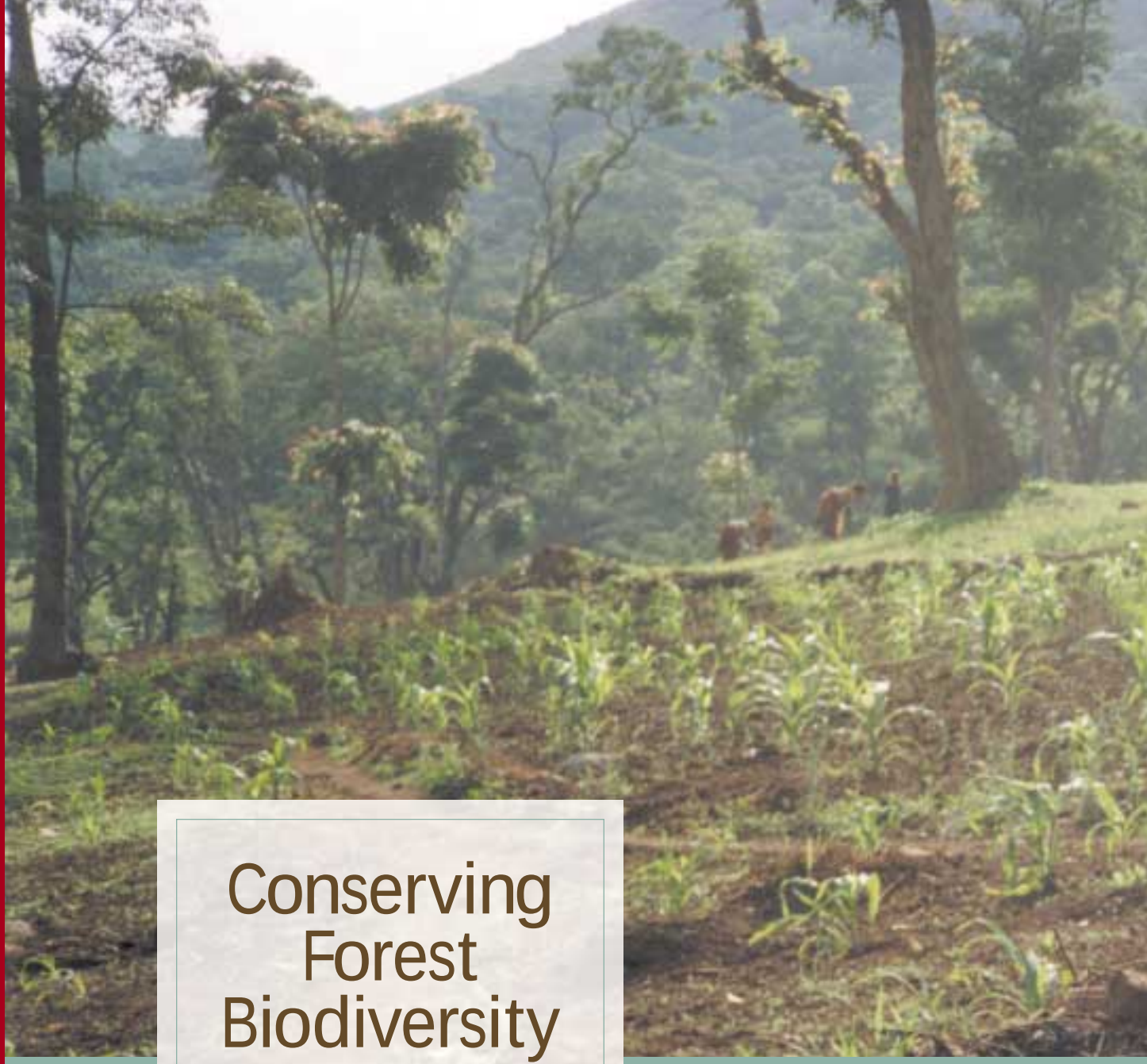
LESSONS FOR THE FUTURE



Conserving Forest Biodiversity

THREATS, SOLUTIONS AND EXPERIENCES

United Nations Development Programme

Global Environment Facility

GLOBAL ENVIRONMENT FACILITY (GEF)

The Global Environment Facility was established to forge international cooperation and finance actions to address four critical threats to the global environment: biodiversity loss, climate change, degradation of international waters, and ozone depletion. Launched in 1991 as an experimental facility, the GEF was restructured after the 1992 Earth Summit in Rio de Janeiro. The facility that emerged after restructuring was more strategic, effective, transparent, and participatory. During its first decade, GEF allocated $4.5 billion in grants, supplemented by more than $13 billion in additional financing, for more than 1200 projects in 140 developing countries and transitional economies as well as 2,800 projects in 60 countries which participate in the GEF Small Grants Programme, managed by UNDP. In 2002, donors pledged $3 billion to finance projects from 2002 to 2006.

In addition to its initial mandate, the May 2003 GEF Council approved two new focal areas for the GEF. The GEF now provides financial assistance for the mitigation and prevention of land degradation and persistent organic pollutants (POPs). GEF funded projects are implemented through the following development agencies: UNDP, UNEP and the World Bank. The GEF also benefits from having the following executing agencies: IDB, AfDB, ADB, EBRD, FAO, IFAD and UNIDO.

The GEF can succeed in its global environmental mission only as part of a worldwide movement towards sustainable development. GEF brings together 166 member governments, leading development institutions, the scientific community, and a wide spectrum of private sector and non-governmental organizations on behalf of a common global environmental agenda.

UNITED NATIONS DEVELOPMENT PROGRAMME (UNDP)

UNDP is the UN's global development network, advocating for change and connecting countries to knowledge, experience and resources to help people build a better life. With 132 country offices, it has long enjoyed the trust and confidence of governments and NGOs in many parts of the developing as well as the developed world. It is typically regarded as a partner rather than an adversary, and its commitment to a universal presence has proven especially useful in post-conflict situations and with States that have otherwise been isolated from the international community.

At the UN Millennium Summit, world leaders pledged to cut poverty in half by 2015. UNDP is charged with helping developing countries monitor their progress in meeting this and other key development goals. Its strategy focuses on six key thematic areas: Democratic Governance, Poverty Reduction, Crisis Prevention and Recovery, Energy and Environment, Information and Communications Technology, HIV/AIDs. Capacity development and gender mainstreaming are cross-cutting issues across the thematic areas.

A trusted source of knowledge-based advice and an advocate of a more inclusive global economy, UNDP provides funds, helps developing countries attract and use aid effectively and promotes South-South cooperation. It seeks to address the many causes of poverty and to promote development, including through the protection of human rights and the empowerment of women.

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THREATS, SOLUTIONS AND EXPERIENCES

TIM BOYLE

NOVEMBER 2003

Foreword

The analytical and evaluative reports published under the Lessons for the Future series present results of work carried out around UNDP's Global Environment Facility (GEF) portfolio. Their purpose is to disseminate findings of studies based on experiences gained from UNDP/GEF's own projects and programmes, or from activities of our partners and other concerned organizations working in areas relevant to the GEF operations. The publications have various objectives and target groups. First and foremost, it is our intent to make available lessons and good practice from past and ongoing operations to project proponents, designers and implementers, the executing agencies of UNDP/GEF projects, and UNDP staff. Secondly, the Lessons for the Future series is aimed at highlighting key issues and results related to UNDP/GEF work to our principal constituencies, including the GEF Council and global environmental Conventions. Finally, we hope that the reports will equally serve to spread the word of our work to other interested parties, including academic and research institutions, non-governmental organizations (NGOs) and the civil society, and the public at large. The reports are published at irregular intervals when relevant materials and studies are completed and become available.

The present publication focuses on conservation of biodiversity in forest ecosystems, the threats and their underlying causes, and possible solutions based on actual experiences. This study was prepared by Tim Boyle, Biodiversity Technical Adviser at UNDP/GEF. The study is a unique contribution to the literature on forest biodiversity conservation because it analyses experiences with forty forest biodiversity conservation projects funded by the GEF and implemented by UNDP during a decade from 1992 to 2002. These projects were implemented different regions – Sub-Saharan Africa, Asia and the Pacific, Latin America and the Caribbean, Arab States, and Europe and the CIS – and the study identifies specific characteristics of environmental threats and their underlying causes for each region and for different forest types. It therefore provides useful strategic guidance to people and organizations working on conservation of forest ecosystems and biodiversity.

We sincerely hope that the research presented in this publication will be of use to everyone concerned with biodiversity conservation. Your feedback on the present study, and the Lessons for the Future series in general, will be most appreciated.

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Chapter 1

INTRODUCTION

Many millions of dollars are spent each year on projects seeking to achieve biodiversity conservation in forests. Greenpeace (2001) estimates $150 million per year by countries belonging to the Organisation for Economic Cooperation and Development. The Global Environment Facility (GEF), serving as the financial mechanism of the Convention on Biological Diversity, is the single largest funder of biodiversity conservation in the developing world. As one of the three 'Implementing Agencies' of the GEF, UNDP is responsible for managing a significant number of GEF-funded forest conservation projects around the world.

The GEF provides funding for biodiversity conservation in many ecosystems, and GEF-funded projects are assigned to one of five 'operational programmes', which cover arid and semi-arid ecosystems; wetland, coastal and marine ecosystems; mountain ecosystems; and agricultural ecosystems in addition to forest ecosystems. In reality, a GEF-funded project will typically include a number of different types of ecosystems, but it is usually assigned to a single operational programme. As of mid-2002, UNDP was responsible for managing the implementation of 42 projects in the forests operational programme, 14 of which have been completed, and 28 of which are still under implementation (Table 1).

Seasonal tropical forest - one of many forest types covered by UNDP/GEF forest conservation projects.

The GEF's 'operational strategy' requires that all biodiversity conservation projects should seek to sustainably remove all threats to biodiversity on specific project sites. Much has been written about threats to forest biodiversity globally and how to address these threats (e.g. Stedman-Edwards 1997; Kaimowitz and Angelsen 1998; Culas and Dutta 2002; Geist and Lambin 2002; Lindenmayer and Franklin 2002). Human actions that affect forests — the direct threats — are driven by other factors, sometimes termed 'underlying causes'. Failure to address underlying causes generating threats will result in non-sustainable solutions, and this fact is recognized in the GEF's operational strategy, which requires an analysis of underlying causes and the design of a strategy to overcome them.

