PROBIO's success has been a pioneering strategy of partnership and consensus building in which key stakeholders from a variety of relevant disciplines and institutions framed problems, brainstormed solutions, and implemented these activities. Because the process was inclusive, interdisciplinary, and adaptive, the results achieved by PROBIO have received a high degree of acceptance and recognition and have been widely adopted. Through this multidisciplinary, participative process, PROBIO established 900 priority areas for biodiversity conservation in the key Brazilian biomes. These priority areas now frame conservation strategies within Brazil and have been widely adopted by institutions such as the National Petroleum Agency, the Brazilian Institute for the Environment, the National Forestry Program, and NGOs, as well as by numerous environmental projects. The innovative PROBIO process used in establishing these priority areas is now being replicated in other countries.

PROBIO has financed 144 subprojects, ranging from biodiversity inventories to the management of endangered species and the economic potential of native species. These subprojects involved 284 institutions, creating an extensive network of partnerships between academic and private institutions, NGOs, and government bodies. These partnerships have endured and are generating enormous synergies in the fields of biodiversity research and conservation. Many subprojects have contributed critical information to the understanding and management of biodiversity in Brazil; at least seven were awarded prizes for work. In a November 2004 congress, the directors of these subprojects publicly recognized the importance PROBIO to their work and for biodiversity in Brazil, noting that without the program many of the advances made in the last 10 years would have been impossible.

Information from the subprojects, and other PROBIO work, has been extensively disseminated widely in the form of workshops, books, articles, theses, videos, maps, school materials, and brochures. The network of PROBIO partnerships has been fundamental in raising the profile of biodiversity within Brazil, stimulating the adoption of biodiversity considerations in areas as disparate as oil exploration, timber production, and private sector development, as well as protected areas creation. A new generation of projects built on the PROBIO experience all have a high focus on partnerships between the public, private, non-profit, and academic sectors. The results of PROBIO now touch innumerable segments of Brazilian society and have had enormous impacts on the ground – a sign of the power of partnerships for conservation.

in Indonesia has significantly increased conservation awareness among local communities through innovative outreach activities, including sponsorship of sport events and regular weekly programs on local radio.

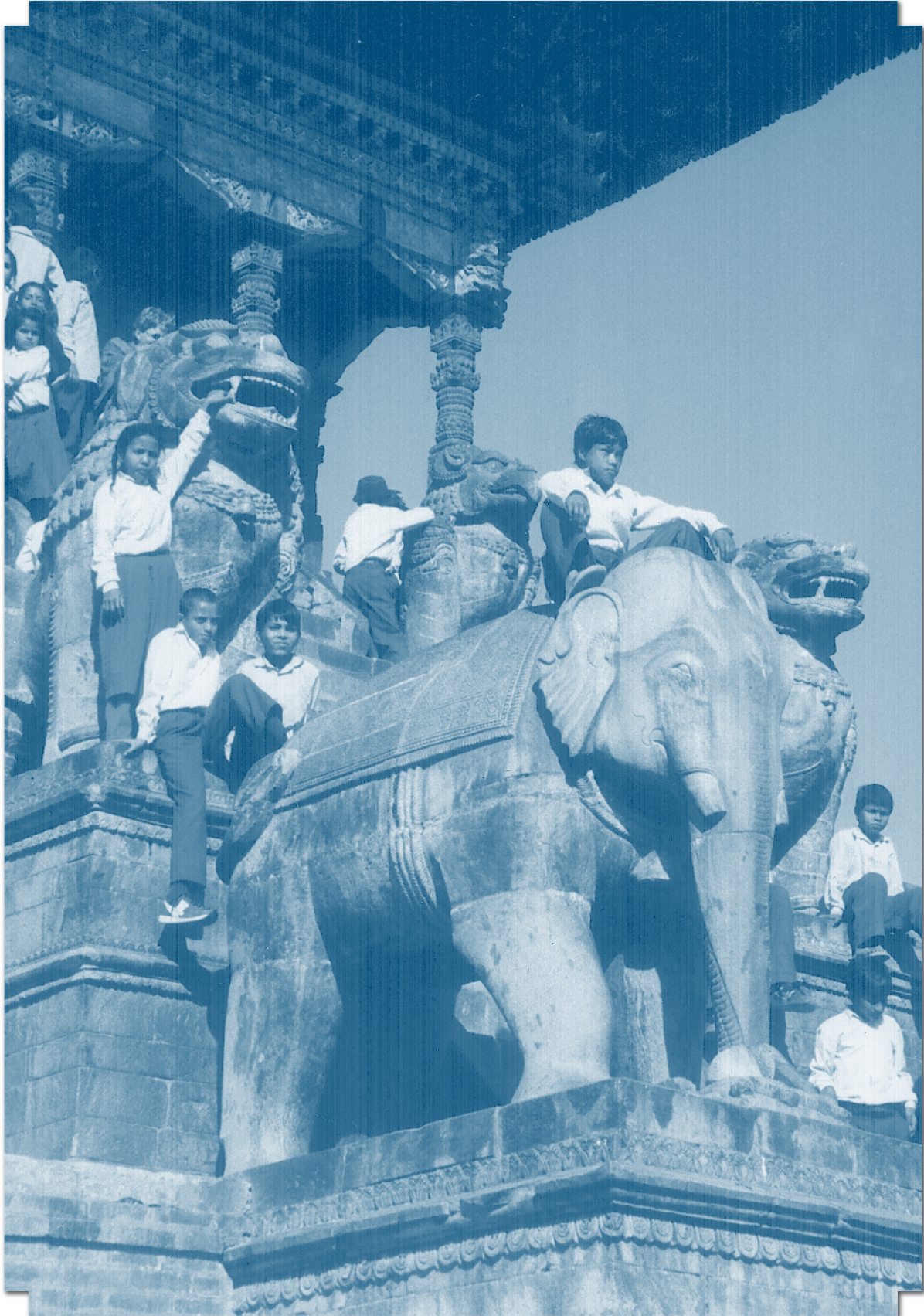
Another useful way to build local capacity and to disseminate information more widely is the production

of local language field guides. The *Bank Local Language Field Guide Program* has collaborated with national and international NGOs and scientific institutions to produce more than 60 field guides in local languages, with another 30 in preparation. Funding has come from Bank projects as well as the Bank Netherlands Partnership Program and MacArthur Foundation. These

field guides cover taxonomic groups as diverse as snails and amphibians, trees and orchids. They have proved to be key tools in promoting environmental awareness and capacity building in developing countries, where lack of accessible information in local languages has hampered biodiversity training, park ranger capacity, and opportunities for local communities to benefit from their rich biological heritage. Thus field guides on the *Birds of*

*North India* (in Urdu, Hindi, and Gujarati) and *Birds of East Georgia* and *Raptors and Owls of Georgia*, some of the most recent releases, are being used in ecotourism ventures and proving to be popular with national students and international tourists. A new call for proposals links production of local language field guides explicitly to engagement of youth in preparation and dissemination.





## Working with Civil Society



**B**iodiversity conservation cannot succeed without the active involvement of all segments of human society. Around the globe, civil society represented by NGOs, the private sector (individual landowners and the business community), scientific institutions, and local communities has played a key role in the effort to protect rare and threatened species, manage protected areas, and increase understanding of the natural world. Although in many countries the State has the primary responsibility for managing national parks, increasingly these responsibilities are being shared with civil society, and partnerships are being developed for conservation, both within protected areas and in the surrounding land and seascapes. In many Bank client countries, NGOs work in co-management arrangements with national governments to raise funds and implement park protection activities. Local communities and private landowners often manage and preserve areas of natural vegetation on which they depend for their livelihoods, and throughout the world the vital role of indigenous people in conserving unique and threatened habitats is increasingly being acknowledged. Many Bank projects support the efforts of local communities, organized civil society, and the business community to conserve biodiversity, encouraging the engagement of a diversity of actors to broaden the scope and enhance the impact of this work.

### Indigenous Peoples, Protected Areas, and Conservation

Biological and cultural diversity are essential for sustainable development and global human security. Many biodiversity-rich ecosystems overlap with territories historically owned and managed by Indigenous Peoples, who represent some of the most threatened social minority groups. In recent years, there has been much debate on whether global efforts to achieve conservation and biodiversity goals have been at the cost and exclusion of indigenous peoples. The World Bank cannot ignore this debate. A review prepared in 2003 for the Parks Congress in Durban showed that of 232 protected area projects funded through GEF, IBRD, and IDA funding, at least a third of projects overlapped with indigenous people, their lands, and their interests (World Bank, 2003). The Bank's indigenous policy has been a key legal instrument to ensure that the voices of indigenous peoples are heard and their inalienable rights protected. Many projects have been successful in working with indigenous groups to integrate conservation and social objectives for sustainable development. Other projects have faced challenges in meeting both the human and biodiversity goals.



Recent Bank reviews of the protected areas portfolio and studies on issues facing indigenous groups (for example, land tenure and utilization of indigenous knowledge) identify some useful emerging lessons. One such review of 48 biodiversity projects in Latin America shows that the Operational Policy on Indigenous Peoples has strengthened project effectiveness by facilitating the participation of indigenous peoples as partners in conservation actions. Broader issues such as national legal frameworks and land tenure arrangements are best addressed through specific Bank operations and land titling projects. The WBG has been assisting several countries with land titling for Indigenous Peoples, for example through projects in Brazil, Colombia, Ecuador, Bolivia, and Central America.

Areas of remaining wilderness and high biodiversity often overlap with lands used by indigenous, and marginalized, communities. The establishment of new protected areas in such territories can lead to conflict between protected area managers and indigenous groups. Analysis shows a general trend toward fewer conflicts between indigenous peoples and protected areas management where stronger legislation on indigenous land rights is in place. For instance, in Brazil and Colombia, which have some of the strongest indigenous legislation in Latin America, the collaboration between protected area managers, biologists, and indigenous people is clearer and less conflictive. There are, however, exceptions to this trend, in particular where legislation is not adequately enforced.

The Bank has recently issued a new publication, written by indigenous peoples from Colombia, sharing experiences of how to plan large indigenous territories for conservation, cultural survival, and development. Such a “Life Plan” is conceptually similar to a development plan or management plan that incorporates the vision of the indigenous group. With GEF financing, a Life Plan is being developed for the Pemon Indigenous People in Canaima National Park in Venezuela. The Life Plan can be a tool to harmonize visions of the territory and its natural resources among all the park stakeholders, particularly indigenous peoples and protected areas staff.

In some countries, protected areas have been titled to indigenous peoples and the Bank has been assisting them to manage biodiversity. New management models for conservation are being supported through indigenous reserves or co-management agreements with indigenous communities in Peru, Bolivia, Colombia, Panama, Costa Rica, Honduras, Nicaragua, Guatemala, and Mexico. Many of these projects address issues such as land tenure and resource rights, traditional knowledge, participation, protected areas management and monitoring, gender, tourism, capacity building, alternative sources of income, and the infrastructure needs of remote populations. In Colombia, 16 indigenous communities established a conservation area within their indigenous territory in the Matavén forests. Community leaders and other stakeholders benefited from site visits to other conservation areas managed by indigenous communities, such as the Kuna lands in Panama (see Box 4.1).

Elsewhere protected areas have been established that overlap indigenous lands, and project activities include mapping of community lands and use rights. In the Philippines, for instance, community lands and indigenous territories have been mapped within protected areas and are part of recognized park zoning. The Virachey National Park (VNP) includes one of the largest remaining expanses of intact forest left in Cambodia, home to numerous ethnic minorities. These communities are now settled along the rivers at the edge of the park. Park staff and the indigenous Brou, Kravet, and Krueng communities are working together to map community lands and usufruct rights to articulate and implement long-term community resource management plans in lands that overlap park boundaries. These plans will assist the communities to assert their rights against large-scale timber interests that are moving into the region.

Many projects have developed the capacity of local beneficiaries, including indigenous peoples, through early social assessments, capacity building activities for local groups, participatory monitoring, and local consultation throughout the life of the project. Community

**BOX 4.1****Conservation and Sustainable Development in the Matavén Forest**

With GEF funding through a medium-size project (MSP), 16 indigenous communities in Colombia led the land planning process to establish a conservation area as an extension of their already demarcated indigenous territory. The Matavén project engaged previously marginalized indigenous communities in conservation planning linked to a comprehensive organizational and land governance process. As a result, the national government recognized indigenous land rights over 900,000 hectares encompassing the central region of the Matavén Forest. This zone helped preserve the indigenous communities' cultural history and promoted the region's natural resource conservation. Creation of an association of indigenous authorities (ACATISEMA), including leaders from the 16 indigenous *resguardos* (territories), helped facilitate the legal recognition and planning process that led to ecological zoning of the area. The project increased female participation in the design and execution of project activities and promoted handmade crafts as an economically and ecologically viable production alternative for Matavén communities. The project trained local representatives, reinforcing local communities' leadership capabilities and improving *interresguardo* communication. Several publications were created and distributed to convey information relevant to indigenous communities, validating their traditional, conservationist approach to natural resource management. The project was effective because it built upon the longstanding efforts of Fundación Etnollano, an NGO that has promoted participatory processes with indigenous communities in the Matavén Forest on themes of health, biodiversity, and sustainable production alternatives since 1985.

capacity building and empowerment are some of the most important local benefits from the biodiversity portfolio. As communities become better informed and experienced, many are able to use this increased capacity to solve other social problems through organized activity and conflict resolution. Because of their experiences with project activities, many community members are able to access additional funding resources available under other local and national programs for social and development needs as well as conservation.

The India Ecodevelopment Project (IEDP), for instance, supported capacity building initiatives for more than 500 ecodevelopment committees around seven protected areas and enabled those communities to manage small grants and access additional resources from other government programs as well as building the skills base to increase local livelihood opportunities. Several of the ecodevelopment communities were tribal peoples, some of the poorest and most disenfranchised peoples in India. The IEDP has helped to free tribal communities and other poor villagers from moneylenders, greatly increased understanding and cooperation between communities and forestry officers, and improved the

incomes, welfare, and status of local people. Often, the original project investments have generated new opportunities and improved the quality of life in unexpected ways, including providing greater empowerment of women in village debate and decision making. A new project, Biodiversity Conservation and Rural Livelihoods, will build on these IEDP experiences to expand the successful ecodevelopment model to achieve conservation at a landscape scale in six high-biodiversity regions, including the Western Ghats.

## Working with the Private Sector

Promoting private sector investment in biodiversity-friendly sustainable businesses has been a key undertaking of the International Finance Corporation (IFC). The IFC's Environmental Finance Group incubates new "bio-businesses" and helps develop markets for businesses that "use" biodiversity as their business platform. For example, in South America the EcoEnterprises Fund (EEF) is providing economic incentives for biodiversity



## *Mountains to Coral Reefs (1988 – 2005)*

conservation by helping to build a network of innovative partnerships between non-profit organizations and private sector businesses. The program empowers the community-based organizations to engage in small and medium-size businesses that integrate biodiversity conservation objectives in their business activities. The GEF contribution plays a catalytic role in effecting behavioral change among the entrepreneurs and local communities. The EEF is managed by The Nature Conservancy and benefits from investment from the Inter-American Development Bank.

Another example of this model is provided by a project sponsor in the Philippines. The Asian Conservation Company (ACC) is a private equity investment holding company that is purchasing majority ownership of companies operating in areas of important coastal or marine biodiversity. It then drives its investee companies toward biodiversity-friendly activities in their business in partnership with NGOs including WWF-Philippines and the El Nido Foundation. The project is designed to provide a financial return for investors while generating a biodiversity “conservation return” via protection of critical habitats. Incremental GEF grant funding complements financing from the ACC’s portfolio companies. In order to address financial sustainability questions, the project is designed such that the contributions from ACC portfolio companies will sustain conservation activities at the end of GEF’s funding.

IFC also seeks to increase access and integration of biodiversity-friendly companies into mainstream financial markets. Through the GEF-funded Environmental Business Finance Program (EBFP), IFC lends and provides technical assistance (TA) to financial intermediaries to encourage them to finance and provide TA to micro-, small, and medium-size enterprises (SMEs) engaged in ecotourism, sustainable agriculture, sustainable fishing, sustainable forestry, and climate-change mitigation activities. As an example, EBFP has financed Egyptian project developer Environmental Quality International to develop sustainable agriculture (olives, dates, herbs, and cattle) and ecotourism ventures in the Siwa oasis by revitalizing traditional knowledge and practices. These

investment projects thus preserve the local culture and bring economic benefits to the indigenous community. EBFP has also invested in the Verde Ventures fund, which invests exclusively in private sector biodiversity-conserving projects. Thus far, Verde Ventures has supported two ecotourism and sustainable fishing projects (in the Galapagos Islands, Ecuador, and in Ibo Island, Mozambique) as well as invested in “Wildlife Works.” The latter is a Kenyan textile company that contributes a significant share of its earnings to conserve biodiversity and employs locals in return for their commitment to protect local wildlife and their ecosystem. Through its TA activities, EBFP also creates and disseminates publications, brings together biodiversity players, and develops financial instruments and tools to support the enabling environment of private sector biodiversity parties.

IFC is also working to transform markets, using a combination of risk mitigation and business opportunity. One such partnership is the Better Management Practices program with the World Wide Fund for Nature (WWF). Since 2003 IFC and WWF, with the support of a number of agribusiness companies and investment banks, have been supporting the set-up of four international, multi-stakeholder, roundtable processes in four commodities: palm oil, sugar, cotton, and soybeans. Together, the various players of the





financing, production, processing, retail, and other groups in a given commodity value chain define, approve, and implement Better Management Practices (BMPs). These BMPs provide guidance on how to mitigate the impact of commodity production, for example by promotion of ecological corridors within the production landscape. Thus the members of the Roundtable on Sustainable Palm Oil (RSPO—see [www.sustainable-palmoil.org](http://www.sustainable-palmoil.org)) have approved eight Principles and corresponding Criteria, one of which is to stop clearing primary forests for production. Since the RSPO members account for between 30 and 50 percent of the total world production of palm oil, this commitment in November 2005 may help substantially to reduce further tropical forest clearance.

In order to share lessons learned in a more systematic way, IFC is launching a Biodiversity Good Practice Guide in the spring of 2006. Drawn from IFC's experience of working with private sector clients, it will comprise a Web-based manual for operations managers, supported by an Executive Brief, which targets company executives and explains why biodiversity management is a strategic issue worthy of their attention. The achievement of biodiversity benefits from private sector SMEs requires full and thorough integration of clear biodiversity investment guidelines and indicators with the business plan. Thus biodiversity conservation becomes embedded

in the business's activities, adds value to the business, and does not become expendable when financial problems are encountered. Although it may be difficult to implement biodiversity projects where strong community participation is critical to success, the presence of highly experienced NGOs and pre-existing profitable entities can often help overcome significant challenges. As an example, the Inka Terra Association, an NGO, works with the local community and a private sector firm, Inka Terra Peru Company, to catalyze self-financing initiatives within a 10,000-hectare ecological reserve in Peru through the expansion of ecolodges, ecotourism attractions, aquaculture operations, animal breeding, and environmental training. IFC has also provided a \$5-million loan to Inka Terra Peru Company, an investor in one of the lodges within the conservation area.