One problem, however, as recognized by several authors (e.g. Culas and Dutta 2002), is that the truly fundamental underlying causes are rooted in systems and processes that cannot be addressed through individual projects. Population growth, international economic policies, and widespread poverty are beyond the scope of a project-based approach to forest conservation. Consequently, it is necessary to refer to three levels of causes: direct threats, underlying causes and root causes. While a project-based approach cannot address the root causes of forest loss, it can tackle the underlying causes, such that the impacts of the root causes are mitigated.

A further source of confusion stems from the assignation of causes as either direct threats or underlying causes. For example, Verolme and Moussa (1999) consider large-scale or unsustainable agricultural practices to be an underlying cause of deforestation, whereas such processes are more often viewed as direct threats. Analyses based on scientific principles and theory require 'ground-truthing' by reference to on-the-ground conservation initiatives.

Many of the ideas proposed by the authors cited in the preceding three paragraphs stem from philosophical or theoretical analyses of threats to forest biodiversity. The purpose of this publication is to compile experiences gained through practical forest conservation projects. This is not the first time such ground-truthing has been attempted; Geist and Lambin (2002) have similarly analyzed case studies. The difference is that the projects analyzed herein are more than case studies; they represent actual conservation projects. The publication also serves a second purpose, namely to identify differences among regions and forest types in the array of threats and underlying causes, and to provide guidance to those engaged in forest conservation regarding such differences and strategies to promote effective conservation.

This analysis is based on 40 projects funded in part by the GEF and implemented by UNDP in the period 1992-2002. These projects account for over $158 million of GEF funds and $102.5 million of co-financing (Table 1). The 40 projects are listed in Annex 1.

TABLE 1

Numbers of UNDP/GEF forests conservation projects in each geographic region.

Region	Under Implementation	Completed Projects	Total
Sub-Saharan Africa	6	3	9
Asia and the Pacific	10	3	13
Latin America and the Caribbean	11	5	16
Arab States	1	0	1
Europe and the CIS	1	0	1
TOTAL	29	11	40

Chapter 2

GLOBAL COVERAGE OF UNDP PROJECTS

The GEF instrument envisages the "development of a portfolio that encompasses representative ecosystems of global biodiversity significance." 'Global biodiversity significance' is not defined in the GEF instrument, but in practice it has been linked to criteria such as levels of endemism, presence in global lists such as World Heritage Sites, or resident species included in the Red List of the World Conservation Union (IUCN). In assessing global coverage for forest conservation projects, the most convenient global list is that provided by the Worldwide Fund for Nature's Global 200 Ecoregions. The Global 200 is a science-based global ranking of the earth's most biologically outstanding terrestrial, freshwater and marine habitats. Of the 238 ecoregions included in the list, 85 are forested, and of these 85 forested ecoregions, 67 are located in GEF-eligible countries. The 40 UNDP/GEF forest conservation projects included in this analysis cover 29 of these 67 (43%) GEF-eligible forested ecoregions (see Annex 2).

An additional 13 ecoregions are covered by projects still in the preparatory phase, meaning that in the future, 42 (63%) of the eligible forested ecoregions will have been covered. The UNDP/GEF portfolio is complementary to the portfolios of other GEF implementing agencies, so most of the 25 ecoregions not covered by UNDP are likely to receive GEF funds through other agencies.

The large majority of UNDP/GEF forest conservation projects to date have focused on protected area management. Seventy-five percent of the projects worked in existing protected areas, while an additional 5% proposed to create new protected areas. Thus, 20% of the projects worked *only* in productive landscapes, although 65% of the projects included interventions in productive landscapes — the majority focused on influencing activities outside protected areas that affected biodiversity conservation within the protected areas. In some cases, for example, in Panama and Vietnam, the projects explicitly

Forested landscapes usually include naturally unforested areas. In this high elevation tropical landscape, trees are limited to places where soil conditions are favourable

addressed buffer zone management. In others, formal buffer zones may not have been designated around the focal protected areas, or project interventions extended beyond formally declared buffer zones.

Many of the projects have therefore adopted a strategy related to the principles of Biosphere Reserves (UNESCO 2002). Ten projects, or one-quarter of the total, work in formally declared biosphere reserves, though others apply the biosphere reserves principles. The biosphere reserves covered by UNDP/GEF forest conservation projects are:

- Brazil: Cerrado BR
- Costa Rica: La Amistad BR
- Guatemala: Sierra de las Minas BR
- Kenya: Mt. Kenya BR
- Mexico: Sierra Gorda BR
- Panama: Darien BR
- Russia: Kronotsky BR
- Sri Lanka: Sinharaja BR
- Sudan: Dinder BR
- Venezuela: Orinoco Delta BR

Nine projects also work in World Heritage Sites (WHS). Six of these WHS comprise part or all of a biosphere reserve. The other three are not located in biosphere reserves. The complete list is:

- Brazil: Chapada dos Veadeiros NP (part of the Cerrado BR)
- Costa Rica: La Amistad BR
- Indonesia: Ujong Kulon NP
- Kenya: Mt. Kenya NP
- Nepal: Royal Chitwan NP
- Panama: Darien BR
- Russia: Kamchatka volcanoes (includes Kronotsky BR — see Box 1)
- Sri Lanka: Sinharaja BR
- Suriname: Central Suriname Nature Reserve

BOX 1

A World Heritage Site and Biosphere Reserve: Russia – Kronotsky Biosphere Reserve and Kamchatka Volcanoes

The Kronotskiy Biosphere Reserve is located in one of the remotest parts of the Russian Far East, on the Kamchatka Peninsula. The biosphere reserve was established in 1984, and in 1996 was one of several sites collectively inscribed as the 'Volcanoes of Kamchatka' World Heritage Site. The area represents some of the most pristine parts of the Kamchatka Peninsula and includes a remarkable set of volcanoes, hot springs and geysers. The biosphere reserve covers 1,142,000 hectares with an elevation change from 0 to 3,528 metres above sea level. The major ecosystem type is boreal needleleaf forests, but the vegetation changes with elevation from maritime ecosystems through to tundra. The biosphere reserve is not inhabited, but it is used extensively by small numbers of indigenous Itelmeni and Eveni.

Growing threats from organized poaching, uncontrolled access and unmanaged uses of the biosphere reserve are being addressed through a UNDP/GEF project. The project is demonstrating replicable, sustainable approaches to biodiversity conservation through strengthening the protected areas administrative and management capacity; enabling the development of a more rational and supportive legal foundation; increasing stakeholder conservation awareness, commitment and participation; promoting alternative livelihoods; and increasing collaboration between federal and regionally administered authorities.

Chapter 3

TYPOLOGY AND ANALYSIS OF THREATS TO FOREST ECOSYSTEMS AND THEIR UNDERLYING CAUSES

Proposals for GEF funding of forest biodiversity conservation projects include an analysis of the threats to forest biodiversity and the underlying causes of those threats. Sustainable removal of threats can succeed only if the underlying causes of those threats are successfully addressed. Since the GEF pursues an 'ecosystem approach' to biodiversity conservation, the threats to be removed include those that apply to the ecosystem as a whole.

A review of 40 GEF-funded projects that feature forest conservation as a major component of the project strategy revealed the range of threats reported; consequently, it is possible to design a typology of threats and underlying causes.

TYPOLOGY OF THREATS

The two basic categories of threats to forest ecosystems, as for other ecosystems, are those that result in **ecosystem loss**, and replacement by an alternative ecosystem, and those that result in retention but significant **degradation of the original ecosystem**. Although this basic typology can be applied to any type of ecosystem, the processes that generate these two categories of threat are dependent on the nature of the ecosystem.

1 Threats resulting in ecosystem loss.

In the case of forests, there are two distinct processes that result in ecosystem loss:

1-a Large-scale, planned conversion of forest to other uses. In many cases, government-sponsored forest conversion is aimed at economic development priorities, such as establishment of new agricultural land, infrastructure development and reservoir construction. Included also in this category is large-scale private land conversion as, for example, in conversion of forest to industrial plantations such as oil palm, or to industrial cattle ranches. In such cases the agents of conversion may be the private sector, but they are usually responding to explicit or implicit policy decisions or other incentives originating from the government.

1-b Small-scale, spontaneous conversion of forest, usually to agriculture. Advancement of the agricultural frontier into forest areas often results from the cumulative effects of a large number of relatively poor small-holders. These individuals are usually responding to social and/or economic drivers, such as scarce land resources in other localities, or demographic or ethnic forces promoting migration. They are exploiting a situation in which institutional control over the resource is inadequate (see Underlying Causes, p. 10).

BOX 2

Forest loss through agricultural conversion: Brazil – Mato Grosso

The project target area is in the extreme northwest of Mato Grosso State in an area of 109,000 km2. Here, tropical forest ecosystems are interlaced with cerrado (savanna) woodlands in a complex and diverse mosaic. Recent colonists, mostly from southern Brazil, are attracted by promises of cheap abundant land, and encouraged to plant coffee by government authorities and private colonization companies. Many colonization efforts succumbed to the infertile tropical soils, torrential rains and unfamiliar pests, and large numbers of colonists were forced to resort to slash-and-burn practices to produce rice, beans and cassava for local consumption. Low productivity soon forced them to advance farther into the forest. Cattlemen typically acquire the land abandoned by colonists, rapidly converting land to pasture, burning forests from which economically valuable trees have been harvested, eliminating nearly all remaining biodiversity.

The goal of the project is to promote a matrix of land uses that, when integrated across the landscape, both conserves globally significant biodiversity through sustainable use and safeguards it through conservation units on private lands. The project strategy involves (i) introducing biodiversity conservation parametres into the prevalent land use planning and enforcement framework, (ii) facilitating adoption of alternatives to current agropastoral activities, and (iii) facilitating adoption of alternatives to temporary forest management primarily for timber.

Often the two types of threats go hand-in-hand (see Box 2). Large-scale development initiatives improve access to previously remote areas, thus allowing in-migration. Because institutional controls are weaker here than in these more centralized localities, these areas are attractive to economic or social migrants.