## NGO Partnerships for Conservation

Partnerships, both public-private partnerships and partnerships between different civil society actors, are becoming increasingly important as the conservation community realizes the importance of coordinating actions to increase impact on the ground. The World Bank has many partnerships with NGOs, both at the individual project level and also through special programs. Many of these partnerships support activities that will directly contribute to the CBD 2010 targets. Two high-level partnership programs with the international conservation NGOs, World Wide Fund for Nature and Conservation International (CI), are discussed below. Through these partnerships, the Bank is able to reach out to national and local NGOs in key biodiversity hotspots around the world.

*The World Bank/WWF Alliance for Forest Conservation and Sustainable Use* was formed in April 1998 as a response to the continued depletion of the world's forest biodiversity and the accompanying loss of goods and services essential for sustainable development. To date the Alliance has worked with governments,



### *Mountains to Coral Reefs (1988 – 2005)*

the private sector, and civil society in 30 countries. By 2005 the Alliance had been successful in meeting its targets for establishment of new protected areas (50 million hectares) and surpassing the target for area of PAs under more effective management (75 million hectares). Improving forest management, however, proved more challenging. By 2005 only 20 million hectares of production forests in Bank client countries were under independently certified sustainable management.

A second phase of the Alliance partnership (2006–10) will continue to focus on strengthening protected area networks and PA management but will give increased attention to improved forest management and reducing degradation of forest habitats. The Alliance will explicitly work to mainstream biodiversity conservation into production landscapes, accelerate the widespread adoption of effective forest management practices, and reduce rates of forest land degradation by encouraging adoption of best practices and corporate social and environmental responsibility. The Alliance has set new targets for 2010 with a strong emphasis on activities that link forest and biodiversity conservation to human well-being and poverty alleviation. These targets are:

- \* Establish 25 million hectares of new forested protected areas
- \* Strengthen management of another 75 million hectares of existing protected areas
- \* Improve management of 300 million hectares of forests outside PAs through independently certified sustainable management, stepwise approaches to certification, and community-based sustainable land management
- \* Initiate 10 learning action pilots to restore forest goods and environmental services of degraded forests through multistakeholder landscape planning and management
- \* Assist 10 private sector enterprises to gain investment approval from the Equator Principle Banks for initiatives that improve forest conservation and forest management.

The Alliance work contributes to both the Protected Area and Forest work programs of the CBD and the objectives and priorities of the United Nations Forum on Forests. A

new initiative under the UNFCCC (Convention on Climate Change) to acknowledge avoided deforestation within the Kyoto protocol will also provide new opportunities to strengthen Bank and Alliance forest initiatives. The Alliance has developed and improved innovative tools and best practices to identify high conservation value forests (HCVF) and to enhance protected area management effectiveness, including the Rapid Assessment and Prioritization Methodology (RAPPAM) at the network level and the Protected Area Management Effectiveness Tracking Tool for site-level monitoring. In partnership with others, the Alliance is currently moving forward on developing a tracking tool for landscape-level forest management and restoration and on testing a monitoring tool for community-based forest management. The Alliance has also developed a Questionnaire for Assessing the Comprehensiveness of Certification Schemes and Systems (QACC) that will serve as a significant operational instrument for guiding the implementation of the World Bank's safeguards policies in the forestry sector.

*The Critical Ecosystems Partnership Fund (CEPF)* was launched in 2000 as a new and different approach to biodiversity conservation. It focuses on providing strategic assistance to engage nongovernmental organizations, community groups, and other civil society partners in conserving Earth's biodiversity hotspots. CEPF is a partnership between Conservation International, the Global Environment Facility the World Bank, the Government of Japan, and the John D. and Catherine T. MacArthur Foundation, with each organization committed to providing \$25 million to the program for a total of \$125 million in grant funding.

The CEPF provides grant funding to civil society for conservation efforts within the world's biodiversity hotspots, which together include 75 percent of global biodiversity. To date, CEPF has awarded \$73 million in grants to more than 570 partners in 15 regions covering 34 countries within 16 biodiversity hotspots in South and Central America, Africa and Madagascar, the Caucasus and East Asia. Each grant awarded helps implement a region-specific investment strategy developed together

with diverse stakeholders and approved by the CEPF Donor Council. Grant recipients range from small farming cooperatives to international NGOs. Many local and national groups supported by CEPF are often outside the reach of traditional funding mechanisms.

The CEPF supported civil society groups in six hotspots on mainland Africa and Madagascar during 2005, awarding \$5.5 million in new grants and bringing the total Africa portfolio to \$22.1 million. In the Cape Floristic Region Hotspot, a program under the South African National Biodiversity Institute (SANBI) assisted 15 community groups to conserve four pilot sites in the Cape Flats townships and created more than 80 income-generation opportunities, clearing alien species and restoring veld in small coastal reserves. The program became a model for effectively engaging the urban poor in conservation. Cape Town councilors recently voted to replicate the program in other sites in the city's biodiversity network.

During 2005, CEPF provided support to local and international NGOs and other civil society partners in six of Asia's hotspots, awarding \$11.7 million in new grants to bring the overall Asia portfolio to \$22.2 million. In Indonesia, a coalition of more than 20 local NGOs is working to secure 38,000 hectares of lowland forest on Sumatra (the new Tesso Nilo national park) while also engaging the global business partners of Indonesian pulp and paper companies to take up sustainable purchasing and production policies. In China the CEPF helped strengthen nascent NGOs and advocacy groups lobbying against more dams in the Three Rivers region of southwest China.

In Latin America, CEPF supported civil society organizations in the Atlantic Forests of Brazil, Mesoamerica, Chaco-Darien (Colombia and Ecuador), and the Tropical Andes Hotspot, awarding \$6.5 million in new grants within a total portfolio of \$21.4 million committed to date. In Costa Rica NGOs worked with landowners to create a 60,000-hectare national wildlife refuge. Containing strict conservation areas and multi-use zones for ecotourism and agroforestry, the park has been dubbed

a "laboratory for sustainable development." In the Atlantic Forest Hotspot, Brazil, a small grants program helped more than double to 18,000 hectares the amount of private land designated as reserves. The Peruvian NGO Asociación para la Conservación del Patrimonio Cutivireni (ACPC or Association for the Conservation of the Cutivireni Patrimony) helped make possible one of the largest reserves in the world. The 2.7 million hectare Alto Purús National Park and Purús Communal Reserve combines a traditional national park, a communal reserve that will be jointly managed by indigenous communities and the state, and a territorial reserve for the indigenous group Mashco-Piro, who live in voluntary isolation from modern society.

Now operating for five years, the CEPF has been deemed a highly successful program, and particularly effective in strengthening NGO capability in some regions where local NGOs are just beginning to emerge, such as southwest China. Project management and supervision have evolved over time with greater inclusion of other conservation NGOs in addition to Conservation International. A second phase of the CEPF program is under discussion to consolidate strategic conservation and integrated ecosystem management in the active hotspots and to further strengthen local civil society capacity to conserve and manage biodiversity in new areas of critical biodiversity importance such as the Western Ghats of India and Indochina.

## Public-Private Partnerships

In addition to global partnership programs directly with the international NGOs, the WBG is supporting many projects that strengthen collaboration between governments and civil society. An IFC/GEF project for Komodo island, Indonesia, is testing a new model of PA management involving a franchise to the private sector and an international NGO, The Nature Conservancy (TNC). Home of the amazing Komodo dragon, Komodo is at the epicenter of marine species



## BOX 4.2

### Civil Society Advocacy and Influence on Policy and Development

Civil society groups supported with modest grants from the Critical Ecosystem Partnership Fund have been able to influence development decisions in favor of biodiversity in at least eight biodiversity hotspots around the world.

**Caucasus** — In Armenia, efforts by a coalition of groups resulted in the government's 2005 decision to redirect part of a transnational highway originally planned to cut through the Shikahogh Reserve. This landmark decision is the first time that civil society has influenced developmental plans in the country.

**Eastern Arc and Coastal Forests of Tanzania and Kenya** — A TRAFFIC assessment of the illegal logging of the coastal forests of southern Tanzania helped lead to a one-year national indigenous hardwood harvest ban as well as harvest and trade restrictions, additional government forest staff and operational budget in all districts, and confiscation of significant quantities of illegally harvested timber products.

**Guinean Forests of West Africa (Upper Guinean Forest)** — The Liberian government reformed the country's protected area management policies, amending the New National Forestry Act of 2000 to define protected area types and permitted uses and prohibitions, including delineation and creation of Nimba Nature Reserve.

**Southern Mesoamerica** — A coalition of more than 15 Panamanian NGOs helped convince government officials to shelve plans for constructing a highway through Volcán Barú National Park, which forms part of La Amistad Biosphere Reserve.

**Mountains of Southwest China** — An initiative by Green Earth Volunteers to raise awareness of the value of Nujiang River helped convince the government to shelve plans to build a series of power generation dams along the river, which is located in a World Heritage Site.

**Sundaland (Sumatra)** — Local communities and organizations in Sumatra won cancellation of logging plans for nearly 50,000 hectares in the northwest of Bukit Tigapuluh National Park, one of the largest areas of remaining lowland forest in Sumatra. Under pressure from local NGOs, one of the world's largest pulp and paper producers instituted a logging moratorium in March 2002 in the proposed Tesso Nilo protected area.

**Tropical Andes (Vilcabamba-Amboró Corridor)** — Logging company Berna Sucesores agreed to give up the last remaining logging concession in the Pilon Lajas Biosphere Reserve and Indigenous Territory, after lengthy negotiations with CI and the Bolivian Protected Areas Service to protect the 195,000-acre site. The concession, granted to the company prior to the creation of the reserve in 1992, threatened the biodiversity of the million-acre reserve as well as the livelihood of thousands of indigenous people living in the region.

**Tumbes-Chocó Magdalena (Chocó-Manabí Corridor)** — In Colombia, the corridor concept was incorporated into policies of the Department of National Parks, the Ministry of Foreign Affairs, and the Ministry of Transportation, Mining and Energy in Colombia, as well as into the 2005–07 environmental action plans of the country's regions. In Ecuador, the corridor concept was also integrated into development plans for Manabí Province.

richness; the coral reefs in the Komodo N.P. are some of the most diverse in the world in terms of coral and fish species. TNC is working with a private tourism

operator to fund and manage park operations, while simultaneously providing revenues and livelihood benefits to district government and local communities.

The Government of Chile has sought, in recent years, to be innovative in the advancement of public/private cooperation in its process of modernization of the State. It has been open to private investment in the conservation sector, including the purchase of large tracts of land for establishment of private protected areas by Chileans and foreign investors. Many national and international nongovernmental conservation organizations are working throughout the country in the conservation sector, supporting both public and private initiatives. A new initiative involves a “cluster” of five MSPs, all being implemented by different organizations but working collaboratively to share lessons and experiences and contribute recommendations for the design and implementation of a National Protected Areas System (NPAS) for Chile (see Box 4.3).

## Engaging the Scientific Community

Many Bank projects are working with national scientific institutions and several have small research components, but a few projects focus primarily on scientific research and its application to practical management regimes. The *Coral Reef Targeted Research and Capacity Building for Management* project represents the first phase of a 15-year Targeted Research Program to bring together the best science from around the world on issues related to coral reef vulnerability and resilience. Through the project, scientists will translate this knowledge into tools and policies for decision makers. The Program partners the World Bank, the Global Environment Facility, the University of Queensland (Australia), the Intergovernmental Oceanographic Commission, the United States National Oceanic and Atmospheric Administration, and research facilities in Africa, Latin America, and Asia.

Coral reefs occupy only 0.1 percent of the ocean’s surface, yet they are the world’s richest repository of marine biodiversity. However, many coral reefs are under increasing threat from over-fishing and destructive fishing

practices, pollution, coastal building construction, and the shipping and cruise line industries. In addition, there is the impact of climate change, including increases in sea surface temperatures that can cause coral bleaching and mortality; a rise in the sea level; increased storm frequency and severity; and changes in ocean chemistry that weaken the structure of coral reefs. Most of the 30 million small-scale fishermen in the developing world are dependent in some form on coral reefs. More than half the protein and essential nutrients in the diet of 400 million poor living in tropical coastal areas is supplied by fish, much of which is dependent on healthy reefs. Tourism based on diving and snorkeling in coral reefs is important to many island nation economies. The deterioration of coral reefs is a serious threat to the environmental and economic security of many coastal nations. Already, 93 of the 109 countries with significant coral reef communities have suffered damage to them.

To coordinate research efforts and address the key outstanding questions about the health of coral reefs, the project is:

- \* Supporting targeted research on reef ecosystems in both rich and poor countries to fill critical gaps in the understanding of how coral reefs respond to various forms of stress—from local human-induced stress to global climate change
- \* Building the capacity of marine scientists and natural resource managers to implement science-based management in developing countries, where most coral reefs are found
- \* Financing the tools and the means to link the research findings with local management to ensure that the results are translated into improved policies, from the community to the global level, that affect the health of coral reefs and those who depend on them.

The project is focusing on those areas of the world that have some of the most important coral reefs—establishing “Centers of Excellence” in Mexico, Tanzania, and the Philippines and twinning these with existing Centers of Excellence in Australia. These Centers will serve as



### BOX 4.3

#### From Flamingos to Penguins — Partnerships for Conservation in Chile

Decentralizing protected area management is fundamental to Chile's protected area management strategy. To foster innovative public-private partnerships in protected area management, the GEF is supporting a "cluster" of five different MSPs. The five projects cover different protected area management categories, ranging from a national park to a biosphere reserve, and including a national reserve, private protected areas, and sustainable use landscape. All are areas of high global biodiversity value. From north to south, or "From Flamingos to Penguins," the projects are:

- \* Joint management of **Los Flamencos National Reserve** by the Atacama Indigenous Communities and the National Forestry Corporation (CONAF)
- \* A landscape approach to conserving the unique biodiversity of the **Nahuelbuta Coastal Temperate Rainforest**, presented by World Wildlife Fund
- \* Catalyzing the sustainability of **Private Protected Areas in Chile** through innovative financial mechanisms based on locally proven models, presented by Parques Para Chile
- \* Integration of the Puerto Eden community in the conservation of the **Bernardo O'Higgins National Park**, presented by the Wildlife Conservation Society
- \* Conservation and sustainable development of the **Cape Horn Biosphere Reserve**, presented by Omora Foundation and CONAMA region XII.

The "Flamingos to Penguins" initiative covers some 9.2 million hectares of protected areas. The five projects were selected because they cover important biodiversity strategy and implementation issues and present favorable scenarios for developing replicable public/private partnerships. They will contribute to the national objective of conserving, at a minimum, 10 percent of each ecosystem found in the country. Each site will test different models to address financial sustainability, participation and co-management, participatory planning, education and capacity building, and legal and policy issues.

Financial sustainability models will test the advantages of income-generating activities, payments for environmental services, user fees, and innovative landowner models. At different sites participation will involve indigenous communities, private landowners, fishermen, small farmers, private companies, government agencies (including the military), advisory councils for landscape planning, community and NGO co-management arrangements, and a wide range of public-private partnerships. Planning will cover issues ranging from landscape-level planning to planning for private lands based on economic incentives; integrating indigenous development needs and marine and terrestrial users with PAs; and planning for a biosphere reserve in a remote and fragile ecosystem. The different project sites will also address a range of capacity needs, everything from building capacity in indigenous communities for sustainable income generation to strengthening forest stakeholder involvement in landscape conservation and training fishermen and farmers for conservation and sustainable use around a national park. At the policy level projects will support mainstreaming biodiversity themes into public education as well as development of policies for conservation-compatible marine and terrestrial resource use, decentralized management of protected areas, and contractual arrangements for co-management under different models, as well as local testing of Private Protected Areas regulations and incentives. The monitoring activities of the cluster are particularly important because they provide not only information on biodiversity impact but also on-the-ground results that will inform the development of the national strategy on protected areas. This experiment in different management modalities should generate replicable lessons useful to other areas within Chile's diverse protected area system.

regional hubs for training scientists in cutting edge techniques and for applying the findings in practical ways to improve the management of reefs worldwide.

## Focus on Youth and Learning

Environmental education and awareness elements are being designed with greater emphasis on local contexts and particular target groups, in order to highlight the wealth of opportunities that a sustainably managed local environment can provide through local employment, recreational havens, and inspiration. The Conservation of Medicinal and Herbal Plants Project in Jordan has explicitly focused on youth programs. It is working closely with the Ministry of Education to disseminate information about medicinal and herbal plants and their importance in Jordan. Schools are being encouraged to establish or expand their nurseries and raise medicinal and herbal plants for young people to plant at school or take home to their gardens. At the tertiary level, technical colleges and universities are being lobbied to introduce or expand courses in medicinal and herbal plants and their products. Students at the MSc and PhD levels will conduct applied research with farmers and the private sector in topics pertaining to various aspects of medicinal and herbal plant establishment, tending, harvesting, and product manufacture.

Elsewhere, youth-focused programs are being implemented on a more regional and district-level scale. For example, a marine science curriculum, linked to marine protected areas, was developed for secondary schools in the districts of Aleipata and Safata of Upolu Island in Samoa, under a GEF MSP. By such means, young people, and their home communities, have embraced the need to manage the coastal resources sustainably to protect food and income sources, as well as the tourism potential of the area. The youth program and educational curriculum has helped to strengthen the social support for marine conservation in Samoa.

Formal education activities have also been supported through a project focusing on conservation and sustainable use of the Mesoamerican Barrier Reef System Project in the Caribbean waters of Mexico, Honduras, Guatemala, and Belize. A marine curriculum guide has been produced for dissemination throughout the region, with teacher training concentrated in transboundary areas. The project has also supported the development of public awareness campaigns targeted at youth and young professionals, including a clearinghouse that collects, classifies, repackages, and distributes relevant information to youth groups.

Teacher training guides have been developed in the Cape Floristic Region of South Africa. The Cape Peninsula Biodiversity Conservation Project has worked within the country's progressive education system to enhance public understanding of the unique biodiversity assets contained in the Cape Floral Kingdom. *The Cape Peninsula National Park—An Educator's Resource* is a series of publications to guide educators in using national parks, especially the Cape Peninsula National Park, to support environmental learning in the school curriculum. The Educator's Resource is based on the revised national educational curriculum, linking park-based activities and content directly to public learning outcomes and assessment standards. Park officials, through the Environmental Experiences program, are introducing teachers from Cape Town schools to the national park, familiarizing them with the Resource Guide, and encouraging educators to develop curriculum-based lesson plans that they can use both in the park and in the classroom. To date, 1,000 copies of the resource pack have been produced and distributed; over 100 teachers have been trained in their use. An outreach program of school and community visits to the park involved over 7,600 children and 1,600 adults between April and October 2004.

Bank projects have encouraged and supported nature clubs (Africa, India) as mechanisms to provide informal learning opportunities to young people and students. On the Sangihe and Talaud islands, BirdLife Indonesia has developed strong youth programs to conserve distinct centers of forest endemism. Young people are



*Mountains to Coral Reefs (1988 – 2005)*

targeted through support of nature clubs, which provide opportunities to spend time in the forests and learn about the native flora and fauna. One such club, Salam Lestari, has 67 members, and free office space provided by local government. It organizes summer forest camps but has also become involved in other environmental issues, such as refuse collection in Tahuna. It has designed and

distributed innovative bins for use on the city streets, which collect refuse and advertise nature. Inventive fundraising that involves bake sales and recycled paper sales provides resources to facilitate the club's activities. Salam Lestari also counts on in-kind support from local government, as well as the young professionals of Yayasan Sampiri (a local NGO) and BirdLife Indonesia.





## New Challenges and Opportunities



While the World Bank investment of \$5 billion in biodiversity projects since 1988 may seem like a large sum, it pales in comparison to the need. Species are disappearing at an alarming rate, many of them before they are even known to science. Some areas, such as the deep sea bottom, are still almost unknown to us, yet human actions are already impacting their fragile biodiversity. Even more alarming is the rate at which terrestrial habitats are being cleared, degraded, and fragmented, while aquatic habitats are particularly vulnerable to the consequences of pollution and habitat conversion far beyond their boundaries. Humans have changed ecosystems more rapidly and extensively in the last 50 years than in any comparable period of human history. While changes to ecosystems have enhanced the well-being of billions of people, they have also caused a substantial and largely irreversible loss in biodiversity and have strained the capacity of ecosystems to continue providing critical services. As the world population continues to grow, pressures increase on natural habitats, species, and systems, yet many of the biological resources under threat are fundamental to human subsistence and welfare.

The global community is increasingly interested in the linkages between biodiversity and poverty, and in particular the practical question of how to design programs that can strengthen biodiversity conservation and decrease poverty at the same time. It is the poorest

communities who depend most heavily and directly on biodiversity and are most hurt by its loss. Studies have shown that the poorer a family is, the more important the role of natural resources in its livelihood strategy. In rural areas in the developing world, most households regularly rely on natural products such as wood for fuel and construction and wild foodstuffs. In rural Zimbabwe, for instance, such products constitute 37 percent of total household income. Wild products play a particularly significant role at times of increased vulnerability, when crops fail or when stored food is scarce just before the next harvest. Wild herbs and traditional medicines play a vital role in health care for many without access to the modern medical system; while many of these medicines have not been scientifically studied, some have proved quite effective in scientific trials and have been used to develop modern drugs against a host of maladies. Agricultural biodiversity (agrobiodiversity) plays a particularly important role for poor farmers. Cultivating a number of different varieties of crops or breeds of animals can greatly reduce vulnerability and smooth production fluctuations due to variable climatic conditions, and traditional varieties of crops and animals often provide valuable genetic material for developing improved varieties.

The destruction and degradation of natural habitats may open up new lands for agriculture and development yet may also bring new problems for local communities. Changes in ecosystems such as deforestation influence



the abundance of human pathogens such as malaria and cholera, as well as the risk of emergence of new diseases; all have substantial costs in social and development terms. Malaria, for example, now accounts for 11 percent of the disease burden in Africa; had it been eliminated 35 years ago, the continent's gross domestic product would have increased by \$100 billion. Inland fisheries from natural habitats such as rivers and lakes, and man-made habitats such as reservoirs, water tanks, and even flooded ricefields, are an important source of food for rural dwellers.

The Mekong River in Vietnam, for example, provides more than 30,000 tons of fish annually, providing food and livelihoods for more than 48,000 fishermen in 250 communes. Yet wetland drainage and new infrastructure can have far-reaching impacts. Thus the Red River Delta in the north of Vietnam, which once supported a highly productive fishery, is now almost devoid of fish due to extensive flood control infrastructure and the closure of floodplain fish breeding and nursery areas.

Reconciling biodiversity conservation and development is a challenging task. As the Millennium Ecosystem Assessment showed, we are living in times of unprecedented global change. Habitat conversion and opening up of new wild lands, combined with expanding trade, transport, and tourism, have opened up new pathways for the spread of invasive alien species. New environmental challenges such as climate change put increasing pressure on natural systems and exacerbate degradation caused by poor land management. Over-harvesting of forest products and wildlife is degrading and emptying tropical forests, with serious consequences for rare species and local forest peoples. Over-exploitation and destruction of the world's coral reefs threaten species diversity and reduce productivity. All of these problems are compounded by issues of poor law enforcement and weak governance. These new challenges require innovative thinking, expeditious action, and even greater amounts of funding in the years to come. This chapter highlights some of these emerging issues and opportunities and presents how the World Bank is beginning to respond to them.

## Invasive Alien Species

Invasive alien species (IAS) are now widely regarded as the second greatest threat to biodiversity after direct habitat destruction and fragmentation. Of even greater concern is their economic impact. The economies of developing countries typically rely heavily on the agriculture, forestry, and fisheries sectors. At the same time, these biodiversity-based sectors are particularly vulnerable to the impacts of invasive species, which can reduce the quantity (yield) or quality (value) of outputs or increase the costs of production by necessitating the implementation of expensive invasive species prevention and control measures. This combination of factors means that the impacts of invasive species are more harshly felt in developing than in developed countries. In India, for example, annual costs attributed to invasive species control and damage were estimated at 20 percent of GDP in 1999. The problem is further exacerbated by the fact that most developing countries do not have the resources to adequately protect their borders and are therefore also more prone to bioinvasions. A new information network in LAC is helping to increase awareness about IAS and species likely to become invasive (see Box 5.1).

Studies of the economic impacts of invasive species have, for the most part, been undertaken at macroeconomic level, with alarming estimates of annual costs—for example, \$13 billion in Australia, \$50 billion in Brazil and \$143 billion in the United States. Within countries, though, it is generally rural communities, whose livelihoods are based on agriculture and natural resources, that are most at risk. This is particularly so in developing countries, where the majority of rural people are poor and largely dependent on biodiversity-based products for food, fuel, and construction material. In Africa, for example, agriculture supports 80 percent of the population in rural areas, including 70 percent of impoverished and undernourished people. Invasive species, such as the cassava mealy bug and larger grain borer, which have been known to cause yield losses of up to 80 percent in staple foods, therefore have devastating consequences for food security.

**BOX 5.1****An Invasives Information Network in Latin America and the Caribbean**

A growing number of plants, animals, and pathogens are becoming invasive in natural areas, inland waters, oceans, croplands, and rangelands. These invasive species pose increasing risks to human health, native species, ecosystems, and national economies and are second only to habitat destruction as a cause of loss of biodiversity. Documenting current invasions, predicting new invasion sites, and preventing invasions are vital to the protection of biological diversity in all countries.

Information on invasive species present in the Americas is incomplete, and that which is available is scattered in a variety of published and unpublished accounts and databases. Anticipating invasions by non-native species is difficult, because access to information on their previous invasive ability is the best predictor of whether a new species will become invasive, but such information is mostly unavailable. Prediction of, and rapid response to, invasive species requires ready access to invasive species knowledge bases from many countries. Internet-accessible knowledge bases can provide crucial information for the early detection, eradication, and containment of invasive species and inform early action for species that have just arrived.

The Inter-American Biodiversity Information Network (IABIN) is an Internet-based forum for technical and scientific cooperation that seeks to promote greater coordination among Western Hemisphere countries in the collection, sharing, and use of biodiversity information relevant to decision making and education. As one of its six thematic priorities, IABIN is addressing the need for a regional network of invasive species knowledge bases. With direct access to national knowledge bases throughout the region, those addressing the invasive species challenge could easily obtain data on which species are invasive or potentially invasive in particular habitats, and use this information in their planning efforts. Agencies responsible for pest control could quickly determine if a species of interest has been invasive elsewhere. Importers of new non-native species (e.g., nurseries, botanical gardens, the pet industry) could access accounts of experiences abroad to make responsible business choices. Land managers could learn about control methods that have been useful in other areas, reducing the need to commit resources for experimentation and increasing the speed at which control efforts can begin.

IABIN has sponsored pilot projects to begin exchanging information on invasive species in the Americas. The IABIN Invasives Information Network pilot participants were Argentina, Brazil, Bahamas, Chile, Dominican Republic, Ecuador, El Salvador, Guatemala, Jamaica, Mexico, Paraguay, and the United States. Countries that have joined since are Bolivia, Colombia, Haiti, Peru, and Venezuela. These activities have produced a series of useful tools and products such as standards, national catalogues, an inter-operable search engine, fact sheets, and a thesaurus.

In an effort to gain a better understanding of the true socioeconomic impact of invasive species, the Global Invasive Species Programme (GISP), with Bank funding, commissioned a research project on the effects of invasive species infestations on livelihoods, with a focus on poor rural communities. The effects of invasive species on rural livelihoods are complex and varied. Invasive species can be classified into four generic types, based on their ability to spread and the benefits/costs that they bring to local communities—see table at top of next page.

One case study investigated the impact of the trifid weed *Chromolaena odorata* in Swaziland, where close to 70 percent of the population relies on subsistence agriculture. The weed was found to negatively affect subsistence farmers by reducing the area of arable land for planting crops and of pasture land for livestock grazing, limiting the availability of water for crop irrigation, increasing the cost of land clearing, and forcing the closure of cattle-fattening ranches, resulting in the loss of this service for livestock owners. Invasion by *Chromolaena* has also



		Aggressiveness	
		Low	High
Beneficial traits	Low	<p><b>Undesirable, docile species</b> The species has negligible or low impact on rural people, because its invasivity is low. Hence it is easily controlled, although such control does represent a cost. It currently has no known direct or indirect use.</p>	<p><b>Undesirable, aggressive species</b> The species has no or limited direct or indirect benefits to people. It invades rapidly and is often difficult to control. The impacts on rural livelihoods will be most severe in the later phases of invasion. Rural communities are frequently unable to control the species without external help.</p>
	High	<p><b>Useful, docile species</b> Not very invasive, the species is easy to manage. Benefits can be extracted from it, so rural people with limited livelihood options will exploit it to maximum benefit. Such exploitation will be sufficient to keep it in check in most situations.</p>	<p><b>Useful, aggressive species</b> The species invades habitats rapidly and may be difficult to control. It is useful to the invaded society and hence there is resistance to its complete removal. Harvesting by dependent communities is an inadequate control measure, so abundance and concomitant ecological costs increase with time.</p>

impacted traditional healers, who report difficulties in collecting medicinal plants in infested areas, as well as a commercial plantation in the Highveld region, which has had to implement costly chemical spraying to control encroachment of the weed. Together these impacts translate into loss of income, employment, and food security in a region that is already struggling to cope with high levels of poverty and HIV/AIDS. Since the case study found no recognized benefit of the weed to rural communities, *Chromolaena* is clearly an example of an undesirable and aggressive species.

In contrast, a case study of *Lantana camara*, regarded as one of the world’s 10 worst invasive alien species, revealed that it is used in India as a hedge plant, as a source of paper pulp, fuelwood, and traditional medicine, and even as a craft material for weaving baskets and making furniture. The plant can therefore be classified as a useful but aggressive species. Invasion by *Lantana* is known to cause significant changes in the structure and function of forests by obstructing potential succession processes, interfering with fire regimes and pollination services, and displacing native flora and fauna. It is a recognized problem in protected areas, where clearing

*Lantana* is an annual operation. However, in recent years several local communities have begun using *Lantana* as a craft material in place of bamboo and rattans, which have dwindled due to over extraction. Encouraging people to use *Lantana* in this way not only reduces pressure on native resources but also creates options for improving rural livelihoods. Large-scale harvesting may even help control the spread of the species and allow native biodiversity to regenerate and recover.

It is important to note, however, that an IAS with benefits for one group of rural stakeholders may have negative consequences for others. In the Eastern Cape of South Africa, for example, the prickly pear *Opuntia ficus-indica* provides a source of food and income for poor local communities but negatively impacts subsistence farmers by reducing the carrying capacity of land for livestock. Such complexities must be considered when developing strategies on how best to tackle the invasive species problem in developing countries. It is clear that in many cases, communities have adapted to the presence of invasive species, in some cases even becoming dependent on them for food, construction material, fuel wood and even traditional medicine. On the other hand, it is

## **BOX 5.2**

### **Making Bereavement Bearable — Invasive Trees for Coffins**

The costs of funerals are crippling for the poor in many developing countries and communities. Not only do these families have to cope with their loss, but the funeral costs associated with honoring the departed often increase the family debts and worsen the grip of poverty. In South Africa, many poor people are persuaded to spend significant amounts of money, often as much as R2,500 or more, on coffins for their loved ones. Yet it is estimated that these coffins could be provided at less than 20 percent of that price. The Working for Water (WfW) program in South Africa has come up with a practical solution, a simple but innovative idea that marries a low-cost service to employment programs and biodiversity conservation. One of the winners from the Bank's 2005 Development Marketplace is a project to manufacture eco-friendly coffins.

Working for Water is a national program that clears invasive alien plants, thereby benefiting water security, the productive use of land, biodiversity conservation, and fire management. During 2004–05 the program provided employment and training to over 32,000 people from marginalized groups and cleared over 1 million hectares of invaded land across South Africa. This has yielded large amounts of timber from the cleared invasive trees. This timber can be put to good use to produce low-cost coffins.

In partnership with the Alliance of Religions and Conservation (ARC), WfW will establish a pilot project to create jobs in manufacturing quality coffins from invasives' wood and distribute the coffins through local faith-based organizations and community leaders. The poor will be assisted in dealing with their bereavement at the least possible financial cost, but with appropriate quality and dignity. The faith-based organizations will provide moral authority to withstand possible intimidation from extortionate competitors and will add significant additional value through the twinning of faith-based communities (e.g., dioceses) in resource-poor communities and in more affluent areas (both nationally and internationally). The partnership will also fund the growing of indigenous plants, in a labor-intensive manner, to assist in rehabilitation of areas cleared of invasives and in planting native trees in remembrance of those who have passed away. The partnership builds on other Bank-supported work to foster environmental advocacy through faith-based organizations.

In the manufacture of the coffins and provision of nursery plants, the partnership will also seek to work with the Department of Correctional Services (DCS) to provide opportunities for the re-integration into society of former inmates (ex-offenders). In addition, the project will aim to partner with existing community-based coffin-makers for support and sustainability. The Eco-Friendly Coffins Project provides tangible environmental benefits through facilitating the control of invasive alien plants and social benefits through the creation of employment opportunities in coffin manufacture and the growing of indigenous plants for rehabilitation and healing. Most of all, it seeks to give the poor the greatest possible dignity, at the lowest possible cost, in their time of bereavement, through the provision of quality Eco-Coffins and pastoral support around the funeral. It is a project that has the potential to be replicated in many parts of Africa and beyond.

seldom that the entire community benefits from these species, with the result that their presence has the potential to generate conflict. Moreover, there is a need to get a long-term perspective on the issue, both in terms of what livelihood strategies were in place before the invasive species were introduced and what the future

implications might be. In South Africa, where clearance of invasive trees is already creating considerable new employment opportunities, a new project funded through a grant from the Bank's Development Marketplace is seeking to bring social and employment benefits by adding value to the cleared timber (see Box 5.2).



## Climate Change and Biodiversity

Global environmental change and its effects have already started to undermine decades of development gains in Africa and elsewhere. Climate change is a major threat to biodiversity, influencing habitat ranges, ecosystem function, livelihoods, agricultural productivity, and natural resource use. It can disrupt and transform natural ecosystems by changing the geographic ranges of species, by altering relative success of species, and indirectly by altering disturbance regimes and ecosystem function. Climate change may be the most serious global threat to biodiversity and ecosystem integrity in the 21st century, with enormous economic and social consequences. In addition to increasing temperatures and influencing climatic and rainfall regimes, the effects of climate change compound other environmental stresses such as land degradation, pollution, invasive species, and over-exploitation to produce magnified impacts on biodiversity and biodiversity-based livelihoods. Although these interactions and effects are very poorly understood, the compound and separate effects of these major threats will seriously transform ecosystems, reduce the services they deliver, and foreclose development options.

In Mongolia, a targeted research project is focusing on gaining a better understanding of the impacts of climate change on biodiversity. A study of the dynamics of biodiversity loss and permafrost melt in Lake Hövsgöl National Park in Mongolia requires an integrated understanding of the ecology of the Hövsgöl watershed and application of scientific information to identify the limits on use and off take that will ensure sustainable management of natural resources in the watershed and six tributary valleys. More than 20 studies have been initiated covering meteorology, permafrost, forest and steppe dynamics, water chemistry stream and wetland ecology, and nomad socioeconomics. In addition to a globally unique research program on permafrost ecosystems, the project has also added significantly to Mongolia's biological research capacity by involving more than 30 young national researchers to work alongside international scientists. The Eastern Shore Newsletter

produced by the researchers has proved very valuable in explaining the purpose of the project to local herders and administrators. These newsletters have been hand-delivered to all 39 families of herders and are read avidly by herders and local officials alike; they were also distributed at local occasions such as National Day.

Providing financial incentives to slow the process of climate change has obvious benefits for biodiversity. About a third of the buildup of greenhouse gases in the atmosphere is derived from land clearing and other land management practices. Activities to retain or increase the amount of carbon in vegetation or soils—referred to as “sinks”—can make a significant contribution to combating climate change. Many of these activities have additional benefits, such as improving soil fertility, improving crop growth, providing non-timber forest products, and providing or maintaining species habitat. The Prototype Carbon Fund (PCF) provides concessional financing for activities that sequester carbon or reduce carbon emissions (for example, afforestation, improved range management, or improved heating systems). In Romania and Moldova, PCF is supporting afforestation projects that will yield carbon trading benefits, as well as improved habitats for wildlife. A new forestry project in Guangxi, China, will use PCF and IBRD funding for reforestation efforts on critical watersheds adjacent to biodiversity-rich but highly threatened forest reserves in karst habitats. The BioCarbon Fund, capitalized at \$200 million and administered by the World Bank, provides carbon finance to poor farmers and rural communities to demonstrate and test projects that sequester or conserve carbon in ecosystems and also provide biodiversity benefits. The Fund will finance learning projects in areas such as reforestation of degraded grasslands, landscape rehabilitation through planting of corridors, and improved fire management (see Box 5.3).

The Bank and the international community have primarily focused on mitigation activities for climate change, especially in the energy sector, but whatever the success of the mitigation program, there is likely to be a significant degree of climate change. Increasingly, nations and communities will need to consider adaptation strategies.