2 Threats resulting in ecosystem degradation.

Almost any human activity, if conducted in an inappropriate or unsustainable fashion, can result in ecosystem degradation. The most frequent examples include the following:

2-a Non-sustainable logging. Both large- and small-scale logging in the permanent forest estate can result in significant ecosystem degradation if conducted with inappropriate harvesting and/or extraction techniques, or at non-sustainable levels (see Box 3). In many cases, forests are subject to 'creaming', in which only the most valuable trees are harvested. Creaming is an extreme type of non-sustainable logging, often associated with other threats — for example, the residual forest may be subsequently cleared for agriculture.

2-b Non-sustainable extraction of non-timber forest products (NTFPs). Although harvesting of NTFPs does not normally involve the removal of whole organisms, and so may not usually cause as dramatic physical changes as logging, intensive harvesting of reproductive tissues (flowers, seed, fruit) can result in ecological disruption. Repeated visitation, combined with inappropriate harvesting methods, also can cause physical degradation.

2-c Intensive hunting. Hunting could theoretically be considered as a form of NTFP extraction. It is identified as a separate threat both because it is so widespread and important, and because — unlike with NTFPs — individual animals are removed from the ecosystem. Hunting also includes fishing in mangroves or other swamps, or in seasonally flooded forests.

2-d Intensive collection of fuelwood. Although fuelwood is a form of NTFP, it is considered separately because of its social importance. Fuelwood collection takes many forms, from collection of dead wood, to harvesting of branches, to harvesting of whole stems.

BOX 3

Forest degradation through logging: Malaysia – Peat swamp forests

Tropical peat swamp forest (PSF) is a unique ecosystem with a diverse and often highly adapted fauna and flora. Southeast Pahang PSF is by far the largest intact virgin peat swamp forest area (ca.160,000 ha) in mainland tropical Asia. Malaysia's tropical peat swamp forests are under threat from a variety of activities, including conversion, drainage and unsustainable logging. Current logging practices have been a significant cause of degradation of PSFs. The widespread use of the 'traxcavator and canal' system causes severe damage to the habitat and compaction of the soil, leaving little chance for regeneration. The use of canals in particular can create a process of drainage that, once well advanced, can be irreversible. In addition to commercial logging, illegal encroachment and removal of logs (albeit generally on a small scale) constitute further threats.

The project will aim to integrate biodiversity conservation into sustainable resource planning and to strengthen institutional and human technical capacity. It will then demonstrate methods for sustainable logging and use of non-timber forest products. A forest management plan, including biodiversity overlays, will identify sensitive areas in which logging will be minimised or even banned. The plan will then adjust the intensity of any planned logging in less sensitive areas to maintain the total yield as close to current levels as possible. Set-aside areas will be established especially in core zones, though the entire forest reserve complex will be managed as a single unit.

2-e Overgrazing of livestock. This threat needs to be distinguished from forest conversion to cattle ranches, which is covered by (1-a). In many instances sedentary small-holders or nomadic herders will graze their livestock in forested areas (see Box 4). Even where stall-feeding is common, fodder may be collected from the forest. However, the physical damage caused by fodder collection is usually lower and less indiscriminate than if livestock are permitted to enter the forest.

BOX 4

Forest degradation through over-grazing: Sudan – Dinder National Park

Dinder National Park lies along the border with Ethiopia, constituting a transition between the Ethiopian high plateau and the arid Saharo-Sudanian biomes. The high plateau receives an average of 800 mm of rain, compared with the arid western biome, where precipitation averages about 100 mm. There is consequently a gradation of vegetation from Acacia-Balanites stands and riverine forest to desert scrub. Continuous droughts and civil strife have resulted in a large increase in the number of people along the boundaries of the park in the last three decades. Most of these people own livestock and engage in subsistence agriculture. The presence of large numbers of livestock has increased pressure on the area. Overgrazing outside the park is prevalent, and trespassing of livestock into the park is commonplace despite the heavy fines imposed by the park authorities on the owners. Fires are also set by honey collectors as well as by cattle herders, who burn tall grasses to make green grass available for their animals.

The project will integrate local communities' needs into park land use planning, support diversified livelihood systems and an intensive awareness programme, and reduce nomadic trespassing inside the park through good patrolling and incorporation of the nomads into the land use plan of the buffer zone. In addition, the project will improve the park's infrastructure and put in place a well-designed monitoring system with a specific set of indicators.

2-f Tourism. While tourism is a potential economic tool that supports forest conservation, impacts from under-regulated tourism can simultaneously cause ecosystem degradation and undermine the potential of tourism as part of a solution.

2-g Fire. It is rare for fire to be a threat independent of other threats. Frequently fire is used as a method to clear land for agriculture, or promote new growth for grazing. When such fires 'escape', the damage is often greater than that caused by land-clearing or grazing, especially in forest ecosystems not adapted to fire.

2-h Invasive species. The threat posed by invasive species has often been underestimated. Invasive species occur in most forested ecosystems, but their effects are rarely rapid or dramatic.

2-i Pollution. Most forest ecosystems of conservation value are remote from sources of industrial pollution, and levels of domestic pollution are also typically not severe because population densities in and around forested areas are lower than in agricultural or urban centres. However, water-borne pollution may be significant in forested ecosystems in the lower reaches of large water catchments, including mangroves.

2-j Mining. Mining is usually a localized threat, even where strip mining is practiced, but the significantly larger sediment load and possible heavy metal contamination in rivers flowing out of mining areas may cause ecological disruption downstream.

TYPOLOGY OF UNDERLYING CAUSES

Despite the requirement that GEF project proposals analyse underlying causes, these analyses are usually flawed because underlying causes are inaccurately categorized. The true 'root' causes of non-sustainable resource use are those over which the GEF has little influence, such as population growth, poverty, and attributes of human nature. However, the processes that stem from these root causes are subject to modification through project interventions.

It is easy to confuse symptoms with causes, resulting in inaccurate analyses of underlying causes. A common example of this phenomenon is the frequent observation that local stakeholders may be unaware of the existence of a protected area, or the exact location of its boundaries, or of regulations governing resource use within the protected area, and that these same stakeholders conduct non-sustainable and illegal activities within the protected area. Under such a scenario, it is easy to conclude that 'lack of awareness' is an underlying cause of the illegal activity. The fallacy of such a conclusion is easy to see if the logical response is considered. If lack of awareness is

the underlying cause, simply raising awareness should result in cessation of the illegal activity. This will rarely, if ever, be the case, of course. The true underlying causes will usually be the failure of local institutions (be they governmental or community-based) to enforce resource use regulations, combined with barriers to adoption of alternative, sustainable livelihoods, such as access to capital or technical knowledge. Raising awareness may be necessary to help remove the true underlying causes, but lack of awareness itself is not the underlying cause.

The following typology is derived from analyses of underlying causes reported from the 40 UNDP/GEF forest conservation projects. Some projects, especially those prepared in the pilot phase of the GEF, did not explicitly report an analysis of underlying causes. In such cases, an effort was made to 'reconstruct' the underlying causes from other information provided in the project proposal and in subsequent monitoring and evaluation reports. Where clearly erroneous underlying causes were reported, as in the example on awareness given above, an attempt was made to 'correct' the analysis.

1 Underlying causes contributing to the perception of an open-access resource.

The perception that an open-access resource exists encourages stakeholders to adopt a short-term economic horizon, since their failure to take immediate financial advantage of the resources likely results in others gaining the benefit.

1-a Land and resource insecurity. Where land and resource tenure is clear and unambiguous (and where resource rights are associated with land tenure), communities or individuals are not likely to view forests as open-access resources. If, however, traditional tenure systems are disrupted, uncertainty about ownership may fuel a perception of open access. This situation arose in many countries as the rise of the western concept of nation-state led to the designation of state ownership of land. In some cases, a period of colonization resulted in suppression of traditional systems. In countries of eastern Europe and the former Soviet Union, the application of political ideology led to suppression of traditional land tenure systems.

Failure of land tenure systems may also result not from a lack of clarity over ownership, but from the introduction of a market economy into a system not designed to address the economic pressures arising from market forces. Many traditional land tenure systems, which have evolved over many generations of a subsistence economy, fail when faced with the transition to a market economy.

1-b Absent, unclear or inappropriate user rights. Problems with user rights often go hand-in-hand with land tenure failure, since ambiguity over land tenure is likely to be reflected in systems of user rights (see Box 5). However, even in cases where land tenure is clear and appropriate to the circumstances, inadequate user rights can create conditions under which a perception of open access to resources applies. For example, government ownership of land may be clear, but allocation of user rights

BOX 5

Underlying causes – Open-access resource: Costa Rica – La Amistad and Osa Conservation Areas

The La Amistad and Osa Conservation Areas, lying in the Pacific Region of Costa Rica and covering some one million hectares, hold some of the most important concentrations of biodiversity in Costa Rica if not all of Central America. One reason for this is that they are located in areas of extremely difficult access. Recently, however, new and improved transportation routes have made the region more accessible. Migrants, perceiving an open-access resource, moved into the area, clearing forest for agriculture, hunting clandestinely and mining for gold .

A UNDP-GEF project running from 1993 to 1998 sought to address these issues. The project focused on institutional development, mainly seeking to strengthen the national protected areas authority and improve the protected areas infrastructure. Other components included scientific research and support to sustainable development activities in the buffer zones surrounding the conservation areas. As an early pilot phase GEF project, it could not benefit from lessons subsequently learned, and while delivering most of the identified outputs, it failed to address the perception of open access. As a result, further support to these areas is needed.

may be vague, or may favour certain stakeholders (for example, influential urban dwellers) over others. Such a situation engenders antipathy or antagonism among local stakeholders who consider themselves deprived of fair and equitable access to forest resources. This, in turn, can result in willful abuse of the resource, or even deliberately destructive activities such as setting of fires.