**BOX 5.3****Carbon Sequestration via the BioCarbon Fund**

In an effort to harness the carbon market to enhance ecosystems and reduce poverty, the World Bank has mobilized a BioCarbon Fund to demonstrate projects that sequester or conserve carbon in forest and agro-ecosystems. The Fund, a public/private partnership, started operations in May 2004. It supports demonstration projects and “learning-by-doing” through actual carbon purchase transactions across diverse LULUCF (land use, land-use change, and forestry) activities. Over 150 project proposals have been submitted for consideration by the BioCarbon Fund and a first group of 20 leading project candidates have been identified to reduce greenhouse gas emissions. Projects that promote social benefits and biodiversity conservation in local communities include:

**Brazil: Reforestation around Hydro Reservoirs** — This project will allow the regeneration of native vegetation cover on approximately 5,576 hectares of conservation area, established around four reservoirs created by hydro-electric plants in the State of São Paulo. The chosen areas have been clear-cut but will be reforested using a mix of at least 80 different native species of plants per hectare. The recovery of the forest will not only increase critical habitats but also create vital animal corridors connecting the newly forested lands with existing conservation areas. It is also expected to increase the attractiveness of the areas for tourism.

**China: Pearl River Watershed Management** — Four thousand hectares will be afforested in the Guangxi Zhuang Autonomous Region, which includes half of the Pearl River basin. Seventy-five percent of the species planted will be native. The reforested land will restore the connectivity of forests between the two nature reserves encompassed by the project (Mulun and Jiuwandashan Reserves in Huanjiang County). The use of the carbon sequestered by a plantation as a “virtual” cash crop will generate income for local communities. As the first life-size LULUCF project in China, it will also test how afforestation activities can generate high-quality emission reductions in greenhouse gases that can be measured, monitored, and certified.

**Kenya: Green Belt Movement** — This project will reforest 4,000 hectares of degraded public and private lands with high community access in the Aberdare Range and Mount Kenya watersheds. These forests host threatened fauna and are recognized as an Important Bird Area (IBA). The project will pay local communities and provide them with the technology and knowledge to reforest these lands and manage the new forest. Communities will be organized in Community Forest Associations (CFAs) that will develop and implement forest management plans. The long term goal is to use the re-grown forest in a sustainable manner for various products including fuelwood, charcoal, timber, and medicinal plants.

For more information on the BioCarbon Fund and projects please visit <http://carbonfinance.org>.

All peoples will have to adapt to new conditions, but the burden of adaptation will fall most heavily on the poor of all nations and particularly on the poorest nations. Climate change puts up to 40 percent of development investments at risk, including investments in water management, agriculture, and biodiversity. The immediate challenges are to provide information and tools to reduce the uncertainties, to assist in planning, and to explore novel financial instruments that might contribute to the costs of adaptation. The Bank has developed a toolkit for

assessing the exposure of Bank projects to climate risks. A report on *Drought in Andhra Pradesh: Long-term Impacts and Adaptation Strategies* will be followed up with an initiative to provide technical assistance and investment support to drought-affected communities to develop adaptation strategies to reduce the impact of climate variability on agriculture and water supplies. A new version of the toolkit will be available by midyear that will cover agriculture, water, rural infrastructure, and possibly biodiversity, issues with particular focus on South Asia. Opportunities are also



being sought on how to incorporate adaptation to climate change more fully into sustainable land management, including the TerrAfrica initiative (see below).

## Forest Law Enforcement and Governance

In addition to its lending portfolio and GEF grants, the World Bank is working with governments and civil society on forest policy and research, governance, and corruption. In support of the Forest Strategy and good governance, a major Bank initiative is focusing on Forest Law Enforcement and Governance (FLEG). Illegal logging, and associated activities along the entire chain of custody to markets and consumers, is common in both developing and industrialized nations and in all major forest types—boreal, temperate, and tropical. Although the full scale of the problem is not known or quantifiable, it is conservatively estimated that governments may be losing as much as \$5 billion annually in uncollected revenues from forest concessions, and an additional \$10 billion from illegal logging practices. Such illegal forestry operations are a major threat to biodiversity, sustainable forest management, and good governance. The Bank now has active FLEG programs in Eastern Europe and Central Asia, Africa, and East Asia and the Pacific Regions.

The Bank is also assisting governments to improve forest governance through specific projects and programs, including new GEF projects in Gabon, Cameroon, and the Democratic Republic of Congo (DRC), which are closely connected with ongoing forest policy reform programs. In Indonesia, decentralization, weak law enforcement, and poor governance have led to an increase in forest exploitation and clearance. More recently, the aftermath of the tsunami devastation has put increasing pressure on affected areas as villagers and communities seek access to Aceh's forests for timber and other building materials. In recognition of the increased threat to the

Leuser National Park, the Government of Indonesia has approved a \$17.5-million project to strengthen protection and monitoring of the park (see Box 5.4).

## Wildlife Trade

Like illegal logging, the increasing impact of the wildlife trade on biodiversity in tropical forests is a governance issue. Indeed, commercial logging often opens up new forest areas to increased hunting and wildlife exploitation. Wildlife has always provided a source of subsistence food in many tropical forest regions, but current harvests of wildlife for bushmeat and trade in live animals and animal parts are far from sustainable. Tropical forests are often species-rich but species occur at very low densities. Intensive hunting is fast leading to the “empty forest syndrome,” where forests remain but wildlife populations of many mammals and birds are much reduced or even locally extinct.

In recent years, the Bank and many other agencies have spent millions of dollars on programs aiming to conserve tropical forest biodiversity, reduce poverty of rural forest peoples, and promote sustainable natural resource management. These investments are being seriously compromised by wildlife harvesting for trade. The rate of harvesting is generally unsustainable, which has negative consequences on the biodiversity itself and on the livelihoods of rural forest peoples. The trade is also potentially linked with zoonotic disease epidemics (e.g., SARS, avian influenza, Ebola). Trade is generally illegal, yet it is expanding as infrastructure networks expand and as hunting techniques become more sophisticated, aided by local hunters who often have few ready alternative sources of cash, creating an ever-widening spiral of wildlife loss and rural disempowerment. Addressing this threat requires better understanding of the dynamics and drivers of the trade building local capacity to monitor and manage that trade, and determining which species can be harvested sustainably. Addressing this issue is important



**BOX 5.4****After the Tsunami — Integrating Forest Protection into Recovery**

The earthquake and tsunami of December 2004 devastated Aceh's society, economy, infrastructure, and institutions, especially along the west coast. In this narrow coastal belt, communities and agricultural lands border directly on protected forests and karst mountain ranges of the Gunung Leuser National Park and Ecosystem in the south and the Ulu Masen Forest Complex in the north. Even within Indonesia, a recognized mega-diversity country, this area is unique, constituting the largest remaining contiguous forested area (3.3 million ha) with the richest assemblage of biodiversity in South East Asia, including tigers, elephants, rhinos, and orangutans. The Leuser National Park is already a World Heritage Site and the surrounding areas are among the most species-rich forests globally. These areas also provide valuable ecological services needed for Aceh's recovery, including water supply, flood prevention, erosion mitigation, and climate regulation. With the effective protection and improved conservation status of these areas, the project will create and sustain the largest biodiversity corridor in South East Asia.

The need for building materials for reconstruction after the tsunami has created a high demand for timber supplies that could lead to widespread, uncontrolled logging from these protected forests. The Government of Indonesia, the Government of Aceh, the Aceh Rehabilitation and Reconstruction Agency (BRR), the donor community, and international NGOs engaged in reconstruction have recognized concerns and risks about illegal logging and forest destruction linked to the reconstruction process. The BRR and the Governor have adopted policies to prohibit logging of natural forest in Aceh and to promote a "green future" for the province. The Multi Donor Fund for Aceh and Nias is financing the project through a grant to two conservation NGOs with a long history in Aceh—Leuser International Foundation and Fauna & Flora International—with the World Bank as the partner agency to oversee implementation.

The purpose of this project is to ensure environmental resources and services from the Leuser and Ulu Masen forest ecosystems are protected during the post-tsunami reconstruction process. The project helps mitigate negative impacts of reconstruction interventions on the forests of Aceh, mainstreaming environmental concerns into planning processes and building sustainable capacity and institutions for forest protection. It helps to ensure that ecosystem services provided by the forest are maintained, supporting Aceh's future social and economic development. The project also aims to support a multi-stakeholder governance framework to integrate environmental concerns into Aceh's reconstruction and development planning. Project activities also include increasing environmental awareness and supporting community-based forest livelihoods.

both for biodiversity conservation and for safeguarding the food security of those rural poor who depend on wildlife for subsistence and as a nutritional safety net.

The Bank is addressing this issue of unsustainable harvesting of wildlife both directly through projects, such as the new generation of forest projects in the Congo Basin, as well as analytical studies and sector work. In Africa a new study will look at hunting levels in pilot sites critical to conserving important wildlife populations and sustaining rural livelihoods. It will examine wildlife trade along logging roads in northern Congo where the wildlife resources of the indigenous Pygmies are

threatened by bushmeat trade draining wildlife from the forests to logging camps and beyond. In central Cameroon, the railway (CamRail) illegally carries wildlife from key landscapes to the luxury urban markets of Yaounde and Douala. In the Ituri Forest Region of the eastern Democratic Republic of Congo, loss of wildlife to the bushmeat trade threatens the livelihoods of the local Mbuti and Efe peoples. Studies from these areas will be compared with similar programs along former logging roads in eastern Cambodia and main access roads in northern Sulawesi, Indonesia. This information will be used to identify best practices and to design appropriate interventions in Bank forestry projects.



Within East Asia, trade in wildlife is a major threat to the integrity of the region's rich biodiversity. Economic growth in East Asia has stimulated more personal wealth and higher standards of living but unfortunately this economic growth has also stimulated more demand for resources, including wildlife. East Asia is becoming a key supplier to the international wildlife market, both legal and illegal, besides being a centre for the consumption of wildlife derivatives ranging from tiger bone medicines to shark fin cuisine. Much of the wildlife drained from Indonesia and other countries in South East Asia finds its way to markets in China and Vietnam. Wildlife is traded as food, traditional medicine, trophies, decorations, pets, zoo exhibits, and for other live animal collections. If a species has a marketable value, then it is traded. The volume of this trade is increasing; in the early 1990s, the illegal wildlife trade in Vietnam was conservatively estimated at \$24 million annually. By 2002 it was estimated at \$66.5 million. Available evidence points to major declines in the populations of many Asian wildlife species in trade. Such declines affect not only the species themselves, but also the livelihoods of the people who depend on them for food, medicines, income, and other uses.

The causes of this illegal trade are complex and are rooted in social, economic, cultural, and political structures. The trade involves many different groups: hunters, the rural poor, government officials, consumers, and decision makers, all of whom need to be aware of the trade and its dangers and problems. In order to better target resources and action intended to address these concerns, a World Bank project, using funding from the Bank-Netherlands Partnership Fund (BNPP), is focusing on the economic and social drivers of the wildlife trade in four Southeast Asian countries: Cambodia, Indonesia, Lao PDR, and Vietnam. The study will be carried out through a partnership with TRAFFIC International and will attempt to identify the causal relationships between poverty, wildlife abundance, wildlife harvest, and trade by examining the flows of benefits and costs of trade and trade control measures to different stakeholders. It will determine the linkages between supply and demand characteristics in the context of the countries that supply

and drive the trade and the use of regional trade routes. An assessment will be made of the effectiveness of existing and potential regulatory and market-based interventions, in order to identify appropriate mechanisms to better regulate and reduce this unsustainable trade in wildlife.

## Improving Land Management

The degradation of ecosystem services could grow significantly worse during the first half of this century and is a barrier to achieving the UN Millennium Development Goals. The Millennium Ecosystem Assessment and the UK Commission for Africa have recognized that land degradation in Sub-Saharan Africa (SSA) is increasingly becoming a major problem. Up to 75 percent of Africa's poor live in rural areas with livelihoods critically dependent on the efficient use of increasingly scarce land, water, biodiversity, and nutrients. Land degradation marginalizes efforts at all levels to secure Africa's long-term food security, economic growth, rural land-use productivity, and ecosystem services. In addition, climate change could trigger large-scale migrations, intra-regional conflicts and instability, and a breakdown of vital ecosystem services. For all of these reasons, the promotion of sustainable land management (SLM) practices should figure prominently in strategies to advance sustainable development, growth, and poverty reduction in this region of Africa.

TerrAfrica is a multi-partner, programmatic platform on sustainable land management to reduce rural poverty, increase food security, and improve environmental sustainability in Sub-Saharan Africa. The BNPP has been supporting TerrAfrica since 2004 with a focus on capacity building. TerrAfrica partners have worked in close collaboration to develop a draft joint work program. This program is designed to support the dissemination and sharing of regional knowledge, consensus building on lessons learned, identification of gaps, and the development of common and harmonized strategies, methodologies, reporting,

and monitoring and evaluation processes. The work program was endorsed by the TerrAfrica Executive Committee in October 2005 and many activities have already started or are in an active planning stage.

The TerrAfrica Web site serves as one of the main tools to accommodate a continuous exchange of information among partners and allows them to be informed without delay on TerrAfrica progress and partner activities (see [www.terrafrica.org](http://www.terrafrica.org)). The TerrAfrica partners are sharing the responsibility for supporting countries in Sub-Saharan Africa to mainstream sustainable land management into national development frameworks such as PRSPs and sector policies as well as country strategy papers and programs of development partners. The World Bank, as part of its contribution to TerrAfrica, has already started providing guidance to PRSP teams (Burundi, Mauritania, Tanzania, and Uganda) and CAS teams (Burkina Faso, Ghana, Ethiopia, Guinea, Madagascar, Mauritania, Mozambique, Niger, Senegal, and Tanzania) to address the SLM agenda. The major program planned under TerrAfrica is expected to produce benefits both for more sustainable land management and for biodiversity.

Habitat restoration as a conservation strategy is relatively costly and complex compared with conserving areas of natural vegetation in their original state. There are some circumstances, however, in which restoration is the only choice. For instance, for ecosystems that have been largely destroyed, such as the Atlantic Forest of Brazil, restoration may be the only way to ensure the long-term integrity of the ecosystem. Similarly, restoration may prove to be cost-effective when it restores not only ecosystem function but also ecosystem services of value to local populations, such as the filtering services provided by wetlands. The Kazakhstan Forest Protection and Reforestation project is being funded by a \$5-million GEF grant, a \$30-million World Bank loan, and government co-financing of \$28.8 million. Project activities include rehabilitation and effective management of 650,000 ha of damaged Irtysh pine forest in the northeast (Pavlodar and East-Kazakhstan Oblasts) as well as rehabilitation of dry Aral seabed and pilot restoration of sauxal



rangelands. Although the project is being funded under the GEF program on land degradation, several activities, especially those in the dry Aral seabed, are also particularly relevant to the biodiversity focal area (see Box 5.5).

## Monitoring for Impact

The Convention on Biological Diversity has identified specific biodiversity targets for 2010 to monitor biodiversity trends and outcomes. Specific targets include coverage and effectiveness of protected areas as well as indicators for invasive alien species, sustainable use, and sharing of benefits. Meeting, and monitoring, these targets will require new tools and new ways of doing business. Objective measurement of biodiversity trends and impacts is difficult, in part because biodiversity management deals with ecological processes that are generally long-term (e.g., changes in numbers of a



## **BOX 5.5**

### **Aral Sea — Rehabilitation at a Site of Ecological Catastrophe**

The decline of the Aral Sea, now about 35 percent of its former size and still shrinking rapidly, is one of the major environmental disasters in Central Asia in the last 100 years. In fact, the catastrophic decline of much of the Aral Sea basin's rich biodiversity (including many endemic species of birds, mammals, and fish), coupled with the loss of the sea's tempering effect on the basin's climatic conditions, represents an ecological loss of global significance. The seashore, which retreats 2–4 km a year, is now 150–200 km away from its original shoreline. This receding shoreline has exposed an estimated 4.2 million ha of former seabed, much of it land that is highly saline. While a new dam is helping to restore the smaller, northern sea, the degradation of the southern sea is likely to continue. Not all this exposed seabed remains bare ground; native halophytic plants cover the newly exposed land to some extent, the first step in a precarious natural revegetation process. These pioneering plants die out as salinity decreases, and unless a more diverse cover of grasses, shrubs, and small trees becomes established over the next few years, the land will become a mass of shifting dunes without permanent plant cover.

Despite harsh ecological conditions, the Aral Sea lowland is home to surprisingly rich communities of flora and fauna wherever sustainable plant cover has managed to be established, including gazelles, gophers, desert monitors, sand rats, jerboas, lizards, and snakes. Wild boars, jackals, and deer can be found, especially near natural springs. The lowlands also include populations of species listed in the Red Data Book of Kazakhstan, such as the wild ass, saiga antelope, goitered gazelle, mountain sheep, and roe deer.

The degraded dry Aral Seabed (DAS) is an extremely hostile natural environment, with temperature extremes in summer and winter, desiccating aridity, and very high wind strengths that delay natural revegetation processes. In Kazakhstan the total area of degraded DAS requiring rehabilitation is about 2.6 million ha, with revegetation, either natural or through planting schemes, estimated at only 80,000 ha. At the current rates of vegetation on the DAS in Kazakhstan, it would take well into the next century to turn the degraded seabed into ecologically productive land. Project interventions to plant 44,000 ha and directly sow 35,000 ha of the seabed will accelerate the vegetation of approximately 118,500 ha in total, as natural regeneration will be facilitated on the open areas enclosed by the planting. This will help reverse land degradation, introduce new structure and functional integrity into the emerging ecosystem, significantly reduce localized wind erosion, and create new habitats for native flora and fauna. Designation of the area as a natural reserve will produce long-term biological benefits.

population of a key species); because of this, changes resulting from management may be slow to emerge.

Individual Bank projects have supported research and inventory programs designed to establish baseline information and monitor biodiversity impact. The Honduran Protected Areas project has established a database of biological monitoring in protected areas, producing a detailed study on the rationalization of the national system of protected areas of Honduras. A system of monitoring and evaluation designed for the Protected Areas Fund (FANP) of Mexico, in 1998, includes four indicators. Two of these indicators are designed to measure

the impact of the conservation activities on biodiversity, specifically trends in the rate of transformation of natural habitat and trends in indicator species within each protected area. The other two socioeconomic indicators are attempting to measure the use of natural resources, including area managed for sustainable use and number of inhabitants who adopt sustainable use practices. The population growth rate within the PA was also included, as a pressure indicator that affects the management of the PA. These indicators are assessed every year to evaluate progress in consolidating conservation and sustainable use of the biodiversity in the protected areas of Mexico. Similarly, regular monitoring of key marine

species in the Hon Mun MPA, Vietnam, has demonstrated significant biodiversity impacts, including increased prevalence and size of fish and other marine organisms.

The Bank is taking steps to further improve monitoring and evaluation (M&E) through training on M&E for task teams; development, with other partners, of appropriate simple monitoring tools; and encouraging task teams to initiate collection of baseline data and monitorable indicators during project preparation. Under the Bank/WWF Alliance the Bank developed and tested a simple, site-level tracking tool for assessing management effectiveness in protected areas; this tool has now been adopted by the GEF as a requirement for all PA projects from GEF-3 onwards. Based on the IUCN/World Commission on Protected Areas (WCPA) framework, this tool is designed primarily to assist protected-area managers to identify and address management needs. Results are being collated from all projects using the tool and will be analyzed as part of a global study being undertaken collaboratively with WWF and the WCPA of IUCN as a contribution to monitoring progress of the CBD PA work program. An adaptation of the management effectiveness tracking tool for use in marine protected areas is currently being field-tested in the Caribbean and East Asia. The tool is available on the Bank's biodiversity Web site, [www.worldbank.org/biodiversity](http://www.worldbank.org/biodiversity). There is still a need to develop appropriate monitoring tools to better assess the effectiveness and impact of mainstreaming biodiversity in production landscapes. The Bank/WWF Alliance is currently working to develop a tracking tool for sustainable forest management.

Sustainability remains a key issue for many projects, including sustainability of biodiversity gains. The most common threat to sustainability is the lack of adequate long-term financing once project funding ceases. Despite

capacity-building efforts within projects, weak institutional frameworks remain a challenge, as are the fragile linkages between global environmental objectives and national or sector development priorities. Several projects have been successful in achieving some of their small-scale conservation outcomes, yet outside development efforts, including major government-supported development initiatives, are threatening the biological integrity of project sites. Thus the rapid economic development of the Nha Trang Bay area is intensifying the threats to the MPA. Similarly, the Kolkheti coastal wetland project in Georgia has achieved encouraging results in building capacity and engaging local communities. Nevertheless, these important coastal wetlands, a Ramsar site, and the offshore marine reserve are threatened by development of an adjacent oil refinery and dredging of a channel through the marine reserve for tankers to access the oil storage tanks. Newly revealed plans for oil exploration in Vashlovani PA in Georgia also raise questions about government commitment and the future of PAs in the face of economic development.

Unfortunately, such conflicts between biodiversity conservation and national economic development priorities are not atypical. Resolving these conflicts will require greater efforts to integrate biodiversity and protected areas into the development mainstream. It will require increased understanding of the contribution of biodiversity goods and services to sustainable development and more recognition of costs and trade-offs of short-term economic development versus long-term environmental security. Increasingly the Bank, through both development lending and GEF projects, is seeking ways to influence policies and programs that will deliver development and environmental gains to enhance quality of life and quality of growth and to protect the global environment.





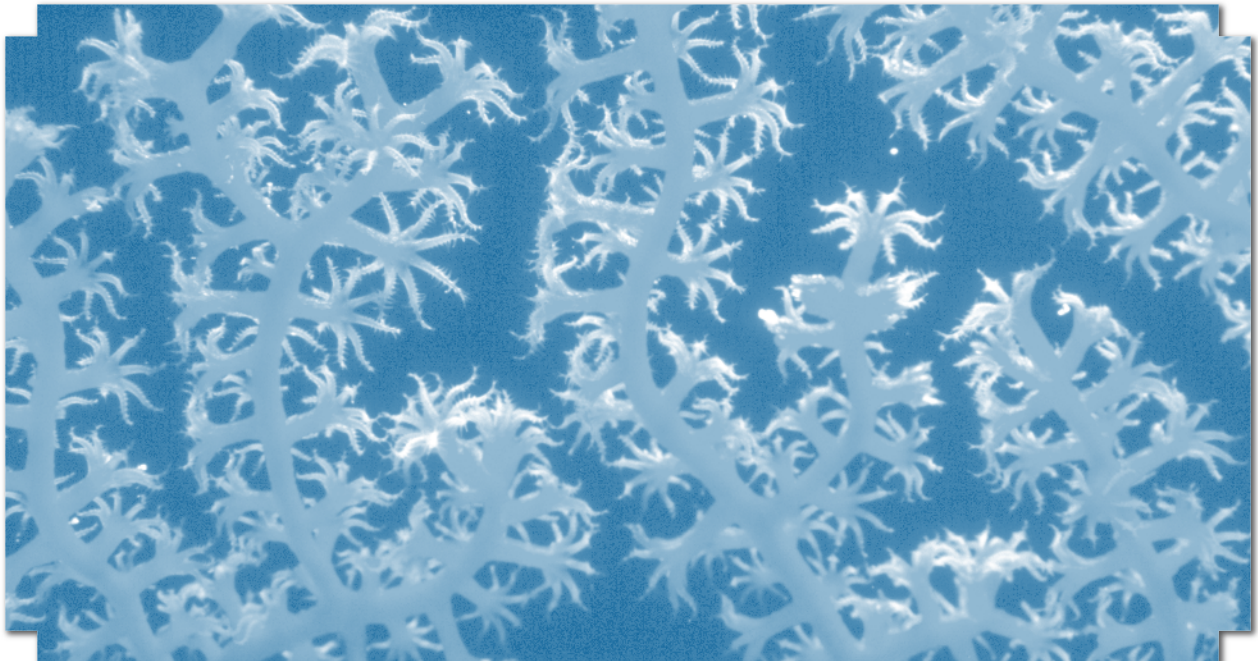
# Appendix



## The World Bank Group Biodiversity Portfolio

Biodiversity Projects and Components  
by Funding Source and Region

FY1988–2005



Investments in Projects with a Biodiversity Component							Biodiversity Activities									
Country	Project Name	FY	Funding source	Project total (US\$m)	Total biodiv (US\$m)	Bank biodiv (US\$m)	1	2	3	4	5	6	7	8	9	10
<b>GLOBAL: 12 PROJECTS</b>																
Global	Small and Medium Scale Enterprise Program	1997	GEF IFC	40.00	20.00	2.00				*	*	*	*			*
Global	Forests and Biodiversity Window	2000	BNPP	6.60	6.60	6.60	*				*					*
Global	Critical Ecosystems Partnership Fund	2001	DGF	25.00	25.00	25.00	*	*	*	*	*	*	*	*		
Global	Critical Ecosystems Partnership Fund	2001	GEF REG	100.00	100.00	25.00	*	*	*	*	*	*	*	*		
Global	Development Marketplace Climate Change and Biodiversity	2003	GEF MSP	2.15	1.08	0.50					*					
Global	Global Invasive Species Programme	2004	BNPP	0.70	0.7	0.70	*		*							*
Global	Global Invasive Species Programme	2005	DGF	1.70	1.7	1.70	*		*							*
Global	Forests Partnerships Program	2004	DGF	1.55	1.55	1.55		*		*	*					
Global	Millenium Ecosystem Assessment	2004	DGF		0.50	0.50		*	*							
Global	Environmental Business Finance Program	2004	GEF IFC	100.00	5.00	5.00					*	*				
Global	Coral Reef Targeted Research and Capacity Building For Management	2004	GEF REG	19.3	19.30	11.00	*	*								
Global	Coral Reef Targeted Research and Capacity Building For Management	2004	DGF	3.00	3.00	3.00	*	*								
<b>AFRICA REGION: 125 PROJECTS</b>																
Benin	Natural Resource Management	1992	IDA	24.40	1.70	0.99	*	*	*	*	*					*
Benin	Environmental Management	1995	IDA	9.30	4.65	4.00	*		*							
Benin	National Parks Conservation and Management Program	2000	GEF REG	24.20	23.90	6.80	*			*	*		*			
Benin	Management of Forests and Adjacent Lands	2002	GEF REG	27.00	27.00	6.00	*				*	*				
Burkina Faso	Environmental Management	1991	IDA	25.20	3.80	2.48					*					
Burkina Faso	Community-Based Rural Development	2001	IDA	114.85	3.82	2.22					*		*			
Burkina Faso	Partnership for Natural Ecosystem Management -PRO-NAGEN	2002	GEF REG	13.46	13.46	7.50	*			*	*					



Investments in Projects with a Biodiversity Component							Biodiversity Activities									
Country	Project Name	FY	Funding source	Project total (US\$m)	Total biodiv (US\$m)	Bank biodiv (US\$m)	1	2	3	4	5	6	7	8	9	10
Burkina Faso	Sahel Integrated Lowland Ecosystem Management	2004	GEF REG	4.91	1.38	1.28					*					
Burundi	Agricultural Rehabilitation and Support Project (PRASAB)	2005	GEF	5.00	0.50	0.50					*					
Cameroon	Biodiversity Conservation and Management	1995	GEF REG	12.39	12.39	5.96	*	*	*	*	*		*			
Central African Republic	Natural Resources Management	1990	IDA	26.2	3.00	2.18	*	*	*	*	*		*	*		
Central African Republic	Livestock Development and Rangeland Management	1995	IDA	32.45	0.30	0.15					*		*		*	
Chad	Household Energy	1998	IDA	6.31	1.36	1.14			*		*					
Chad	Community Based Integrated Ecosystem Management	2005	GEF REG	6.00	6.00	6.00	*	*	*	*	*		*	*		
Chad	Community Based Integrated Ecosystem Management	2005	IDA	46.00	8.39	2.80			*		*			*		
Congo	Wildlands Protection and Management	1993	GEF REG	13.90	13.90	10.10	*	*	*	*	*			*		
Cote d'Ivoire	Forestry Sector	1990	IBRD	147.80	8.40	8.40	*	*		*						
Cote d'Ivoire	Rural Land Management and Community Infrastructure Development	1997	IDA	71.50	1.64	0.94		*	*		*	*			*	
Eritrea	National Biodiversity Strategy, Action Plan and Report	1997	GEF EA	0.28	0.28	0.28	*	*								
Eritrea	Assessment of Capacity Building Needs for Biodiversity, Participation in Clearing House Mechanism and Preparation of Second National Report	2002	GEF EA	0.19	0.185	0.17	*	*								
Ethiopia	Conservation and Sustainable Use of Medicinal Plants	2001	GEF REG	1.81	1.81	1.81	*	*	*	*	*				*	
Ethiopia	Conservation and Sustainable Use of Medicinal Plants	2001	IDA	3.37	3.37	0.78	*	*			*				*	
Gabon	Forestry and Environment	1993	IDA	38.20	12.44	6.44	*	*		*						
Gambia	Integrated Coastal and Marine Biodiversity Management	2002	GEF MSP	0.96	0.96	0.96					*					
Ghana	Forest Resource Management	1989	IDA	64.60	5.10	3.11					*					
Ghana	Coastal Wetlands Management	1993	GEF REG	8.30	8.30	7.20		*	*	*	*					



Investments in Projects with a Biodiversity Component							Biodiversity Activities									
Country	Project Name	FY	Funding source	Project total (US\$m)	Total biodiv (US\$m)	Bank biodiv (US\$m)	1	2	3	4	5	6	7	8	9	10
Ghana	Environmental Resource Management	1993	IDA	27.60	0.99	0.66	*	*	*							
Ghana	Natural Resource Management	1998	GEF REG	9.40	8.70	8.70	*	*	*	*	*		*			
Ghana	Natural Resource Management I	1998	IDA	23.80	14.30	5.59	*	*	*	*	*				*	
Ghana	Northern Savanna Biodiversity Conservation Project	2002	GEF REG	16.80	16.80	7.90	*	*	*	*	*	*			*	
Ghana	Community-based Integrated Natural Resources Management Project in Okyeman	2004	GEF MSP	1.48	0.750	0.40	*	*	*		*		*	*		
Guinea	Forestry and Fisheries Management	1990	IDA	21.00	4.00	2.46				*	*					
Guinea-Bissau	Coastal and Biodiversity Management Project	2005	IDA	6.31	1.87	0.00	*	*		*	*					
Guinea-Bissau	Coastal and Biodiversity Management Project	2005	GEF REG	4.80	4.80	4.80	*	*		*	*					
Kenya	Forestry Development	1991	IDA	83.80	39.49	0.00		*			*					
Kenya	Protected Areas and Wildlife Services	1992	IDA	143.00	143.00	60.00	*	*	*	*			*			
Kenya	National Biodiversity Strategy, Action Plan and Report	1997	GEF EA	0.157	0.16	0.16	*									
Kenya	Tana River National Primate Reserve	1997	GEF REG	7.14	7.14	6.20		*	*	*						
Kenya	Lewa Wildlife Conservation	1999	GEF MSP	3.94	3.94	0.75			*	*		*				
Kenya	Western Kenya Integrated Ecosystem Management	2005	GEF REG	8.50	7.2	3.15	*		*			*		*		*
Lesotho	Lesotho Highlands Water: Phase IA	1992	IBRD	2,414.00	5.55	4.60				*						
Lesotho	Lesotho Highlands Water -Phase IB	1998	IBRD	1,132.00	33.35	1.56				*						
Lesotho	Maloti-Drakensberg Transfrontier Conservation and Development Area	2002	GEF REG	8.40	8.40	7.32	*	*	*	*	*		*			*
Liberia	Sapo National Park	2005	GEF MSP	0.98	0.975	0.975	*		*	*				*		
Madagascar	Forest Management and Protection	1988	IDA	22.60	9.20	2.86	*		*	*	*		*			
Madagascar	Environment Project I	1990	IDA	85.53	45.05	9.55	*		*	*	*		*			
Madagascar	Second Environment Program	1997	GEF REG	20.80	20.80	12.80	*	*	*	*	*	*	*			
Madagascar	Second Environment Program	1997	IDA	134.20	56.00	12.52	*	*		*	*				*	

Investments in Projects with a Biodiversity Component							Biodiversity Activities									
Country	Project Name	FY	Funding source	Project total (US\$m)	Total biodiv (US\$m)	Bank biodiv (US\$m)	1	2	3	4	5	6	7	8	9	10
Madagascar	Third Environment Program	2004	GEF REG	9.00	9.00	9.00	*		*	*	*	*	*			
Madagascar	Third Environment Program	2004	IDA	148.9	71.50	19.50	*		*	*	*	*	*			
Malawi	Lake Malawi/Nyasa Biodiversity Conservation	1995	GEF REG	5.44	5.44	5.00		*		*	*					
Malawi	Environmental Support	1997	IDA	13.7	6.85	6.20	*	*	*	*						
Malawi	Mulanje Biodiversity Conservation	2001	GEF REG	8.02	8.02	6.75		*	*	*	*	*	*		*	*
Mali	Natural Resource Management	1992	IDA	32.1	6.78	4.31	*	*	*	*	*					
Mali	Gourma Biodiversity Conservation	2005	GEF REG	9.08	9.08	5.5	*			*			*			
Mauritius	Environmental Monitoring and Development	1991	IBRD	20.53	4.40	2.00				*						
Mauritius	Biodiversity Restoration	1996	GEF REG	1.60	1.60	1.20	*	*	*	*	*					*
Mauritius	Restoration of Round Island	2001	GEF MSP	1.40	1.40	0.75				*						*
Mozambique	Transfrontier Conservation Areas Pilot and Institutional Strengthening	1997	GEF REG	8.10	8.10	5.00	*	*	*	*	*					
Mozambique	Agricultural Sector Public Expenditure Program PROAGRI	1999	IDA	216.50	25.10	1.00	*	*	*		*					
Mozambique	Coastal & Marine Biodiversity Management Project	2000	GEF REG	4.1	4.10	4.10	*	*	*	*	*		*			
Mozambique	Coastal & Marine Biodiversity Management Project	2000	IDA	6.40	6.40	5.60	*	*	*	*	*		*			
Namibia	Integrated Community-Based Ecosystem Management	2004	GEF REG	32.43	11.26	2.08	*	*			*				*	
Niger	Community-based ecosystem management - Supplement to the Community Action Program	2003	GEF REG	43.83	1.00	1.00	*		*		*					
Nigeria	Environmental Management	1992	IDA	37.90	3.30	2.18	*		*	*						
Nigeria	Micro-watershed and Environmental Management Program	2002	GEF REG	8.00	8.00	8.00	*	*		*						
Nigeria	Micro-watershed and Environmental Management Program	2002	IDA	107.35	12.88	12.00	*	*	*		*	*			*	



Investments in Projects with a Biodiversity Component							Biodiversity Activities									
Country	Project Name	FY	Funding source	Project total (US\$m)	Total biodiv (US\$m)	Bank biodiv (US\$m)	1	2	3	4	5	6	7	8	9	10
Nigeria	National Capacity Needs Self-Assessment (NCSA) for Environmental Management	2003	GEF EA	0.23	0.056	0.056	*	*								
Regional	Coral Reef Monitoring Network in member states of Indian Ocean Commission	2001	GEF MSP	2.41	2.41	0.74	*	*	*	*						
Regional East Africa: Kenya, Tanzania and Uganda	Lake Victoria Environmental Management	1997	GEF REG	38.5	8.51	7.63					*					*
Regional East Africa: Kenya, Tanzania and Uganda	Lake Victoria Environmental Management	1997	IDA	39.10	4.85	4.36					*					*
Regional	Transboundary Diagnostic Analysis and Strategic Action Program for Lake Victoria Basin	2004	GEF MSP	1.00	0.20	0.20	*	*			*					*
Regional	Transboundary Diagnostic Analysis and SAP Development for Lake Victoria Basin	2004	IDA	5.60	1.12	0.60	*	*			*					*
Regional	Senegal River Basin Water and Environmental Management	2004	GEF REG	21.20	0.15	0.15	*									*
Regional - Southern Africa	Southern Africa Community Outreach Program	2000	GEF MSP	0.89	0.89	0.73	*		*	*	*					
Regional West Africa: Burkina Faso and Cote D'Ivoire	West Africa Pilot Community-Based Natural Resource and Wildlife Management	1996	GEF REG	13.19	13.19	7.00	*	*	*		*		*	*	*	
Regional (SADC)	Protection and Strategic Uses of Groundwater Resources in the Transboundary Limpopo Basin	2005	GEF REG	13.32	1.735	1.735	*		*			*				
Regional: Central African Countries	Regional Environment Information Management Project (REIMP)	1997	GEF REG	19.79	19.79	4.10	*	*	*							
Regional: Comoros, Mauritius, Madagascar, Seychelles	Western Indian Ocean Oil Spill Contingency Planning	1999	GEF REG	4.64	1.17	0.98			*		*					
Rwanda	Rural Sector Support Project	2001	IDA	53.00	18.97	18.97	*	*	*		*					