BOX 6

Underlying causes – Low risk of penalty: Vietnam – PARC

The Creating Protected Areas for Resource Conservation (PARC) project works in two protected areas in northern Vietnam, and one in the central highlands. The threats encountered by the PARC project are varied, but are characterized by the situation at Ba Be National Park. The key threats stem from encroachment at the edges of the national park, and even from within the park, and from illegal activities such as hunting and logging. In both cases, one of the key underlying causes was the low risk of capture and penalty. As a result of perverse incentives designed to encourage economic development, clearance of hill forest accelerated, for both shifting and permanent agriculture, and local authorities merely 'turned a blind eye' to issues of land ownership and tenure. Similarly, in the case of hunting, although gun ownership is illegal under national law, virtually every family owned one or more guns at the start of the project. Enforcement of the law was virtually non-existent.

During the project, agricultural incentives have been changed to promote reforestation of land within the protected areas and diversification of agricultural systems in the buffer zone, including the establishment of fuelwood plots. These changes are supported by a government-sponsored financial incentive scheme and by enforcement of national park regulations. As a result, the agricultural area inside the park has declined from 15,000 ha to 2,000 ha. Similarly, a gun exchange programme followed by strengthened patrolling and strict enforcement has dramatically reduced hunting pressures. Increased income from the diversified agricultural practices has served to reduce the need for hunting as a source of income.

1-c Low risk of capture and/or punishment. Perhaps the most significant underlying cause of a perception of an open-access resource is the failure to apprehend and punish those who violate regulations (see Box 6). If potential resource users consider that the chance of being captured or having to pay a penalty is minimal, non-sustainable resource use will be promoted. Low risk of capture and punishment may be due to the oft-reported inadequacies of agencies mandated to fulfil such a role, but it is also often the result of a perception within such agencies, or among the judiciary that the 'offences' being committed are not really significant or important. In some cases, corrupt officals, tasked with preventing offences, actually benefit from them.

The failure of local stakeholders to be aware of the regulations or laws that they may be violating is probably overestimated. But even where this applies, it reflects the failure of the institutions established to prevent resource abuse, because even if awareness raising is not an explicit element of their mandate, active efforts to apprehend violators would quickly raise awareness.

2 Financial incentives for inappropriate resource use.

In situations where land tenure and users rights are unambiguous, a perception of an open-access resource is unlikely to apply. However, in such circumstances, owners of land or of users' rights might still make resource use decisions that degrade or destroy forest land. In such cases, they are responding to financial incentives that appear more attractive than the financial benefits resulting from sustainable management. This group of underlying causes therefore represents a contrast to the preceding section.

It is important to note, however, that interventions designed to counteract the perception of an open-access resource may simply generate new underlying causes of the type outlined below. The two groups of underlying causes are therefore interrelated.

2-a Owners sell rights for short-term financial benefit. This is the simplest and clearest form of a financial incentive as an underlying cause. Quick financial gain accrues to the owner of the land or resource,

but the purchaser of the right has no incentive to conserve resources. This type of problem applies frequently where a market economy is displacing traditional or subsistence economies (see Box 7).

Non-local stakeholders, having access to markets, technical knowledge or capital denied to local rights owners, exploit their advantage for financial gain. In this regard, such cases clearly raise questions about fair and equitable sharing of benefits from resource use.

2-b Government subsidies support inappropriate resource use. Subsidies are frequently used to encourage particular behaviour. As an instrument to stimulate conservation activities, they can be effective in enhancing conservation values of biodiverse ecosystems. However, usually subsidies trigger economic activities that are harmful to natural ecosystems by increasing the returns to investment in activities that contribute to erosion of biodiversity (e.g. small- and large-scale forest conversion). The negative or 'perverse' effects of subsidies reflect a failure to account for the total economic value of ecosystems (or the cost of their loss or degradation), which in turn indicates a failure of public policies and departmental planning.

2-c Non-internalization of environmental costs. This represents a 'hidden' financial incentive that, in economic terms, constitutes a form of subsidy. This is because the price actually paid for a good or service produced without internalization of environmental costs is lower than the true market price would be if all costs of production were accounted for. However, there is an important distinction from the direct subsidies discussed in (2-b), above, in that the non-internalization of environmental costs is the unintended consequence of faulty economic analyses, rather than the intended result of a direct subsidy. It is also probably an over-reported underlying cause, in that the failure to internalize environmental costs does not necessarily mean that the land use decision reached was inappropriate.

3 Barriers to more sustainable livelihoods.

Barriers to more sustainable livelihoods exist both for migrants having tenuous or no rights to land and resources and for those who have secure rights. These barriers are therefore 'cross-cutting', in that they are likely to represent a challenge to sustainable management no matter which of the preceding two sections is relevant (see Box 8). The following resources required for sustainable livelihoods represent those for which barriers are most commonly encountered.

BOX 7

Underlying causes – financial incentives: Papua-New Guinea – Biodiversity conservation

The project sought to address a situation in which rich tropical rainforest, virtually all of which was under customary tenure, was being degraded primarily by unsustainable logging. The project's immediate objectives were to establish conservation areas using an integrated conservation and development area (ICAD) concept, assist in the strengthening of institutional and management capacity, and establish a framework for the expansion and maintenance of the conservation areas system. The project initially worked in two areas, Bismark Ramu and Lak (New Ireland). In 1996, however, the project withdrew from the Lak site. The circumstances leading to this decision are captured by McCallum and Sekhran (1997), who wrote:

"Many communities have a world view that is inclined towards the short-term, planning for their perceived immediate needs rather than for their long-term welfare necessities. The medium- to long-term social, economic and environmental consequences of their current land use practices are poorly understood and often ignored.

"In this context, forest-edge communities are opting to sell harvest rights to timber companies as a means of obtaining cash and social services. This provides 'development,' as they perceive it, and addresses their concerns regarding economic exclusion. The fact that it does little to establish a framework for durable development rarely enters the decision-making calculus. Conservation, because it yields future, diffuse and often intangible benefits, many of which have no direct monetary value, tends to be undervalued in this context and seen to conflict with community aspirations. This ethos tends to be reinforced by many developers and Government agencies."

BOX 8

Underlying causes – Barriers to alternative livelihoods: Pakistan – MACP

In northern Pakistan, the Mountain Areas Conservancies Project (MACP) addresses threats to the diverse forest ecosystems in the mountain conservancies. These include ecosystem degradation due to grazing by domestic livestock, and unsustainable harvesting of fuelwood, construction timber and medicinal plants. Underlying causes are characterized by a number of barriers to more sustainable use of natural resources. Such barriers include lack of access to water, which prevents widespread adoption of stall feeding of livestock, and technical and financial barriers to adopting alternative livelihoods or using more environmentally friendly fuel technologies. The project has three principal thrusts: first, to empower, organize and boost the capacity of local communities to conserve biodiversity at an ecological landscape level; second, to enhance the relative values of wild resources (as a conservation incentive) by promoting their sustainable use; and third, to create a conducive policy, legislative and financial framework for community-based conservation. The focus, therefore, is on empowering local communities to manage ecosystems and wild resources, making them accountable for the quality of their stewardship.

An interesting lesson that has emerged during project implementation is that a complex system of ownership rights exists that is quite foreign to western models, and that while western models of ownership and rights may be easier to comprehend for project designers or evaluators, they may not be sociologically appropriate. Nor are such models necessarily superior in terms of the wide range of rights and obligations conferred by the indigenous system.

3-a Access to capital. Adopting new livelihoods or modifying existing ones often requires an initial capital investment. If stakeholders do not have adequate capital of their own, or access to organizations providing capital, the alternatives will not be adopted.

3-b Access to information. Since many stakeholders having an interest in forest resource use live in remote areas and are frequently poorly educated, their access to technical information about new or modified livelihood options may be limited. Even with technical information about livelihood options, knowledge about business practices and marketing may determine how effectively new or modified livelihoods can or will be adopted.

3-c Access to markets. Even where capital and technical information are adequate, a further barrier to adopting new or modified livelihood options may be limited access to markets where financial benefits can be realized. Such barriers will often be logistical barriers, such as distance or physical access to markets, but they also include institutional barriers, such as the need to sell through 'middlemen', which reduces financial benefits to the local stakeholders.

4 Institutional failure.

As is the case with barriers to alternative livelihoods, institutional failure represents a cross-cutting set of underlying causes that exacerbate threats arising from either of the first two categories of underlying cause.

4-a Government planning. A commonly reported underlying cause of forest loss or degradation is the failure of government planning procedures to account for forest values. This may be linked to the failure to internalize environmental costs (2-c, above) and to an imbalance in power and influence among different governmental sectoral agencies. It is frequently the case that the government agricultural agency is more influential in decision-making than the environmental or forestry agency, and this can result in inappropriate land use decisions.

4-b Weak governance arrangements. Whether or not governmental planning processes are adequate, weaknesses in governance arrangements, and especially weaknesses in the judiciary process, can contribute to the suite of threats affecting forests. Institutional weaknesses also affect how policies and regulations are applied and enforced (see Box 9), often counteracting interventions designed to promote sustainability. In many cases, weaknesses in the judiciary system can accentuate the problem by creating an environment in which there is willful abuse of authority for personal gain.

BOX 9

Underlying causes – Institutional failure: Ghana – Bosumtwe

The integrity of both aquatic and terrestrial habitats in the Lake Bosumtwe basin is being undermined by human-induced activities. The forests in the catchment area are an important source of firewood, which accounts for about 80% of the energy needs of the people. As population increases, demand for firewood is rising with adverse impacts on forest flora and fauna. An important underlying cause of these threats is the weakening of traditional resource management systems. Communities around the lake traditionally have protected a network of sacred groves in the forest areas because of their religious and cultural significance. The lake itself is considered to be sacred because of the belief that it is the abode of the gods. However, the influence of Western religions has begun to erode those taboos and regulations. With no alternative system of land and resource tenure replacing the traditional system, the forests and the species they contain are viewed as a common resource.

The project therefore seeks to create a situation in which local indigenous rules and regulations on conservation of sacred groves and Lake Bosumtwe will be legitimized by the local leadership and community. It also seeks to raise awareness about the global and local benefits of conservation by local land natural resource users. The project will also establish a revolving fund, based on local traditional solidarity systems, to catalyse the replication of sustainable farming systems piloted under the project and other environmentally benign income-generating activities.

Unclear or insecure land tenure and user rights are major underlying causes of threats to forest biodiversity, prompting local populations to move into new forest lands and exploit forest resources non-sustainably.

ANALYSIS OF THREATS AND UNDERLYING CAUSES IN UNDP/GEF FOREST CONSERVATION PROJECTS

Using the threats and underlying causes typologies described above, the 40 UNDP/GEF forest conservation projects already under implementation or completed were analyzed. As previously mentioned, an explicit description of threats and/or underlying causes was not present in all cases, so such information was reconstructed from existing documentation. For one project, relevant information was completely lacking from all documentation; therefore, Table 2 (right) which gives the percentage of projects reporting each threat or underlying cause, is based on only 39 projects.

The interpretation of these data is complicated by different perceptions of threats and underlying causes, and may be biased by questionable data. For example, corruption among government officials, which contributes to underlying cause 4-b, may often be underreported. Despite these constraints, some clear patterns do emerge. For example, in terms of threats, the pattern is unequivocal. Two threats overwhelmingly dominate: (1) small-scale, spontaneous conversion of forests to agriculture, and (2) non-sustainable logging. Hunting and NTFP collection from a secondary group of threats, and the remaining threats are much less common.

Table 2 reveals that the perception of an open-access resource is easily the dominant underlying cause. In fact, 36 of the 39 projects reported at least one of the underlying causes associated with the perception of an open access resource. All three other categories of underlying cause are frequently cited, with 21 projects reporting some form of financial incentive for inappropriate use, 16 reporting barriers to sustainable livelihoods, and 15 reporting institutional failure. The relatively low reporting of institutional failure is probably not a reflection of reality, given that governments have to endorse the analyses in the project proposals, and weak governance would imply government corruption.

Results for the same analysis conducted by forest type and by region are shown in the Table in Annex 3.

Few projects involved tropical coniferous forest or temperate forest, so the analysis by forest type is useful only in revealing differences between tropical/subtropical moist and dry broadleaf forest. Differences in threats are fairly predictable, with fire, livestock grazing and fuelwood collection much more common in dry than in moist forests. Less predictable, perhaps, are differences in the underlying causes. Failure of the land tenure system is more common in moist forest areas, whereas barriers to alternative livelihoods stemming from access to technical information or markets are much more common in dry forests, as is inappropriate planning procedures.

Differences among regions partly reflect the balance between moist and dry forest projects in each region, but the results clearly indicate that forest conversion is a much more common threat in Latin America than elsewhere. In particular, planned conversion is four times more common, and spontaneous conversion to agriculture, while frequent in every region, is almost always an issue in Latin America. In contrast, non-sustainable NTFP collection is more characteristic of Asian forests, while hunting is less of a problem in Africa than elsewhere. These differences among the threats reflect differences in underlying causes. Government subsidies promoting forest conversion never feature in Africa, and they are four times more common in Latin America than in Asia/Pacific. The most surprising result is that barriers to adoption of alternative livelihoods, and especially limited access to capital, are less frequent in Africa than elsewhere. This, perhaps, reflects the fact that penetration of the market economy into remote forest areas is less complete in Africa, so traditional livelihoods still predominate.

Many of the results in Annex 3 mirror the findings of Geist and Lambin (2002). Geist and Lambin also found that timber exploitation is less common in Africa than elsewhere, and that large-scale agricultural development is a particular feature of Latin America. Similarly, they found that property rights were less a problem in Africa than elsewhere. In fact, on this issue, the figures are remarkably similar. The figures reported here (Annex 3) for percentage of projects encountering property rights barriers, with Geist and Lambin's figures in parentheses, are: Africa 18% (26%), Asia/Pacific 58% (60%), Latin America 40% (37%).

TABLE 2

Frequency of threats and underlying causes reported for UNDP/GEF forest conservation projects.

Threats	% of projects	No. of projects
1 Habitat loss		
a) Planned large-scale conversion to other land uses, including infrastructure development	23.1	9
b) Spontaneous small-scale conversion to agriculture	69.2	27
2 Habitat degradation		
a) Non-sustainable logging	61.5	24
b) Non-sustainable extraction of NTFPs	35.9	14
c) Intensive hunting and fishing	48.7	19
d) Intensive collection of fuelwood	15.4	6
e) Grazing of livestock	17.9	7
f) Underregulated tourism	7.7	3
h) Fire	30.8	12
i) Invasive species	2.6	1
j) Pollution	12.8	5
k) Mining	12.8	5

Underlying causes	% of projects	No. of projects
1 Perception of open-access resource		
a) Land and resource tenure insecure	38.5	15
b) User rights absent/ unclear/ inappropriate	59.0	23
c) Risk of capture and punishment low	64.1	25
2 Financial incentives for inappropriate use		
a) Sale of rights by owners for short-term financial benefit	30.8	12
b) Government subsidies	12.8	5
c) Non-internalization of costs	28.2	11
3 Resources for more sustainable livelihoods for which barriers are encountered		
a) Access to capital	35.9	14
b) Technical information	33.3	13
c) Market access (due to remoteness and/or institutional barriers)	12.8	5
4 Institutional failure		
a) Inappropriate planning procedures	33.3	13
b) Weak governance	5.1	2

Chapter 4

PROJECT STRATEGY AND INTERVENTIONS

The approach used to sustainably remove threats to globally significant biodiversity was assessed according to the categories of interventions shown in Annex 4. Because the level of detail in project documents was highly variable, the nature of the interventions could be determined more precisely for some projects than for others.

CATEGORIES OF INTERVENTION

The basic categories of interventions shown in Annex 4 are as follows:

- Protected areas management
- Capacity-building at the institutional level
- System-wide capacity-building
- Sustainable financing
- Information and education
- Facilitation and demonstration of sustainable livelihoods
- Research and assessment
- Other

The types of project activities undertaken for each of these forms of intervention are briefly outlined below.

1 Protected areas management.

Since the goal of so many projects concerns protected areas, it is natural that many project strategies include activities in support of protected areas management (see Box 10). One common activity is the formulation and subsequent implementation of management plans. This is often supported by strengthening of reserve management infrastructure and sustainable development in buffer zones, often as part of an integrated conservation and development area approach. Training of enforcement and antipoaching units is an explicit activity in some cases, and it presumably is incorporated into management planning in others.

2 Capacity-building.

Capacity-building is a complex concept incorporating activities that assist individuals, groups and organizations to increase their abilities to perform core functions, solve

BOX 10

Project strategy – Protected Area management: Chile – Chiloé

Chiloé National Park (CNP) is faced with threats both from unsustainable management of native forests and from agricultural and pastoral expansion. The project aims to (a) improve the management of the park by according full partnership to local indigenous communities; and (b) demonstrate biodiversity-friendly conservation planning and management for the landscape of the island of Chiloé. Together, these objectives aim to strengthen a process in which communities decide how to use the forest and its related resources to meet their needs while at the same time conserving globally significant biodiversity. These two objectives will be met through seven coordinated and interlinked components:

1 Establishment of an advisory council for Integrated Conservation and Development Plan (ICDP) to coordinate the development and implementation of the ICDP.

2 Formulation of ICDP to build on the broad consensus about the need for an integrated approach to future development of the areas adjoining CNP and the indigenous and non-indigenous communities inhabiting them.

3 Strengthening of park management operations by updating the management plan and by training park staff about biodiversity conservation and participatory park management.

4 Demonstration of best sustainable integrated land management techniques, to improve the efficiency and sustainability of land management practices.

5 Demonstration of biodiversity-friendly and sustainable alternatives, concentrating on the harvesting of non-wood products, based on market feasibility studies.

6 Identification of mechanisms to replicate biodiversity-friendly and sustainable alternatives through an adequate legal and policy framework.

7 Improved public awareness and environmental education regarding the importance of biodiversity.

problems, and define and achieve objectives (UNDP 1998). Such activities can be targeted at the level of institutions or individuals within institutions, focusing on improving skills, systems and leadership; or at a system-wide level, focusing on making laws, regulations and attitudes more supportive of biodiversity conservation. The most comprehensive approach to capacity-building adopts both an institutional and a systems approach, recognizing that society works through multilevel and interrelated systems, but such an approach is not always possible within individual projects.

Institutional capacity-building activities may be aimed at both government organizations and local communities (see Box 11). Training programmes dealing with various themes related to biodiversity conservation are often featured, but so too are other forms of capacity-building. These include the establishment of conditions for local decision-making, including the empowerment of communities for participation in decision-making, enforcement and monitoring programmes; and the strengthening of planning processes, including intersectoral planning.

Project activities in the area of legislation and policy include not only legislative arrangements governing land and resources ownership, but also the establishment of legal mechanisms and/or a regulatory and institutional framework in support of conservation. Regional projects and some national projects in countries having a decentralized structure of natural resource management also include activities aimed at policy harmonization.

3 Sustainable financing.

Since all GEF projects are expected to result in sustainable global benefits, the issue of sustainable financing is either an implicit or explicit component of the project strategy. The establishment of revolving funds and endowment funds is the most common form of sustainable financing mechanism proposed (see Box 12). Other cases feature a system of incentives for resource users to benefit financially from sustainable use of their resources. The concept of privately owned reserves as an alternative or supplement to government-owned and -managed protected areas is sometimes proposed as an approach to sustainable financing in Latin American project sites.

BOX 11

Project strategy – Government and community capacity-building: Tanzania – Jozani

Communities within the Jozani area are heavily dependent on forest resources, and these resources are declining as the human population grows. The harvesting of various products occurs at unsustainable levels. These include timber and building poles, fuelwood and bush meat. Recent years have seen reduced harvests of fuel wood and building poles as well as declines in populations of bush pig, suni, blue and Ader's duiker, and the Zanzibar leopard. The underlying causes of these threats are reflected in institutions that are inappropriate for a growing population in a market economy, resulting in an open-access view of forest resources.

Consequently, the project will secure seven outcomes in the areas of biodiversity conservation, community-based natural resources management, and alternative income generation. These outcomes illustrate the breadth of capacity-building interventions, including the following:

1 National Park Establishment: gazette the site and establish strong management under relevant legislation.

2 Institutional Development: develop and strengthen institutions involved in natural resources management.

3 Community Based Natural Resources Management: secure commitment of adjacent communities and empower them to manage and benefit from their own resources

4 Implementation of Policies and Legislation: advocate policies and legislation appropriate to conservation and development in the Jozani-Chwaka area.