Investments in Projects with a Biodiversity Component							Biodiversity Activities									
Country	Project Name	FY	Funding source	Project total (US\$m)	Total biodiv (US\$m)	Bank biodiv (US\$m)	1	2	3	4	5	6	7	8	9	10
Rwanda	Integrated Management of Critical Ecosystems Project	2005	GEF REG	5.30	2.65	2.15	*	*		*	*					
Sao Tome & Príncipe	BSAP, First National Report and Clearing House Mechanism	2000	GEF EA	0.163	0.163	0.16	*									
Senegal	Sustainable and Participatory Energy Management	1997	GEF REG	4.70	4.70	4.70			*	*	*					
Senegal	Sustainable and Participatory Energy Management	1997	IDA	15.2	4.38	1.50	*	*	*						*	
Senegal	Energy Sector Adjustment	1998	IDA	100.00	1.00	1.00	*				*					
Senegal	Integrated Marine & Coastal Biodiversity Conservation	2004	IDA	11.49	11.49	10.00	*			*	*		*			
Senegal	Integrated Marine & Coastal Biodiversity Conservation	2004	GEF REG	5.00	5.00	5.00	*			*	*		*			
Seychelles	Biodiversity Conservation and Marine Pollution Abatement	1993	GEF REG	2.00	2.00	1.80				*						*
Seychelles	Environment and Transport	1993	IBRD	5.00	0.19	0.17	*		*	*						
Seychelles	Management of Avian Ecosystems in Seychelles	1999	GEF MSP	1.06	1.06	0.74	*	*	*	*			*		*	*
Seychelles	Marine Ecosystem Management	2000	GEF MSP	1.40	1.40	0.74	*	*	*	*	*					*
Seychelles	Improving Management of NGO and Privately Owned Nature Reserves and High Biodiversity Islands	2004	GEF MSP	1.88	1.88	0.81	*		*	*			*			*
South Africa	Cape Peninsula Biodiversity	1998	GEF REG	91.2	91.20	12.30	*	*	*	*	*	*	*			*
South Africa	Conservation of Globally Significant Biodiversity in Agricultural Landscapes through Conservation Farming	1999	GEF MSP	1.72	1.72	0.75	*	*			*				*	
South Africa	Sustainable Protected Area Development in Namaqualand	2000	GEF MSP	1.00	1.00	0.75	*			*						
South Africa	Conservation Planning for Biodiversity in the Thicket Biome	2000	GEF MSP	0.74	0.74	0.74	*	*								
South Africa	Maloti-Drakensberg Transfrontier Conservation and Development Area	2002	GEF REG	7.93	7.93	7.93	*	*	*	*	*		*			*



Investments in Projects with a Biodiversity Component							Biodiversity Activities									
Country	Project Name	FY	Funding source	Project total (US\$m)	Total biodiv (US\$m)	Bank biodiv (US\$m)	1	2	3	4	5	6	7	8	9	10
South Africa	Richtersveld Community Biodiversity Conservation	2003	GEF MSP	2.45	2.45	0.88	*		*	*	*		*			
South Africa	Greater Addo Elephant National Park Project	2004	GEF REG	40.07	39.94	5.50				*		*	*			
South Africa	C.A.P.E. Biodiversity and Sustainable Development Project	2004	GEF REG	55.13	55.13	9.00	*	*	*	*	*	*	*	*	*	*
Tanzania	Lower Kihansi Environmental Management Project	2002	IDA	6.40	6.40	6.30	*	*		*						
Tanzania	Eastern Arc Forests Conservation and Management Project	2003	GEF REG	7.00	7.00	7.00	*			*	*	*		*		*
Tanzania	Forests Conservation and Management	2003	IDA	45.00	14.50	2.30	*			*	*	*		*		*
Tanzania	Innovations in Livestock & Wildlife Integration Adjacent to Protected Areas	2004	GEF MSP	2.21	1.10	0.88	*			*			*			*
Tanzania	Lake Victoria Environmental Management Project Second Supplemental Credit	2005	IDA	3.60	0.81	0.79	*	*		*						*
Tanzania	Lolkisale Biodiversity Conservation Support Project	2004	GEF IFC	0.89	0.885	0.475				*			*			
Tanzania	Marine and Coastal Environment Fisheries	2005	GEF REG	10.00	5.00	5.00	*		*	*		*	*			
Tanzania	Marine and Coastal Environmental Management	2005	IDA	52.75	25.5	25.5	*		*	*		*	*			
Uganda	Conservation of the Bwindi Impenetrable and Mgahinga Gorilla National Parks	1995	GEF REG	4.89	4.89	4.00	*	*	*	*	*	*	*			
Uganda	Environmental Management Capacity Building	1996	IDA	15.2	1.38	1.08	*		*							
Uganda	National Biodiversity Strategy, Action Plan and Report	1998	GEF EA	0.13	0.13	0.13	*									
Uganda	Kibale Forest Wild Coffee	1999	GEF MSP	0.75	0.75	0.75		*	*	*	*					*
Uganda	Institutional Capacity Building for Protected Areas Management and Sustainable Use-	1999	GEF REG	2.00	2.00	2.00	*			*	*					

Investments in Projects with a Biodiversity Component							Biodiversity Activities									
Country	Project Name	FY	Funding source	Project total (US\$m)	Total biodiv (US\$m)	Bank biodiv (US\$m)	1	2	3	4	5	6	7	8	9	10
Uganda	Institutional Capacity Building for Protected Areas Management and Sustainable Use-	1999	IDA	18.29	18.29	12.37	*			*	*		*			
Uganda	Supplemental Credit to the Lake Victoria Environmental Management Project	2002	IDA	4.64	2.65	2.57	*	*	*		*			*		
Uganda	Environment Management and Capacity Building II	2002	IDA	24.10	12.05	11.00	*		*							
Uganda	Institutional Capacity Building for Integration of Indigenous Knowledge	2002	IDF	0.43	0.43	0.43	*	*						*		
Uganda	Protected Areas Management and Sustainable Use Supplemental Credit	2003	GEF REG	8.00	8.00	8.00	*		*	*	*		*			
Uganda	Protected Areas Management and Sustainable Use	2003	IDA	30.00	30.00	27.00	*		*	*	*		*			
Zambia	Environmental Support Program	1997	IDA	20.80	10.40	6.40	*	*	*			*				
Zambia	Sustainable Land Management in the Zambian Miombo Woodland Ecosystem	2002	GEF MSP	1.35	0.25	0.25			*		*				*	
Zambia	Support for Economic Expansion and Diversification (SEED)	2005	IDA	28.15	10.18	10.18		*		*			*			
Zambia	SEED Biodiversity	2005	GEF REG	4.00	4.00	4.00		*		*			*			
Zimbabwe	Park Rehabilitation and Conservation	1998	GEF REG	5.00	5.00	5.00			*	*	*		*			
Zimbabwe	Park Rehabilitation and Conservation	1998	IDA	70.00	70.00	62.50	*		*	*	*		*			
<b>EAST ASIA AND PACIFIC REGION: 64 PROJECTS</b>																
Cambodia	Forest Concession Management and Control Project	2000	IDA	5.42	1.10	0.98	*	*			*					
Cambodia	Biodiversity and Protected Areas Management	2001	GEF REG	3.00	3.00	2.75	*	*	*	*				*		
Cambodia	Biodiversity and Protected Areas Management	2001	IDA	1.91	1.91	1.91	*	*	*	*				*		
China	Biodiversity Conservation Action Plan	1993	GEF EA	0.40	0.40	0.40	*									
China	Environmental Technical Assistance	1993	IDA	76.00	29.40	20.00	*	*	*							



Investments in Projects with a Biodiversity Component							Biodiversity Activities									
Country	Project Name	FY	Funding source	Project total (US\$m)	Total biodiv (US\$m)	Bank biodiv (US\$m)	1	2	3	4	5	6	7	8	9	10
China	Forest Resource Development and Conservation	1994	IDA	333.10	20.55	12.34	*	*	*		*					*
China	Nature Reserves Management	1995	GEF REG	23.60	23.60	17.90	*	*	*	*			*			
China	Lake Dianchi Freshwater Biodiversity Restoration Project	2002	GEF MSP	1.86	1.86	1.00		*	*		*					*
China	Sustainable Forestry Development (Natural Forest Protection)	2002	GEF REG	16.00	16.00	16.00	*	*	*	*	*					
China	Sustainable Forestry Development I	2002	IBRD	214.58	26.85	11.75	*	*			*					
China	Gansu and Xinjiang Pastoral Development	2003	GEF REG	10.50	8.30	8.30	*	*	*		*			*	*	*
China	Gansu and Xinjiang Pastoral Development	2003	IBRD	98.72	3.00	1.99	*	*			*			*		*
Indonesia	First Forestry Institutions and Conservation	1988	IBRD	63.00	6.40	3.79	*		*	*	*					
Indonesia	Second Forestry Institutions and Conservation	1990	IBRD	33.10	3.10	1.87	*		*	*	*		*			
Indonesia	Biodiversity Collections	1994	GEF REG	11.40	11.40	7.20	*	*	*							
Indonesia	Integrated Swamps Development	1994	IBRD	106.00	3.10	1.89	*			*						
Indonesia	Kerinci Seblat ICDP	1996	GEF REG	15.00	15.00	15.00		*		*	*			*		
Indonesia	Kerinci Seblat ICDP	1996	IBRD	32.20	32.20	19.20	*		*		*					
Indonesia	Coral Reef Rehabilitation and Management Project (COREMAP)	1998	GEF REG	4.10	4.10	4.10	*	*	*	*						
Indonesia	Coral Reef Management and Rehabilitation Project (COREMAP)	1998	IBRD	8.70	8.70	6.90	*	*	*		*					
Indonesia	Biodiversity Strategy and Action Plan - IBSAP	2000	GEF EA	0.44	0.44	0.44	*									
Indonesia	Conservation of Elephant Landscape in Aceh Province, Sumatra	2000	GEF MSP	1.04	0.74	0.74	*	*	*		*					
Indonesia	Greater Berbak-Sembilang Integrated Coastal Wetlands Conservation	2001	GEF MSP	1.60	1.60	0.73	*	*	*	*	*					
Indonesia	Sangihe-Talaud Forest Conservation	2002	GEF MSP	1.14	1.14	0.82	*	*	*	*	*			*		



Investments in Projects with a Biodiversity Component							Biodiversity Activities									
Country	Project Name	FY	Funding source	Project total (US\$m)	Total biodiv (US\$m)	Bank biodiv (US\$m)	1	2	3	4	5	6	7	8	9	10
Indonesia	Indonesia Forests and Media Project (INFORM)	2002	GEF MSP	1.23	1.23	0.94			*							
Indonesia	Coral Reef Management and Rehabilitation Project (COREMAP II)	2004	GEF REG	7.50	7.50	7.50	*	*	*	*	*					
Indonesia	Coral Reef Management and Rehabilitation Project (COREMAP II)	2004	IBRD	44.10	44.10	33.20	*	*	*	*	*					
Indonesia	Coral Reef Management and Rehabilitation Project (COREMAP II)	2004	IDA	23.00	23.00	23.00	*	*	*		*					
Indonesia	Komodo Collaborative Management Initiative (KCMI)	2005	GEF IFC	16.98	16.975	5.375				*		*				
Indonesia	Lambusango Forest Conservation, Sulawesi	2005	GEF MSP	4.49	4.493	1.00		*	*	*	*		*			
Lao PDR	Wildlife and Protected Areas Conservation	1994	GEF REG	5.00	5.00	5.00		*		*				*		
Lao PDR	Forest Management and Conservation	1994	IDA	15.3	7.75	4.35	*	*			*			*		
Lao PDR	District Upland Development and Conservation	1999	IDA	2.25	2.25	2.00		*	*	*	*	*		*		
Lao PDR	Sustainable Forestry for Rural Development Project	2003	IDA	16.45	1.10	0.66	*	*			*			*		
Lao PDR	Lao Environment and Social Project	2005	IDA	4.80	1.54	1.28	*	*	*	*		*	*	*		
Lao PDR	Nam Theun 2 Social and Environment	2005	IDA	24.00	5.00	5.00	*		*	*		*		*		
Lao PDR	Bolikhambay Biodiversity Conservation (Integrated Ecosystem & Wildlife Management)	2005	GEF MSP	1.61	1.612	0.999	*		*	*			*			
Malaysia	Sabah Land Settlement and Environmental Management	1989	IBRD	216.00	1.20	1.20	*			*			*			
Mongolia	Assessment of Capacity Building Needs and Country Specific Priorities in Biodiversity	2000	GEF EA	0.23	0.22	0.2	*									
Mongolia	Biodiversity Loss and Permafrost Melt in Lake Hovsgol National Park	2001	GEF MSP	0.83	0.83	0.83		*		*	*			*		
Mongolia	Conservation of the Eg-Uur Watershed	2003	GEF MSP	1.93	1.93	1.00		*	*		*	*	*			



Investments in Projects with a Biodiversity Component							Biodiversity Activities									
Country	Project Name	FY	Funding source	Project total (US\$m)	Total biodiv (US\$m)	Bank biodiv (US\$m)	1	2	3	4	5	6	7	8	9	10
Mongolia	Netherlands Mongolia Trust Fund for the Environment (NEMO)	2005	TF	6.00	1.225	1.225	*	*	*							
Papua New Guinea	National Biodiversity Strategy, Action Plan and Report	1999	GEF EA	0.18	0.18	0.18	*									
Papua New Guinea	Forestry and Conservation	2002	GEF REG	17.30	17.30	17.30	*			*	*	*		*		
Papua New Guinea	Forestry and Conservation	2002	IBRD	38.50	19.25	6.25	*				*			*		
Philippines	Environment and Natural Resources Sector Adjustment	1991	IBRD	280.20	140.10	79.00	*				*					
Philippines	Environment and Natural Resources Sector Adjustment	1991	IDA	66.00	33.00	33.00	*				*					
Philippines	Conservation of Priority Protected Areas	1994	GEF REG	22.86	22.86	20.00	*	*	*	*				*		
Philippines	Community Based Resource Management	1998	IBRD	67.50	7.80	7.80	*				*	*		*		
Philippines	Mindanao Rural Development/Coastal Resource Conservation	2000	GEF REG	1.30	1.30	1.30	*	*	*	*	*	*		*		
Philippines	Mindanao Rural Development	2000	IBRD	39.70	0.99	0.68	*					*		*		
Philippines	Asian Conservation Foundation (Tranche I)	2004	GEF IFC	16.90	16.90	1.60	*	*	*		*	*	*			
Philippines	Asian Conservation Company (Tranche II)	2005	GEF IFC	5.10	5.10	2.90	*		*		*	*	*			
Regional	Marine Aquarium Market Transformation Initiative	2004	GEF IFC	22.28	22.28	6.915	*	*			*	*				
Regional	Mekong River Commission Water Utilization Project	2000	GEF REG	16.30	5.50	3.71	*	*	*							
Samoa	Marine Biodiversity Protection and Management	1999	GEF MSP	1.10	1.10	0.90			*	*	*			*		
Vietnam	Forest Protection and Rural Development	1998	IDA	32.39	32.39	21.51			*	*	*		*			
Vietnam	Coastal Wetlands Protection and Development	2000	IDA	65.60	15.00	7.27		*	*		*					
Vietnam	Hon Mun Marine Protected Area Pilot	2001	GEF MSP	2.17	2.17	1.00	*	*	*	*			*			
Vietnam	Conservation of Pu Luong-Cuc Phuong Limestone Landscape	2001	GEF MSP	1.31	1.31	0.75	*	*	*	*	*			*		

Investments in Projects with a Biodiversity Component							Biodiversity Activities									
Country	Project Name	FY	Funding source	Project total (US\$m)	Total biodiv (US\$m)	Bank biodiv (US\$m)	1	2	3	4	5	6	7	8	9	10
Vietnam	Hai Van Range Green Corridor	2004	GEF MSP	2.00	2.00	1.00	*	*	*	*	*			*		
Viet Nam	Forest Sector Development	2004	IDA	57.70	8.17	0.02	*				*					
Viet Nam	Forest Sector Development (Conservation Fund)	2004	GEF REG	9.00	9.00	9.00	*			*		*				
Vietnam	Integrating watershed and biodiversity management in Chu Yang Sin National Park	2005	GEF MSP	1.74	1.739	1.00		*	*	*						
<b>EUROPE AND CENTRAL ASIA REGION: 78 PROJECTS</b>																
Albania	Forestry	1996	IDA	21.60	4.15	1.54	*			*	*					
Albania	National Biodiversity Strategy, Action Plan and Report	1997	GEF EA	0.96	0.96	0.96	*									
Albania	Fishery Development	2002	IDA	6.66	1.19	1.00	*	*	*		*		*			
Albania	Integrated Water and Ecosystems Management Project	2004	GEF REG	20	0.91	0.91	*	*	*		*	*	*			
Albania	Assessment of Capacity Building Needs	2005	EA	0.39	0.39	0.324	*									
Albania	Natural Resource Management	2005	IDA	19.40	1.90	1.90	*		*	*	*					
Albania	Natural Resource Management	2005	GEF REG	5.00	5.00	5.00	*		*	*	*					
Armenia	Natural Resources Management and Poverty Reduction	2002	GEF REG	5.12	5.12	5.12	*	*	*	*	*			*		*
Armenia	Natural Resources Management and Poverty Reduction	2002	IDA	10.88	3.00	0.00	*	*	*		*			*		
Azerbaijan	Urgent Environmental Investment Project	1998	IDA	24.50	9.00	7.35	*				*					
Azerbaijan	Rural Environment Project	2005	IDA	12.10	12.10	8.00		*	*							
Azerbaijan	Rural Environment Project	2005	GEF REG	5.00	5.00	5.00	*	*	*	*	*		*			
Belarus	Forest Biodiversity Protection	1993	GEF REG	1.25	1.25	1.00	*	*	*	*					*	
Belarus	Forestry Development	1994	IBRD	54.70	2.13	0.50	*	*							*	
Bosnia-Herzegovina	Forestry	1998	IDA	20.20	1.85	0.64	*			*	*					
Bosnia-Herzegovina	Environmental Capacity Building	2000	IDF	0.29	0.15	0.15	*									
Bosnia-Herzegovina	Forest Development and Conservation	2003	IDA	5.09	1.80	1.32	*	*	*		*			*		



Investments in Projects with a Biodiversity Component							Biodiversity Activities									
Country	Project Name	FY	Funding source	Project total (US\$m)	Total biodiv (US\$m)	Bank biodiv (US\$m)	1	2	3	4	5	6	7	8	9	10
Bulgaria	Wetlands Restoration and Pollution Reduction	2002	GEF REG	13.28	10.60	5.99	*	*	*	*	*		*			
Bulgaria	Pomoriisko Lake Conservation, Restoration and Management	2005	GEF MSP	2.15	0.79	0.67	*		*				*			
Croatia	National Biodiversity Strategy, Action Plan and Report	1997	GEF EA	0.102	0.10	0.10	*									
Croatia	Coastal Forest Reconstruction and Protection	1997	IBRD	67.00	2.90	2.90	*				*		*			
Croatia	Reconstruction Project for Eastern Slavonia, Baranja and Western Srijem	1998	IBRD	61.10	2.20	1.00					*					
Croatia	Kopacki Rit Wetlands Management	1999	GEF MSP	2.36	2.36	0.75	*		*	*			*			
Croatia	Karst Ecosystem Conservation	2002	GEF REG	8.37	8.37	5.07	*	*	*	*	*		*			
Czech Republic	Biodiversity Protection	1994	GEF REG	2.75	2.75	2.00				*		*	*			
Czech Republic	National Biodiversity Strategy, Action Plan and Report	1998	GEF EA	0.10	0.10	0.10	*									
Estonia	Haapsalu and Matsalu Bays Environment	1995	IBRD	8.37	0.48	0.11	*			*						
Estonia	Agriculture	1996	IBRD	30.90	0.90	0.46					*					
Georgia	National Biodiversity Strategy, Action Plan and Report	1997	GEF EA	0.12	0.12	0.12	*									
Georgia	Integrated Coastal Management	1999	GEF REG	1.20	1.20	1.20	*		*	*						
Georgia	Integrated Coastal Management	1999	IDA	6.30	4.80	2.60	*				*					
Georgia	Protected Areas Development	2001	GEF REG	30.30	30.30	8.70	*	*	*	*						*
Georgia	Forest Development	2003	IDA	21.34	5.00	3.67	*	*	*		*					*
Kazakhstan	Syr Darya Control and North Aral Sea Phase-I	2001	IBRD	85.80	27.35	20.56					*					
Kazakhstan	Drylands Management	2003	GEF REG	9.70	0.46	0.25	*	*	*		*					
Kyrgyz Republic	National Biodiversity Strategy, Action Plan and Report	1997	GEF EA	0.11	0.11	0.11	*									
Latvia	Liepaja Environment	1995	IBRD	21.17	0.50	0.00	*									
Lithuania	Klaipeda Environment	1995	IBRD	23.10	1.50	0.00	*			*			*			
Lithuania	National Biodiversity Strategy, Action Plan and Report	1997	GEF EA	0.07	0.07	0.07	*									

Investments in Projects with a Biodiversity Component							Biodiversity Activities									
Country	Project Name	FY	Funding source	Project total (US\$m)	Total biodiv (US\$m)	Bank biodiv (US\$m)	1	2	3	4	5	6	7	8	9	10
Macedonia	National Strategy and Action Plan, National Report, Clearing House Mechanism, Capacity Building Needs	2001	GEF EA	0.37	0.37	0.34	*									
Moldova	National Biodiversity Strategy, Action Plan and Report (Phase I)	1998	GEF EA	0.13	0.13	0.13	*									
Moldova	Assessment of Capacity Building Needs	2001	GEF EA	0.34	0.34	0.30	*									
Moldova	Biodiversity Conservation in the Lower Dniester Delta Ecosystem	2002	GEF MSP	1.71	1.71	0.98	*		*	*	*	*		*		
Poland	Forest Biodiversity Protection	1992	GEF REG	6.20	6.20	4.50	*	*		*	*					*
Poland	Forestry Development	1994	IBRD	335.40	14.00	2.00	*			*	*					*
Poland	Rural Environmental Protection	2000	GEF REG	15.80	0.75	0.75	*		*		*					
Poland	Rural Environmental Protection	2000	IBRD	15.80	0.63	0.63	*		*		*					
Regional	Central Asia Transboundary Biodiversity	1999	GEF REG	13.65	13.65	10.15	*			*	*	*				
Regional	Lake Ohrid Conservation	1998	GEF REG	4.37	1.95	1.83	*				*					
Regional	Aral Sea Basin Program: Water and Environmental	1998	GEF REG	21.50	3.90	2.21					*					
Regional	Baltic Sea Regional	2003	GEF REG	12.12	1.41	0.64	*	*	*		*					
Romania	Danube Delta Biodiversity	1995	GEF REG	4.80	4.80	4.50	*		*	*	*					
Romania	Biodiversity Conservation	1999	GEF REG	8.80	8.80	5.50	*		*	*			*			
Romania	Agricultural Pollution Control	2002	GEF REG	10.80	1.09	0.52					*					
Romania	Forest Development Project	2003	IBRD	31.89	2.44	1.91	*	*	*		*					
Romania	Afforestation of Degraded Agricultural Land Proto-Carbon	2004	PCF	13.76	1.65	0.44					*					*
Russia	Biodiversity Conservation	1996	GEF REG	26.00	26.00	20.10	*	*	*	*	*		*			
Russia	Sustainable Forestry Pilot	2000	IBRD	74.5	11.20	9.02	*	*		*	*					
Russia	Khabarovsk Habitat Conservation	2002	GEF MSP	1.75	1.75	0.75	*		*	*	*					
Slovak Republic	Biodiversity Protection	1994	GEF REG	2.86	2.86	2.17	*	*		*			*			



Investments in Projects with a Biodiversity Component							Biodiversity Activities									
Country	Project Name	FY	Funding source	Project total (US\$m)	Total biodiv (US\$m)	Bank biodiv (US\$m)	1	2	3	4	5	6	7	8	9	10
Slovak Republic	National Biodiversity Strategy, Action Plan and Report	1997	GEF EA	0.077	0.08	0.08	*									
Slovak Republic	Conservation and Sustainable Use of Central European Grasslands	2000	GEF MSP	1.10	1.10	1.10	*			*	*					
Slovenia	National Biodiversity Strategy, Action Plan and Report	1998	GEF EA	0.09	0.09	0.09	*									
Tajikistan	Community Watershed Development	2004	IDA	15.29			*		*		*					*
Tajikistan	Community Watershed Development	2004	GEF REG	4.50	1.70	1.70	*		*		*					*
Tajikistan	Dashtidzhum Biodiversity Conservation and Risk Mitigation	2004	GEF MSP	0.97	0.97	0.775			*	*	*					
Turkey	Eastern Anatolia Watershed Rehabilitation	1993	IBRD	109.80	7.76	5.44		*			*					*
Turkey	In-Situ Conservation of Genetic Biodiversity	1999	GEF REG	5.70	5.70	5.10	*	*			*					*
Turkey	Biodiversity and Natural Resource Management	2000	GEF REG	11.54	11.54	8.19	*	*	*	*	*		*			*
Turkey	Anatolia Watershed Rehabilitation	2004	IBRD	28.65	3.84	2.75			*		*					
Turkey	Anatolia Watershed Rehabilitation	2004	GEF REG	16.46	2.82	1.62			*		*					
Ukraine	Transcarpathian Biodiversity Protection	1994	GEF REG	0.58	0.58	0.50	*	*	*	*	*	*				
Ukraine	Danube Delta Biodiversity	1995	GEF REG	1.74	1.74	1.50	*	*		*	*	*				
Ukraine	National Biodiversity Strategy, Action Plan and Report. Phase I	1997	GEF EA	0.12	0.12	0.11	*									
Ukraine	Assessment of Capacity-building Needs	2001	GEF EA	0.37	0.37	0.32	*	*								
Ukraine	Azov Black Sea Corridor Biodiversity Conservation	2002	GEF REG	6.90	6.90	6.90	*	*	*	*	*					
Uzbekistan	Drainage, Irrigation & Wetlands Improvement Project	2003	IBRD	43.55	0.50	0.40				*						
Uzbekistan	Drainage, Irrigation & Wetlands Improvement Project	2003	IDA	31.00	0.50	0.40				*						
<b>LATIN AMERICA AND THE CARIBBEAN REGION: 163 PROJECTS</b>																
Argentina	Yacyreta Hydroelectric Project II	1993	IBRD	2,591.10	4.50	4.50	*		*	*	*		*			

Investments in Projects with a Biodiversity Component							Biodiversity Activities									
Country	Project Name	FY	Funding source	Project total (US\$m)	Total biodiv (US\$m)	Bank biodiv (US\$m)	1	2	3	4	5	6	7	8	9	10
Argentina	Forestry Development	1996	IBRD	26.20	7.62	4.65	*	*			*	*				
Argentina	Flood Protection	1997	IBRD	488.00	3.60	1.48	*		*	*	*					
Argentina	Native Forests and Protected Areas	1997	IBRD	30.00	30.00	19.50	*	*	*	*					*	
Argentina	Biodiversity Conservation	1998	GEF REG	21.90	21.90	10.10		*		*	*		*			
Argentina	El Nino Emergency Flood	1998	IBRD	60.00	0.65	0.43					*					
Argentina	Patagonia Coastal Contamination Prevention and Sustainable Fisheries Management	2001	GEF REG	18.76	13.85	6.16	*	*			*					
Argentina	Indigenous Community Development	2001	IBRD	5.88	2.94	2.50					*			*		
Belize	Northern Belize Biological Corridors Consolidation and Maintenance	1999	GEF MSP	3.88	3.88	0.72	*	*	*	*	*					
Belize	Roads and Municipal Drainage Project	2000	IBRD	18.38	0.18	0.18			*	*						
Belize	Community Management Sarstoon Temash Project	2003	GEF MSP	1.07	1.07	0.81		*	*	*	*		*	*		
Bolivia	Biodiversity Conservation	1993	GEF REG	7.60	7.60	4.50	*			*	*	*	*			
Bolivia	National Land Administration	1995	IBRD	27.00	0.50	0.50		*								
Bolivia	PROMETA - Strengthening of Private Sector Conservation	2001	GEF MSP	1.13	1.13	0.72	*	*		*	*		*			
Bolivia	Sustainability of the National System of Protected Areas	2001	GEF REG	43.69	43.69	15.00	*	*		*	*	*	*			
Bolivia	Indigenous Development	2001	IBRD	5.00	1.11	1.11			*		*		*	*	*	
Bolivia	National Land Administration - Supplemental	2002	IBRD	6.00	0.05	0.05		*		*						
Brazil	Land Management I Project - Parana	1989	IBRD	149.10	4.70	1.96	*	*		*					*	
Brazil	Land Management II Project - Santa Catarina	1990	IBRD	76.30	4.30	1.98	*	*		*					*	
Brazil	National Environmental Project	1990	IBRD	166.40	166.40	117.00	*			*	*	*		*		
Brazil	Mato Grosso Natural Resource Management	1992	IBRD	285.70	48.50	44.70		*	*	*						
Brazil	Rondonia Natural Resource Management	1992	IBRD	228.90	38.70	35.90	*		*	*						



Investments in Projects with a Biodiversity Component							Biodiversity Activities									
Country	Project Name	FY	Funding source	Project total (US\$m)	Total biodiv (US\$m)	Bank biodiv (US\$m)	1	2	3	4	5	6	7	8	9	10
Brazil	Extractive Reserves	1995	RFTF	9.70	9.70	3.00			*	*	*			*		
Brazil	Indigenous Lands	1995	RFTF	20.90	20.90	2.10		*		*	*			*		
Brazil	Demonstration Projects	1995	RFTF	22.00	22.00	3.00	*		*		*	*	*	*		
Brazil	Science Centers and Directed Research	1995	RFTF	15.10	15.10	8.50	*	*							*	
Brazil	Natural Resources Policy	1995	RFTF	79.00	79.00	20.00	*	*								
Brazil	National Biodiversity Project PROBIO	1996	GEF REG	20.00	20.00	10.00	*	*		*	*			*		
Brazil	Brazilian Biodiversity Fund (FUNBIO)	1996	GEF REG	34.50	34.50	20.00				*	*	*	*			
Brazil	Environmental Conservation and Rehabilitation	1996	IBRD	109.00	10.90	5.00		*		*	*			*		
Brazil	Rural Poverty Alleviation and Natural Resources Management Project	1996	IBRD	175.00	24.80	10.00	*	*	*		*					
Brazil	Forest Resources Management	1997	RFTF	20.00	2.00	0.00	*	*	*	*	*	*	*	*	*	
Brazil	Bahia Water Resources Management	1998	IBRD	85.00	6.87	4.10	*	*	*	*	*			*		
Brazil	Gas Sector Development	1998	IBRD	2,086.00	8.40	0.52	*			*			*	*		
Brazil	Federal Water Resources Management - PROAGUA	1998	IBRD	330.00	0.63	0.38			*		*					
Brazil	Land Management III: Sao Paolo	1998	IBRD	124.70	10.72	4.73			*		*	*		*		
Brazil	Fire Prevention and Mobilization in the Amazon - PRO-ARCO	1999	IBRD	20.00	20.00	15.00	*	*	*		*			*		
Brazil	Fire Prevention and Mobilization	1999	RFTF	2.00	2.00	1.00	*	*	*		*			*		
Brazil	Monitoring and Analysis	1999	RFTF	5.80	5.80	2.00		*								
Brazil	Ceara Integrated Water Resource Management Project (PROGERIRH)	2000	IBRD	247.20	5.90	5.90				*	*	*				
Brazil	Fire Prevention and Mobilization in the Amazon - PROTEGER II	2001	RFTF	2.00	2.00	2.00	*	*	*							
Brazil	Formoso River -- Integrated Watershed Management and Protection	2002	GEF MSP	2.18	2.18	1.00	*	*	*	*	*		*	*		
Brazil	Parana Biodiversity Project	2002	GEF REG	8.00	8.00	8.00	*	*	*	*	*		*	*		*



Investments in Projects with a Biodiversity Component							Biodiversity Activities									
Country	Project Name	FY	Funding source	Project total (US\$m)	Total biodiv (US\$m)	Bank biodiv (US\$m)	1	2	3	4	5	6	7	8	9	10
Brazil	Santa Catarina Natural Resources & Poverty Project	2002	IBRD	107.50	3.30	3.30	*	*	*		*					
Brazil	Ecological Corridors	2002	RFTF	5.16	5.16	3.90	*	*	*	*	*	*		*		
Brazil	Amazon Region Protected Areas	2003	GEF REG	81.50	81.50	30.00	*	*	*	*	*	*	*	*		
Brazil	Tocantins Sustainable Regional Devt	2003	IBRD	100.00	12.70	10.10		*	*	*					*	
Brazil	Ecosystem Restoration of Riparian Forests in Sao Paulo	2005	GEF REG	19.52	19.52	7.75	*		*			*				
Brazil	Integrated Ecosystem Management in Productive Landscapes of the Northwestern Fluminense	2005	GEF REG	14.95	14.95	6.75				*	*			*	*	
Brazil	Atlantic Forest Sub-program Phase I	2005	RFTF	0.80	0.8	0.8	*	*								
Brazil	Support to Atlantic Forest NGO Network (RMA)	2005	RFTF	0.93	0.934	0.934			*							
Brazil	Support to Sustainable Business Practices in Rain Forests	2005	RFTF	0.48	0.12	0.12					*					
Brazil	First Programmatic Reform Loan for Environmental Sustainability	2005	IBRD	505.05	42	42	*				*					
Brazil	Sustainable Communities	2005	IBRD/IDA	6.81	2.72	2.40	*							*		
Chile	Environmental Institutions Development	1993	IBRD	32.80	16.40	5.75	*	*								
Chile	Valdivian Forest Zone: Private Public Mechanisms for Biodiversity Conservation	2001	GEF MSP	0.73	0.73	0.73	*	*	*	*	*					
Chile	Conservation of the Santiago Foothills	2002	GEF MSP	4.72	4.72	0.73	*	*		*						
Colombia	Natural Resource Management Program	1994	IBRD	65.30	11.60	6.93	*	*	*	*	*					
Colombia	Santa Fe Water Supply and Sewerage Rehabilitation I	1996	IBRD	414.20	2.40	1.58	*	*			*					
Colombia	Sustainable Use of Biodiversity in Western Slope of Serrania del Baudo (Choco)	1999	GEF MSP	2.96	2.96	0.73	*	*	*	*	*		*			
Colombia	Cartagena Water Supply and Sewerage Environmental Management	1999	IBRD	117.00	0.41	0.41	*	*		*						



Investments in Projects with a Biodiversity Component							Biodiversity Activities									
Country	Project Name	FY	Funding source	Project total (US\$m)	Total biodiv (US\$m)	Bank biodiv (US\$m)	1	2	3	4	5	6	7	8	9	10
Colombia	Archipelago of San Andres: Conservation and Sustainable Use of the Marine Reserves	2000	GEF MSP	4.16	4.16	0.98	*			*	*					
Colombia	Sierra Nevada Sustainable Development	2000	IBRD	6.25	6.25	5.00	*	*	*	*	*	*	*	*		
Colombia	Mataven Forest - Conservation and Sustainable Development	2001	GEF MSP	1.37	1.37	0.73				*	*			*		
Colombia	Andean Region Conservation and Sustainable Use of Biodiversity	2001	GEF REG	30.00	30.00	15.00	*	*		*	*	*		*		*
Colombia	Capacity Building in Biosafety	2003	GEF MSP	4.45	4.45	1.98	*									
Colombia	Community-based Management for the Naya Conservation Corridor	2003	GEF MSP	2.23	2.23	0.75	*	*	*	*				*	*	
Colombia	Amoya River Environmental Services	2004	PCF	101.40	2.00	0.00		*	*							
Costa Rica	Training Program for Sustainable Development of Indigenous People	1995	IDF	0.12	0.06	0.06	*		*					*		
Costa Rica	Biodiversity Resources Development	1998	GEF REG	11.00	11.00	7.00	*	*		*	*	*	*			
Costa Rica	Institutional Strengthening on Gender in Natural Resource Management and Agriculture	1998	IDF	0.40	0.20	0.20	*		*							*
Costa Rica	EcoMarkets	2000	GEF REG	8.00	8.00	8.00	*	*	*		*	*				
Costa Rica	EcoMarkets	2000	IBRD	41.20	27.47	21.53	*	*	*		*	*				
Costa Rica	Training Program for Sustainable Development of Indigenous People	2000	IDF	0.30	0.15	0.15			*					*		
Costa Rica	Sustainable Cacao Production in South-eastern Costa Rica	2001	GEF MSP	3.01	3.01	0.72	*	*			*	*		*	*	
Dominican Republic	National Biodiversity Strategy, Action Plan and Report	1998	GEF EA	0.25	0.25	0.25	*									
Dominican Republic	National Environmental Policy Reform	1998	IBRD	3.70	1.95	1.58	*		*				*			
Ecuador	Lower Guayas Flood Control	1991	IBRD	97.50	1.80	1.09	*		*	*	*			*		
Ecuador	Rural Development	1992	IBRD	112.70	1.93	1.44	*	*	*	*						*