5 Alternative Income Generation: develop sources of alternative income for adjacent communities, thus reducing dependence on natural resources and assisting in community development.

4 Information and education.

The dominant type of information and education activity is aimed at increasing awareness of biodiversity conservation and values, including the establishment of environmental education programmes. The target audiences for such activities are most often the local communities, with broader programmes aimed at national audiences also frequent. School children are a common target group, but adult education, sometimes aimed at specific resource user groups, is also common. Information sharing among different sectoral organizations is often proposed as a means to promote coordination. International and regional projects usually include proposals to share information among organizations in the different participating countries.

5 Sustainable livelihoods facilitated/ demonstrated.

In most projects, activities in support of sustainable livelihoods take a demonstration approach, in which targeted communities or individuals are used as pilots for specific types of alternative livelihoods. Ecotourism, sustainable forest management, sustainable agricultural systems (including grazing systems), and use of non-timber forest products encompass virtually all the forms of sustainable livelihoods demonstrated in this way (see Box 13).

6 Research and assessment.

Many projects include research and assessment activities as the basis for improved information and for monitoring. This is particularly true for early GEF-funded projects approved during the pilot phase, when more research-oriented projects were approved and when the preparatory process was not as thorough as it now is. Detailed inventories of species and site characteristics are the most common form of research activity.

7 Other.

Various projects also include a range of other activities that are not accounted for under the previous headings. These include site purchase, negotiation of environmental easements (negotiated agreements under which land owners agree to manage for conservation), control of exotic weeds and animals, and ecological restoration.In most projects, activities in support of sustainable livelihoods take a demonstration approach, in which targeted communities or individuals are used as pilots for specific types of alternative livelihoods. Ecotourism, sustainable forest management, sustainable agricultural systems (including grazing systems), and use of non-timber forest products encompass virtually all the forms of sustainable livelihoods demonstrated in this way (see Box 13).

BOX 12

Project strategy – Sustainable financing: Suriname – Guyana Shield

Threats to the Central Suriname Nature Reserve and the Sipaliwini Nature Reserve are presently limited, but timber extraction, mineral extraction, and uncontrolled hunting and intensive gathering of plants and animals are increasing pressure on the reserves. The goal of the project is to engender sustainable conservation of the globally significant Guayana Shield tropical forest wilderness biota through two sets of interventions. Component A consists of a bundle of one-time enabling investments designed to foster a supportive policy and institutional environment for protected area management, and to undertake management planning operations in the two reserves.

Component B will create the Suriname Conservation Foundation, an environmental fund (endowment) with an initial capitalization target of USD$15 million, to provide sustainable financing for conservation. The foundation will finance protected area operations and community-based conservation management, conservation awareness, biological inventories, targeted research and monitoring functions, and promotion and management of ecotourism through barrier removal activities. An emerging lesson from this project is that the thorough and careful design of the Suriname Conservation Fund during project design has facilitated the rapid implementation of activities in support of the establishment of the fund.

BOX 13

Project strategy – Provision of alternative livelihoods: Cameroon – Bamenda

The montane forests of the Bamenda Highlands are under threat from human pressures, primarily clearing forest for agriculture. Forest loss is driven by the existence of barriers that prevent communities from managing natural resources sustainably. The project will scale-up activities undertaken in an initial multi-donor funded Kijum-Ilum pilot project in order to provide support to communities and the government, build capacity in government and expand support for forest management.

A critical outcome is therefore to establish conditions under which communities have the ability to use their natural resources more sustainably and in a way that supports forest conservation. While many projects seek solutions such as the promotion of ecotourism, this project is pursuing simple, low-cost technologies that already exist, and that can make a difference — such as ridging along contours, use of animal and 'green' manure, agroforestry and farming new varieties of (high-value) crops suited to local conditions. Soil and water conservation methods at specific forest-adjacent communities will be demonstrated, together with methods of improving production from existing farmland, thus reducing the pressure for forest clearance. "Off-farm" income-generating activities such as bee-keeping will also be promoted.

An important lesson learned in initial implementation of the project is that community-based natural resource management requires considerable energy, time and resources on the part of the community, and no community will invest in the process unless it is clear that there is some benefit to be gained. The benefits do not have to be monetary but must be something that the community values. Effective community mobilization requires specialist project staff who are skilled in the art of participatory approaches.

ANALYSIS OF PROJECT STRATEGY AND INTERVENTIONS

1 Portfolio-wide.

The frequency of each type of project intervention across the entire set of projects is shown in Table 3 (page 23). Capacity-building provides the core of most projects, with 93% of the projects involving some form of capacity-building. All of these projects addressed capacity-building at the institutional level, and a little over half also tackled system-wide capacity-building, through interventions dealing with legislation, planning, etc. Institutional-level capacity-building was approximately equally split between government and non-governmental/community capacity-building, with 50% of the projects involved in the former, and 65% in the latter.

The next most common form of intervention was the provision or demonstration of alternative and sustainable livelihoods, which featured in 58% of the projects. Where the nature of these livelihoods was specified, there was an approximately equal split among eco-tourism, sustainable forest management, sustainable agricultural systems and NTFP harvesting, all accounting for 15–17.5% of the projects.

Protected area management was a feature of 58% of the projects, although this is an underestimate, since much of the government capacity-building was likely aimed at protected areas staff but was not explicitly stated as such. Information and education was included in 50% of all projects.

Sustainable financing and scientific research were each explicitly mentioned in 35% of the projects, though there are undoubtedly many more projects within which such activities are taking place.

Given the data from the threats and underlying causes typologies, two glaring anomalies stand out. First, only five projects, or 12.5% of the total, explicitly propose to implement or strengthen enforcement programmes. Even though improving enforcement is no doubt implied in many of the additional 12 projects that refer to

Improved enforcement to counteract poaching and illegal logging is an important intervention which is under-represented in UNDP/GEF forest conservation projects.

"strengthening protected area management" as a project intervention, this still accounts for just over 40% of the projects. This is despite the fact that virtually all threats analysed identify one or more illegal activities as constituting a threat to biodiversity, and more than 62% of all projects report that a low risk of capture and punishment contributes to a perception of an open-access resource. The disconnect between the identified need for strengthened enforcement and relatively infrequent project interventions in support of enforcement is most likely a result of corruption within agencies responsible for enforcement, and the fact that influential decision makers may be linked to the financial benefits that such corruption yields. Because all GEF-funded projects, even if executed by non-governmental organizations, require endorsement by — and often the involvement of — government agencies that may be involved with corrupt activities, the strengthening of enforcement may often be difficult or impossible to achieve.

Second, only six projects, or 15% of the total, explicitly refer to working on legislative and/or regulatory arrangements governing land and resources ownership. However, 75% of the projects reported underlying causes related to unclear or inappropriate land tenure or users rights as contributing to the perception of an open-access resource. Again, if an existing regulatory framework yields significant financial benefits to influential stakeholders, it may not be surprising that project proposals identify the need for modifications less frequently than would seem warranted — the stakeholders who benefit from inadequate regulatory frameworks are often the people who must endorse or implement the project proposals.

2 Regional differences.

Table 3 also shows the breakdown of project components by region. Substantial regional differences are found in most components, and several are notable. For example, protected areas management is a much stronger focus of project strategies in Asia than elsewhere. Despite this, government institutional capacity-building is relatively unusual in Asia, especially compared with Africa, where it is very common. On the other hand, initiatives related to system-wide capacity-building are much more common in Asia — and in Africa — than in Latin America. Interventions in support of alternative livelihoods are least common in Africa and most common in Latin America.

TABLE 3

Frequency of occurrence of different components of project strategies. Figures are percentages of all projects in the specified category.

	% of all projects	Latin America & the Caribbean	Africa	Asia and the Pacific
1 Protected areas management	**58**	53	30	77
2 All institutional capacity-building	**93**	87	90	100
2-a Government institutional capacity-building	**50**	47	70	39
2-b Local community institutional capacity-building	**65**	53	60	77
3 System-wide capacity-building	**53**	33	60	69
4 Sustainable financing	**35**	47	30	31
5 Information management	**50**	47	30	62
6 Facilitation/demonstration of sustainable livelihoods	**58**	73	30	54
7 Research and assessment	**35**	40	50	23
8 Other	**10**	0	10	23

Chapter 5

LESSONS LEARNED

GENERALLY APPLICABLE LESSONS

The standard monitoring and evaluation processes of UNDP/GEF projects have previously identified lessons of more or less general applicability to GEF-funded biodiversity conservation projects across different ecosystems. These regular reviews have occasionally been supplemented by thematic reviews, the most thorough of which was an analysis of early integrated coastal zone management (ICM) projects, done in 1997 (Nakashima 1997). This ICM review identified a large number of lessons, some of which can now be considered to be conventional wisdom, and virtually all of the lessons were not specific to coastal zone projects.

Other lessons have been derived from the annual project implementation review process and project evaluations. These generally applicable lessons can be summarized under the following headings:

1 Integrated approaches and methods.

- Building effective processes for conflict resolution and strengthening institutional arrangements and human resources for management and planning are not the inevitable by-products of other project interventions —they require the development and application of a specific and focused project intervention.

- Clear legal mandates must underlie efforts to integrate the activities of diverse sectors and organizations.

Building the capacity of institutions to represent the interests of forest and forest-margin dwellers, who are often among the poorest and most marginalized stakeholders, is a key to more effective forest conservation.

2 Stakeholder participation.

- Participation and environmental education can link the technical science with the legal and institutional management/development components.
- Press releases and public information materials advertise the project presence and accomplishments and build a constituency for support.
- Regional training sessions and meetings bringing together technicians and managers from regional participant countries can help overcome deep-seated, traditional mistrust.
- A balance between sectors and disciplines must be maintained during project implementation — overemphasis on biological issues is a common fault.
- Community-based resource management requires an investment of time and energy to develop trust and mutual respect.
- The role and responsibility of the steering committee, project management unit and other bodies need to be clearly and unambiguously stated in the project document.
- Established and complementary partnerships, such as between national and international NGOs, can provide a sound basis for effective project design and implementation.
- Changes in political administration can cause immense problems if all stakeholders are not engaged from the outset.

3 Programme focus and decision-making.

- The identification of appropriate implementation arrangements requires rigorous studies of institutional strengths and weaknesses.
- Information concerning biological resources in the project site is often available; additional surveys should be carefully justified.
- Database creation and the establishment of GIS units incur significant capital and recurrent costs, and therefore need to be carefully justified in terms of the benefits to be derived for conservation.
- Purchase and delivery of capital equipment will likely take a long time.
- Practical and effective indicators of impact must be established and measured. Interim milestones are also necessary to allow a review of progress on an annual basis.
- Organizations implementing projects tend to focus on activities that are within their own competence, rather than on the overall project goal.
- Replication of best practice and incorporation of lessons by a project do not happen spontaneously. The project team needs an explicit role in promoting replication.

4 Commitment to adaptive learning.

- Adaptive management is difficult to put into practice; arrangements to promote adaptive management need to be clearly described in the project document.
- Stakeholder participation in annual work planning will build support, especially if supplemented by semi-annual reviews.
- Determination of long-term impact and sustainability of institutions can only be undertaken if monitoring and evaluation extend beyond the completion of a project.
- Transfer of lessons and experience among projects is vital, but 'home grown' solutions are far more effective and sustainable than 'lessons' introduced directly from elsewhere.

5 Commitment to institutional capacity-building.

- A social scientist specializing in natural resources management and an environmental educator with strong non-formal training experience are needed in the field from the beginning, in addition to the natural science specialists.
- The design of project training and public awareness campaigns, using non-formal training techniques and local resources and subjects, requires a good environmental educator.
- Awareness-building at the top level requires a long-term continuous effort because of the high rate of turnover in senior government management.

- In-country training and on-the-job training are often much more effective in building skills than international long-term fellowships.
- On-the-job training requires a long-term presence of international consultants in various specialties.
- A good strategy is required for filling the void created when a person leaves for long-term fellowships and also for placement of the stand-in after the study fellow returns.
- Discontinuity between the design and implementation phases can easily result in loss of momentum, key individuals and stakeholder commitment
- Assistance in developing local college level curricula helps to meet the long-term need for trainers and technical experts.
- Project facilitation and coordination require sufficient time and staff, particularly in a transnational situation where distance, terrain and civil conditions make communication and logistics difficult.

6 Project timing.

- A project life of three to five years is too short to achieve project goals. Transition to financial and institutional sustainability requires at least five to seven years.
- A lengthy and sustained process is necessary to achieve biodiversity conservation using an integrated management framework.
- Many of the early actions that consolidate stakeholder support and trust begin during the preparatory phase and require a substantial investment of time and energy.
- Sequencing and balance of activities is important; a focus on short-term activities can result in the neglect of longer-term project strategies.
- Implementing agencies often need considerable help at project start-up. This is rarely planned for, and consequently project designs are often overambitious with respect to possible first-year achievements.

Biodiversity conservation projects that take account of the lessons listed above will benefit by avoiding many of the mistakes of earlier projects. In the context of forest conservation projects, some additional forest-specific lessons can be identified. These are listed below.

FOREST-SPECIFIC LESSONS

The first two lessons focus on threats to forest biodiversity, drawing a distinction between those that result in loss of forest (deforestation) and those that result in habitat modification (forest degradation):

Lesson 1. The leading direct contributor to deforestation is small-scale land conversion to agriculture. This is true especially for dry tropical forests and in Latin America. A further contributing factor that is especially common in Latin America is planned large-scale conversion to agriculture.

Lesson 2. Forest degradation is most often due to illegal and/or non-sustainable timber harvesting. This is true for all forest types, but it is less frequent in Africa; there, most projects occur in dry forests, where livestock grazing and fire are major contributing factors to forest degradation.

The next three lessons address the underlying causes that generate the threats to forests:

Lesson 3. In virtually every case, the threats are partly or mainly created by the perception of an open-access forest resource. The underlying causes contributing to this perception originate in unclear or inappropriate land tenure or users rights, and a low probability of capture and punishment.

Lesson 4. Notwithstanding Lesson 3, there is always a multiplicity of contributing factors. Perverse financial incentives, barriers to adoption of alternative livelihoods and institutional failure conspire to accentuate the conditions for threats to develop. This is consistent with results reported by Geist and Lambin (2002).

Non-sustainable harvesting of non-timber forest products, especially of fruits and other reproductive structures can reduce or prevent reproduction. Here, harvesting of fruits from Phyllanthus emblica and other species in south India has eliminated all regeneration.

Lesson 5. Underlying causes are interrelated. For example, clarifying unclear land tenure by granting tenure to current residents may simply substitute another underlying cause that generates the same or a new suite of threats (as when a newly designated owner sells resource rights). These problems are emblematic of institutional failures, which are grossly underreported. This underreporting is possibly due to the unwillingness of governments — which must endorse project proposals — to acknowledge or confront governmental institutional failure.

The final three lessons concern project strategy and identify weaknesses in the current approach followed in most UNDP/GEF forest conservation projects:

Lesson 6. In the past, UNDP/GEF projects have emphasized capacity-building, information management and support to alternative livelihoods. While these are necessary interventions, they do not adequately remedy either the perception of open access to a resource or other underlying causes; nor do they address the institutional failures that contribute to the underlying causes. In this context, projects often underestimate the importance of early financial benefits as a demonstration of the longer-term benefits that the project strategy offers.

Lesson 7. For UNDP/GEF forest conservation projects to be more effective in conserving globally significant biodiversity, they must place much greater emphasis on (1) modifying policy to counteract the perception of an open-access resource by providing clear and appropriate land tenure and users rights, without generating new underlying causes; and (2) strengthening enforcement. Developing these components effectively requires much greater emphasis during project design on the analysis of conditions that may foster a perception of an open-access resource and on appropriate policy responses.

Lesson 8. Project design must also explicitly address the issue of institutional failure and devise appropriate interventions. Governmental institutional failure can often create conditions under which individuals, including those with political influence, can benefit financially. Project design must address this possibility. A significant impact on conservation will be impossible unless institutions responsible for managing the forest resource are effective.

Lesson 9. To rectify institutional failure, projects must link their local actions to the policy level and attain government commitment to strengthen relevant institutions and their activities. Gaining this commitment is difficult and requires lengthy processes of consultation and negotiation with and between ministries (e.g. finance, as well as tourism, planning and environment). These negotiations often need to be supported by studies and briefing to government, demonstrating the economic and social benefit to the country from managing forest resources in a more sustainable manner, particularly in protected areas. Without this effort and the ability to galvanize real government commitment, institutional failure — and hence deforestation, degradation and biodiversity loss — will most likely persist.

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Annex 1

PROJECTS INCLUDED IN THE ANALYSIS

Sequence	Region	Short title	Stage	Lead country	GEF cost	Co-financing
1	LAC*	Creating a Co-Managed Protected Areas System in Belize: A Plan for Joint Stewardship between Government and Community.	Underway	Belize	$750,000	$230,000
2	LAC	Establishment of Private Reserve Heritage Reserves (RPPNs) in the Brazilian Cerrado Biome	Underway	Brazil	$750,000	$100,000
3	LAC	Promoting Biodiversity Conservation and Sustainable Use in the Frontier Forest Mato-Grosso	Underway	Brazil	$6,704,000	$9,049,119
4	Asia/ Pacific	Management of the Cardamom Mountains Protected Areas Complex	Underway	Cambodia	$998,143	$3,333,980
5	Africa	Sustainable Forest Management by Communities in the Bamenda Highlands, Cameroon	Underway	Cameroon	$1,000,000	$2,090,278
6	Africa	A Highly Decentralized Approach to Biodiversity Protection and Use: The Bangassou Dense Forest	Underway	Central African Republic	$2,500,000	$469,500
7	LAC	Conservation and Sustainable Use of Chiloé Globally Significant Biodiversity	Underway	Chile	$1,000,000	$3,246,200
8	LAC	Conservation of Biodiversity in the Chocó Region	Complete	Colombia	$6,000,000	$3,000,000
9	Africa	Conservation of Biodiversity and Sustainable Development in the Federal Islamic Republic of the Comoros	Underway	Comoros	$2,442,000	$1,630,000
10	LAC	Conservation of Biodiversity in the Talamanca-Caribbean Biological Corridor	Underway	Costa Rica	$750,000	$519,931
11	LAC	Conservation of Biodiversity and Sustainable Development in La Amistad and La Osa Conservation Areas	Complete	Costa Rica	$7,993,381	$0
12	Asia/ Pacific	Conservation of Biodiversity of Mt. Myohyang	Underway	DPR Korea	$750,000	$914,383
13	Africa	Conservation of Biodiversity through Effective Management of Wildlife Trade	Complete	Gabon	$1,000,000	$0
14	Africa	Biodiversity Conservation of Lake Bosumtwe Basin	Underway	Ghana	$520,000	$98,000
15	LAC	Integrated Biodiversity Protection in the Sarstun-Motagua Region	Underway	Guatemala	$4,000,000	$3,700,000
16	LAC	Programme for Sustainable Forestry (Iwokrama Rainforest Programme)	Complete	Guyana	$3,000,000	$0
17	Asia/ Pacific	Strategy for Conservation of Rhinos in S.E. Asia	Complete	Indonesia	$2,000,000	$1,646,700
18	Africa	Institutional Support for the Protection of East African Biodiversity	Complete	Kenya	$10,000,000	$0
19	Asia/ Pacific	Conservation and Sustainable Use of Peat Swamp Forests	Underway	Malaysia	$5,985,000	$7,680,000
20	Africa	Restoration of Highly Degraded and Threatened Native Forests in Mauritius	Complete	Mauritius	$200,000	$0

• LAC = Latin America and the Caribbean.