Investments in Projects with a Biodiversity Component							Biodiversity Activities									
Country	Project Name	FY	Funding source	Project total (US\$m)	Total biodiv (US\$m)	Bank biodiv (US\$m)	1	2	3	4	5	6	7	8	9	10
Ecuador	Biodiversity Protection	1994	GEF REG	8.70	8.70	7.20	*	*	*	*	*		*			
Ecuador	Indigenous and Afro-Ecuadorian Peoples Development	1998	IBRD	50.00	6.91	3.47	*	*	*	*	*		*	*		
Ecuador	Monitoring System for the Galapagos Islands	1999	GEF MSP	1.59	1.59	0.94	*	*		*			*			*
Ecuador	Wetland Priorities for Conservation Action	1999	GEF MSP	0.91	0.91	0.72	*	*	*	*						
Ecuador	Choco-Andean Corridor	2001	GEF MSP	3.19	3.19	0.98	*		*	*	*					
Ecuador	Coastal Albarrradas: Rescuing Ancient Knowledge and Sustainable Use of Biodiversity	2001	GEF MSP	3.08	3.08	0.73		*			*		*	*	*	
Ecuador	Poverty Reduction and Local Rural Development (PROLOCAL)	2001	IBRD	41.96	1.70	1.02			*		*	*		*		
Ecuador	Biodiversity Conservation in Pastaza	2003	GEF MSP	1.01	1.01	0.76	*		*		*			*		
Ecuador	National System of Protected Areas Project	2003	GEF REG	32.70	32.70	8.00	*	*	*	*	*	*				
El Salvador	Promotion of Biodiversity Conservation with Coffee Landscapes	1998	GEF MSP	3.81	3.81	0.73		*	*		*	*				*
El Salvador	Environmental Services Project	2005	IBRD	9.50	9.50	5.00	*				*	*				
El Salvador	Environmental Services Project	2005	GEF REG	5.00	5.00	5.00	*				*	*				
Grenada	Dry Forest Biodiversity Conservation	2001	GEF MSP	1.13	1.13	0.72	*	*	*	*	*					
Guatemala	Management and Protection of Laguna del Tigre National Park	2000	GEF MSP	1.66	1.66	0.72		*		*	*		*			
Guatemala	Western Altiplano Integrated Natural Resource Management	2001	GEF REG	8.00	8.00	8.00		*		*	*					
Guatemala	Western Altiplano Integrated Natural Resource Management	2001	IBRD	47.60	47.60	32.80	*			*	*					
Guatemala	Community Management of the Bio-Itza Reserve	2002	GEF MSP	1.48	1.48	0.75	*	*	*	*	*		*	*		
Haiti	Forest and Parks Protection Technical Assistance	1997	IDA	22.50	22.50	21.50	*			*	*					



Investments in Projects with a Biodiversity Component							Biodiversity Activities									
Country	Project Name	FY	Funding source	Project total (US\$m)	Total biodiv (US\$m)	Bank biodiv (US\$m)	1	2	3	4	5	6	7	8	9	10
Haiti	National Biodiversity Strategy, Action Plan and Report	1998	GEF EA	0.26	0.26	0.26	*									
Honduras	Environmental Development	1995	IDA	12.48	2.50	2.16	*		*		*					
Honduras	Rural Land Management	1997	IDA	34.00	17.25	14.03	*		*		*				*	
Honduras	Biodiversity in Priority Areas	1998	GEF REG	9.50	9.50	7.00	*	*		*	*					
Honduras	Interactive Environmental Learning and Science Promotion	1999	IDA	9.30	2.33	2.08		*	*	*			*			
Honduras	Rural Land Management Project - supplemental credit	2002	IDA	9.10	0.50	0.50		*	*		*					
Honduras	Sustainable Coastal Tourism	2002	IDA	6.04	1.51	1.25	*		*		*		*			
Honduras	Regional Development in the Copan Valley	2003	IDA	13.35	1.73	1.73		*	*				*			
Honduras	Forests and Rural Productivity	2004	IDA	32.70	6.78	4.20	*	*		*		*				
Mexico	Decentralization and Regional Development	1991	IBRD	1,362.70	40.00	15.08	*		*	*	*		*	*		
Mexico	Protected Areas Program	1992	GEF REG	10.70	10.70	8.70	*	*		*		*	*	*		
Mexico	Environmental Project	1992	IBRD	60.77	13.23	4.30	*		*		*					
Mexico	Northern Border Environmental Project	1994	IBRD	762.00	15.00	7.24	*			*						
Mexico	Protected Areas Program: Proposed Restructuring	1997	GEF REG	34.55	34.55	17.48	*			*		*				
Mexico	Community Forestry	1997	IBRD	23.57	9.90	6.30	*		*			*		*		
Mexico	El Triunfo Biosphere Reserve: Habitat Enhancement in Productive Landscapes	1999	GEF MSP	2.12	2.12	0.73		*	*		*	*		*	*	
Mexico	Sustainable Hill-Side Management in Indigenous Micro-catchments in Oaxaca	1999	GEF MSP	0.72	0.72	0.50					*			*	*	
Mexico	Rural Development in Marginal Areas - APL II	2000	IBRD	73.00	4.25	4.25	*				*				*	
Mexico	Indigenous and Community Biodiversity Conservation (COINBIO)	2001	GEF REG	7.50	7.50	7.50	*	*	*	*	*		*	*	*	
Mexico	Mesoamerican Biological Corridor	2001	GEF REG	85.80	85.80	14.84	*	*	*		*		*		*	

Investments in Projects with a Biodiversity Component							Biodiversity Activities									
Country	Project Name	FY	Funding source	Project total (US\$m)	Total biodiv (US\$m)	Bank biodiv (US\$m)	1	2	3	4	5	6	7	8	9	10
Mexico	Natural Disaster Management	2001	IBRD	658.30	1.28	0.78		*				*				
Mexico	Indigenous and Community Biodiversity Conservation (COINBIO)	2001	IBRD	11.20	11.20	2.60	*				*		*	*		
Mexico	Private Land Conservation Mechanisms Project	2002	GEF MSP	2.53	2.53	0.73			*	*		*				
Mexico	Consolidation of Protected Areas - SINAP II - Tranche I	2002	GEF REG	60.12	60.12	16.10	*	*	*	*	*	*	*			*
Mexico	Consolidation of the Protected Area System SINAP II - Tranche II	2003	GEF REG	17.44	17.44	2.21	*	*	*	*	*	*	*			*
Mexico	Community Forestry II (PROCYMAF)	2003	IBRD	28.90	1.80	1.80	*				*	*		*		
Mexico	Programmatic Environment Structural Adjustment Loan	2003	IBRD	202.00	2.83	2.83	*	*	*		*			*		
Nicaragua	Agricultural Technology and Land Management	1994	IDA	57.80	0.50	0.38		*		*						
Nicaragua	Atlantic Biological Corridor	1997	GEF REG	7.10	7.10	7.10	*	*		*	*					
Nicaragua	Rural Municipalities	1997	IBRD	40.40	7.65	5.68	*		*		*		*	*	*	
Nicaragua	Sustainable Forestry Investment Promotion	1999	IDA	15.00	7.50	4.50	*	*	*		*	*				
Nicaragua	Barrier Removal and Forest Habitat Conservation (Coffee/Allspice)	2001	GEF MSP	12.08	12.08	0.73	*	*	*		*					*
Nicaragua	Land Administration	2002	IDA	38.50	5.17	4.37	*	*	*		*			*		
Panama	Rural Poverty and Natural Resources	1997	IBRD	27.30	3.20	3.00	*	*			*			*		
Panama	Atlantic Mesoamerican Biodiversity Corridor	1998	GEF REG	12.80	12.80	8.40	*	*	*	*	*		*			
Panama	Effective Protection with Community Participation of the New Protected Area of San Lorenzo	1999	GEF MSP	2.23	2.23	0.73	*		*	*	*		*			
Panama	Land Administration	2001	IBRD	72.36	8.92	5.90	*	*	*		*			*		
Paraguay	Natural Resources Management	1994	IBRD	79.10	14.83	9.38	*	*		*	*		*			
Paraguay	Mbaracayú Biodiversity	2003	GEF MSP	3.00	3.00	0.97				*	*					
Peru	Trust Fund for Parks and Protected Areas	1995	GEF REG	7.86	7.86	5.00	*		*	*		*				



Investments in Projects with a Biodiversity Component							Biodiversity Activities									
Country	Project Name	FY	Funding source	Project total (US\$m)	Total biodiv (US\$m)	Bank biodiv (US\$m)	1	2	3	4	5	6	7	8	9	10
Peru	Vilcabamba - Participatory Conservation and Sustainable Development with Indigenous Communities	2000	GEF MSP	1.14	1.14	0.73	*	*	*	*	*			*		
Peru	Collaborative Management for the Conservation and Sustainable Development of the Northwest Biosphere Reserve (Tumbes)	2000	GEF MSP	2.07	2.07	0.73	*	*	*	*	*		*	*		
Peru	Indigenous and Afro-Peruvian Peoples Development	2000	IBRD	6.70	3.35	2.50	*	*	*		*		*	*		
Peru	Biodiversity Conservation through Sustainable Management of the Nanay River Basin	2001	GEF MSP	0.95	0.95	0.75	*	*		*	*		*	*		
Peru	Indigenous Management of Protected Areas in the Peruvian Amazon	2001	GEF REG	14.61	14.61	10.00		*		*	*		*	*		
Peru	Indigenous Management of Protected Areas in the Peruvian Amazon	2001	IBRD	8.14	8.14	5.00			*		*	*		*		
Peru	Participatory Management of Protected Areas - PROFONANPE II	2003	GEF REG	32.81	32.81	14.80	*	*	*	*	*	*	*	*		
Peru	Poison Dart Frog Ranching	2004	GEF IFC	1.85	1.85	0.86		*	*		*	*	*			
Peru	Inka Terra: An Innovative Partnership for Self-Financing Biodiversity Conservation & Community Development	2004	GEF IFC	12.12	12.12	0.75		*	*	*		*	*			
Regional OECS: Org. of Easter Caribbean States	Ship-Generated Waste Management	1995	GEF REG	5.50	0.20	0.20	*			*						
Regional - South and Central America and Mexico	Terra Capita Fund for Biodiversity Enterprises	1998	GEF IFC	30.00	30.00	5.00					*	*	*		*	
Regional - Central America	Conservation and Sustainable Use of the Mesoamerican Barrier Reef System (MBRS)	2001	GEF REG	24.20	24.20	11.00	*	*	*	*	*		*			

Investments in Projects with a Biodiversity Component							Biodiversity Activities									
Country	Project Name	FY	Funding source	Project total (US\$m)	Total biodiv (US\$m)	Bank biodiv (US\$m)	1	2	3	4	5	6	7	8	9	10
Regional Latin America - Colombia, Costa Rica, Ecuador	Integrated Silvopastoral Approaches to Ecosystem Management	2002	GEF REG	8.45	8.45	4.50		*	*		*	*	*			
Regional	OECS Protected Areas and Associated Sustainable Livelihoods	2004	GEF REG	7.57	7.57	3.7	*		*	*	*	*				
Regional	Building the Inter-American Biodiversity Information Network (IABIN)	2004	GEF REG	34.93	34.93	6.00	*	*								
Regional	Developing Connectivity between Biological and Geospatial Information in Latin America and the Caribbean	2004	DGF	1.20	1.20	1.20	*	*								
Regional	Integrated Ecosystem Management in Indigenous Communities	2004	GEF REG	11.50	11.5	4	*		*		*		*	*		
Saint Vincent & the Grenadines	National Biodiversity Strategy, Action Plan and Report	1998	GEF EA	0.35	0.35	0.35	*									
St. Lucia	Water Supply	1990	IBRD	35.30	0.20	0.01		*								
St. Lucia	Water Supply	1990	IDA	5.20	0.03	0.03		*								
St. Lucia	Watershed and Environmental Management	1996	IDA	7.10	2.50	0.93	*	*								
Uruguay	Integrated Ecosystem Management	2005	GEF REG	7.00	7.00	7.00			*		*		*			
Uruguay	Integrated Ecosystem Management	2005	IBRD	88.85	2.00	2.00			*		*		*			
Venezuela	Inparques	1995	IBRD	95.90	95.90	55.00	*	*	*	*			*			
Venezuela	Conservation and Sustainable Use of Llanos Ecoregion	1999	GEF MSP	2.43	2.43	0.94	*		*		*					
Venezuela	Dhekuana Indigenous Lands	2005	GEF MSP	1.10	1.10	0.75	*	*		*			*	*		
<b>MIDDLE EAST AND NORTH AFRICA REGION: 23 PROJECTS</b>																
Algeria	Pilot Forestry and Watershed Management	1992	IBRD	37.40	0.40	0.27		*		*						
Algeria	El Kala National Park and Wetlands Management	1994	GEF REG	9.56	9.56	7.20	*		*	*						
Algeria	Second Rural Employment Project	2003	IBRD	142.89	14.34	9.54	*				*				*	
Egypt	Red Sea Coastal and Marine Resource Management	1993	GEF REG	5.73	5.73	4.75	*	*	*	*		*	*			



Investments in Projects with a Biodiversity Component							Biodiversity Activities									
Country	Project Name	FY	Funding source	Project total (US\$m)	Total biodiv (US\$m)	Bank biodiv (US\$m)	1	2	3	4	5	6	7	8	9	10
Egypt	Matruh Resource Management	1993	IDA	29.50	1.70	1.27					*					
Egypt	GEF component for Second Matruh Resource Management	2003	GEF REG	5.17	5.17	5.17				*	*					
Egypt	Nile Transboundary Environmental Action Plan	2003	GEF REG	43.60	2.71	2.71	*		*		*					
Iran	Irrigation Improvement	1993	IBRD	311.70	4.00	0.40	*		*		*					
Jordan	Gulf of Aqaba Environmental Action Plan	1996	GEF REG	12.67	0.95	0.65	*	*	*	*	*		*			
Jordan	Second Tourism Development	1998	IBRD	44.00	9.00	6.55	*		*	*	*	*	*			
Jordan	Conservation of Medicinal and Herbal Plants Project	2003	GEF REG	14.21	14.21	5.00	*	*		*	*					*
Morocco	Lakhdar Watershed Management Pilot	1999	IBRD	5.80	0.66	0.46		*			*					*
Morocco	Protected Areas Management	2000	GEF REG	15.70	15.70	10.50	*		*	*	*		*			
Regional	Strategic Action Plan for the Red Sea	1999	GEF REG	36.60	12.95	2.11	*		*	*	*		*			
Syria	Conservation of Biodiversity and Protected Areas Management	1999	GEF MSP	1.43	1.43	0.75	*		*	*						
Tunisia	Second Forestry Development	1993	IBRD	148.10	1.63	0.87	*			*	*					
Tunisia	National Biodiversity Strategy, Action Plan and Report	1997	GEF EA	0.89	0.89	0.89	*									
Tunisia	Protected Areas Management Project	2002	GEF REG	9.88	9.88	5.33	*	*	*	*	*					
Tunisia	Northwest Mountain and Forestry Areas Development Project	2003	IBRD	44.86	6.28	4.76					*	*		*		*
Tunisia	Gulf of Gabes Marine and Coastal Resources Protection	2005	GEF REG	9.81	9.81	6.31	*		*				*			*
Yemen	Land and Water Conservation	1992	IDA	47.60	0.64	0.44		*								
Yemen	Protected Areas Management	1999	GEF MSP	1.42	0.74	0.74	*	*	*	*	*					
Yemen	Coastal Zone Management along the Gulf of Aden	1999	GEF MSP	1.56	0.75	0.75	*	*	*	*	*		*			
<b>SOUTH ASIA REGION: 27 PROJECTS</b>																
Bangladesh	Forest Resources Management	1992	IDA	58.70	27.20	22.10	*	*		*	*					



Investments in Projects with a Biodiversity Component							Biodiversity Activities									
Country	Project Name	FY	Funding source	Project total (US\$m)	Total biodiv (US\$m)	Bank biodiv (US\$m)	1	2	3	4	5	6	7	8	9	10
Bangladesh	Jamuna Bridge	1994	IDA	696.00	0.25	0.07		*	*	*						
Bangladesh	Biodiversity Conservation in the Sundarbans Reserved Forest	1998	GEF REG	75.50	75.50	12.20	*	*	*	*						
Bangladesh	Fourth Fisheries -Aquatic Biodiversity Conservation	1999	GEF REG	5.00	5.00	5.00	*	*			*					
Bangladesh	Fourth Fisheries	1999	IDA	55.80	32.20	15.60	*	*			*					
Bhutan	Trust Fund for Environmental Conservation	1992	GEF REG	18.58	18.58	10.00	*	*		*		*				
Bhutan	Third Forestry Development	1994	IDA	8.90	1.80	1.09	*		*	*	*					
India	West Bengal Forestry	1992	IDA	39.00	6.50	5.67		*		*	*				*	
India	Maharashtra Forestry	1992	IDA	142.00	31.24	27.28		*		*	*				*	
India	Andhra Pradesh Forestry	1994	IDA	89.10	28.80	25.02		*		*	*				*	
India	Forestry Research Education and Extension	1994	IDA	56.40	8.30	6.92		*		*					*	
India	Madhya Pradesh Forestry	1995	IDA	67.30	31.10	26.80	*	*		*	*			*	*	*
India	Orissa Water Resources Consolidation	1996	IDA	345.50	1.80	1.52	*				*				*	
India	Ecodevelopment	1997	GEF REG	20.00	20.00	20.00		*	*	*	*			*	*	*
India	Ecodevelopment	1997	IDA	47.00	47.00	28.00	*		*	*	*			*	*	*
India	Environmental Management Capacity Building and Technical Assistance	1997	IDA	65.29	5.34	4.09		*	*		*					
India	Uttar Pradesh Forestry	1998	IDA	65.01	19.93	16.23	*	*	*	*	*				*	*
India	Kerala Forestry	1998	IDA	47.00	19.70	16.35	*	*	*	*	*				*	
India	Capacity Building for Implementation of Cartagena Protocol on Biosafety	2003	GEF EA	3.07	0.60	0.20	*	*								*
Pakistan	Environmental Protection and Resource Conservation	1992	IDA	57.20	6.40	3.00		*	*	*	*					
Pakistan	Balochistan Natural Resources Management	1994	IDA	17.80	4.65	3.84	*		*	*	*				*	
Pakistan	Punjab Forest Sector Development	1995	IDA	33.75	2.29	1.69		*			*				*	
Pakistan	Protected Areas Management	2001	GEF REG	10.75	10.75	10.08	*	*	*	*						



Investments in Projects with a Biodiversity Component							Biodiversity Activities									
Country	Project Name	FY	Funding source	Project total (US\$m)	Total biodiv (US\$m)	Bank biodiv (US\$m)	1	2	3	4	5	6	7	8	9	10
Sri Lanka	Forest Sector Development	1989	IDA	31.40	1.30	0.82	*	*	*	*	*					
Sri Lanka	Conservation and Sustainable Use of Medicinal Plants	1998	GEF REG	5.21	5.21	4.60	*	*	*	*	*				*	
Sri Lanka	Protected Area Management and Wildlife Conservation	2001	GEF REG	33.50	33.50	9.00	*			*		*	*			
Sri Lanka	Land Administration and Management	2001	IDA	6.93	0.25	0.18		*		*	*	*				

1 Institution building, policies, and strategic planning	3 Public awareness and education	6 Sustainable financing and market mechanisms	8 Indigenous peoples
2 Inventory, research, and monitoring	4 Protected areas	7 Nature tourism	9 Agrobiodiversity
	5 Production landscape		10 Invasive species

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