Sequence	Region	Short title	Stage	Lead country	GEF cost	Co-financing
21	LAC	Conservation of the Sierra Gorda Biosphere Reserve	Underway	Mexico	$6,733,000	$6,996,760
22	Asia/ Pacific	Community Conservation and Compatible Enterprise development in Pohnpei	Underway	Micronesia	$710,000	$1,452,660
23	Asia/ Pacific	Landscape-scale Conservation of Endangered Tiger and Rhinoceros Populations in and around the Chitwan National Park.	Underway	Nepal	$750,000	$930,415
24	Asia/ Pacific	Biodiversity Conservation in Nepal	Complete	Nepal	$3,800,000	$2,700,000
25	LAC	Establishment of a Programme for the Consolidation of the Mesoamerican Biological Corridor	Underway	Nicaragua	$10,600,000	$11,717,000
26	Asia/ Pacific	Mountain Areas Conservancies Project	Underway	Pakistan	$8,100,000	$2,250,000
27	LAC	Biodiversity Conservation in the Darien Region	Underway	Panama	$2,000,000	$478,837
28	Asia/ Pacific	Biodiversity Conservation and Resource Management	Complete	Papua New Guinea	$5,000,000	$0
29	LAC	Paraguayan Wildlands Protection Initiative	Underway	Paraguay	$9,200,000	$2,955,000
30	LAC	Regional Support for the Conservation and Sustainable Use of Natural Resources in the Amazon	Complete	Peru	$4,500,000	$0
31	Asia/ Pacific	Samar Island Biodiversity Project (SIBP) Conservationand Sustainable Use of the Biodiversity of a Forested Protected Area	Underway	Philippines	$5,759,470	$2,521,620
32	Asia/ Pacific	Sustainable Use of Mt. Isarog's Territories	Underway	Philippines	$750,000	$1,486,593
33	Europe/ CIS	Demonstrating Sustainable Conservation of Biological Diversity in Four Protected Areas in Russia's Kamchatka Peninsula	Underway	Russia	$2,100,000	$2,778,570
34	Africa	Conservation and Management of Habitats and Species, and Sustainable Community Use of Biodiversity in Dinder National Park	Underway	Sudan	$750,000	$1,100,000
35	Asia/ Pacific	Contributing to Conservation of Unique Biodiversity in Threatened Rainforests of Southwest Sri Lanka	Underway	Sri Lanka	$724,713	$226,000
36	LAC	Conservation of Globally Significant Forest Ecosystems in the Suriname's Guyana Shields	Underway	Suriname	$9,240,000	$8,790,000
37	Africa	New Approaches to Reducing Biodiversity Loss at Cross-Border Sites in East Africa	Underway	Tanzania	$12,655,000	$0
38	Africa	Development of Jozani-Chwaka Bay National Park, Zanzibar Island	Underway	Tanzania	$747,500	$430,050
39	LAC	Conservation and Sustainable Use in the Orinoco Delta	Underway	Venezuela	$9,787,000	$15,700,484
40	Asia/ Pacific	Creating Protected Areas for Resources Conservation in Vietnam Using a Landscape Ecology Approach	Underway	Vietnam	$5,806,273	$2,315,609

Annex 2

GLOBAL 200 FOREST ECOSYSTEMS COVERED BY UNDP/GEF PROJECTS

	Included in this analysis	Included in UNDP/GEF pipeline	Ineligible
Tropical/Subtropical Moist Broadleaf Forests			
Afrotropical:			
1 Guinean Moist Forests	•	•	
2 Congolian Coastal Forests			
3 Cameroon Highlands Forests	•		
4 Northeastern Congo Basin Moist Forests	•		
5 Central Congo Basin Moist Forests		•	
6 Western Congo Basin Moist Forests		•	
7 Albertine Rift Montane Forests		•	
8 East African Coastal Forests	•		
9 Eastern Arc Montane Forests		•	
10 Madagascar Forests and Shrublands		•	
11 Seychelles and Mascarenes Moist Forests		•	
Australasia:			
12 Sulawesi Moist Forests			
13 Moluccas Moist Forests			
14 Southern New Guinea Lowland Forests			
15 New Guinea Montane Forests	•		
16 Solomons-Vanuatu-Bismarck Moist Forests			
17 Queensland Tropical Forests			•
18 New Caledonia Moist Forests			•
19 Lord Howe-Norfolk Islands Forests			•
Indo-Malayan:			
20 Southwestern Ghats Moist Forests			
21 Sri Lanka Moist Forests	•		
22 Northern Indochina Subtropical Moist Forests	•		
23 Southeast China-Hainan Moist Forests			
24 Taiwan Montane Forests			•
25 Annamite Range Moist Forests		•	
26 Sumatran Islands Lowland and Montane Forests			
27 Philippines Moist Forests	•		
28 Palawan Moist Forests			
29 Kayah-Karen/Tenasserim Moist Forests			
30 Peninsular Malaysian Lowland and Mountain Forests	•		
31 Borneo Lowland and Montane Forests	•		
32 Nansei Shoto Archipelago Forests			•
33 Eastern Deccan Plateau Moist Forests			
34 Naga-Manupuri-Chin Hills Moist Forests			
35 Cardamom Mountains Moist Forests	•		
36 Western Java Mountain Forests		•	
Neotropical:			
37 Greater Antillean Moist Forests		•	
38 Talamancan and Isthmian Pacific Forests	•		
39 Chocó-Darién Moist Forests	•		
40 Northern Andean Montane Forests	•		
41 Coastal Venezuela Montane Forests			
42 Guianan Moist Forests	•		
43 Napo Moist Forests	•	•	
44 Río Negro-Juruá Moist Forests			
45 Guayanan Highlands Forests	•		
46 Central Andean Yungas			
47 Southwestern Amazonian Moist Forests	•		
48 Atlantic Forests	•		
Oceania:			
49 South Pacific Islands Forests	•		
50 Hawaiian Moist Forests			•
Tropical – Subtropical Dry Broadleaf Forests			
Afrotropical			
51 Madagascar Dry Forests	•		

	Included in this analysis	Included in UNDP/GEF pipeline	Ineligible
Australasia			
52 Nusu Tenggara Dry Forests			
53 New Caledonia Dry Forests			•
Indo-Malayan			
54 Indochina Dry Forests	•	•	
55 Chhota-Nagpur Dry Forests			
Neotropical			
56 Mexican Dry Forest			
57 Tumbesian-Andean Valleys Dry Forests			
58 Chiquitano Dry Forest	•	•	
59 Atlantic Dry Forests	•	•	
Oceania			
60 Hawaiian Dry Forests			•
Tropical – Suptropical Coniferous Forests			
Nearctic			
61 Sierra Madre Oriental and Occidental Pine-Oak Forests	•		
Neotropical			
62 Greater Antillean Pine Forests		•	
63 Mesoamerican Pine-Oak Forests	•		
Temperate Broadleaf and Mixed Forests			
Australasia			
64 Eastern Australia Temperate Forests			•
65 Tasmanian Temperate Rain Forest			•
66 New Zealand Temperate Forests			•
Indo-Malayan			
67 Eastern Himalayan Broadleaf and Conifer Forests			
68 Western Himalayan Temperate Forests	•		

	Included in this analysis	Included in UNDP/GEF pipeline	Ineligible
Nearctic			
69 Appalachian and Mixed Mesophytic Forests			•
Palearctic			
70 Southwest China Temperate Forests			
71 Russian Far East Temperate Forests			
Temperate Coniferous Forests			
Nearctic			
72 Pacific Temperate Rainforests			•
73 Klamath-Siskiyou Coniferous Forests		•	
74 Sierra Nevada Coniferous Forests			•
75 Southeastern Coniferous and Broadleaf Forests			•
Neotropical			
76 Valdivian Rainforests/Juan Fernandez Islands	•	•	
Palearctic			
77 European-Mediterranean Montane Mixed Forests		•	
78 Caucasus-Anatolian-Hyrcanian Temperate Forests		•	
79 Altai-Sayan Montane Forests		•	
80 Hengduan Shan Coniferous Forests			
Boreal Forests / Taiga			
Nearctic			
81 Muskwa/Slave Lake Boreal Forests			•
82 Canadian Boreal Forests			•
Palaearctic			
83 Ural Mountains Taiga			
84 Eastern Siberian Taiga			
85 Kamchatka Taiga and Grasslands	•		

Annex 3

THREATS AND UNDERLYING CAUSES BY FOREST TYPE AND REGION

Figures are the percentages of the projects reporting each category (the total number in each category is shown in the first line of the table).
LAC = Latin America and the Caribbean.

	Forest types				Regions		
	Tropical/subtropical			Temperate			
	Moist broadleaf forest	Dry broadleaf forest	Conifer forest	All types of forest	Africa	Asia/ Pacific	LAC
Threats Number of projects	29	8	3	3	11	12	15
1 Habitat loss							
a) Planned large-scale conversion to other land uses, including infrastructure development	17.2	37.5	33.3	0	9.1	8.3	40
b) Spontaneous small-scale conversion to agriculture	69.0	100	100.0	0	54.5	66.7	93.3
2 Habitat degradation							
a) Non-sustainable logging	69.0	62.5	66.7	33.3	36.4	83.3	73.3
b) Non-sustainable extraction of NTFPs	31.0	25	33.3	66.7	18.2	50.0	26.7
c) Intensive hunting	48.3	50	66.7	33.3	27.3	50.0	53.3
d) Intensive collection of fuelwood	6.9	25	0.0	66.7	18.2	8.3	13.3
e) Overgrazing of livestock	10.3	50	33.3	33.3	45.5	16.7	6.7
f) Underregulated tourism	3.4	0	33.3	33.3	0.0	0.0	6.7
h) Fire	17.2	75	66.7	33.3	54.5	0.0	40.0
i) Invasive species	3.4	0	0	0	9.1	0.0	0.0
j) Pollution	10.3	12.5	33.3	0	9.1	0.0	20.0
k) Mining	17.2	0	33.3	0	0.0	0.0	33.3
Underlying causes							
1 Perception of open-access resource							
a) Land tenure system failure	41.4	25	0.0	33.3	18.2	58.3	40.0
b) Absent/ unclear/ inappropriate user rights	62.1	50	66.7	33.3	72.7	58.3	53.3
c) Risk of capture and punishment low	58.6	75	66.7	66.7	45.5	66.7	66.7
2 Financial incentives for inappropriate use							
a) Owners sell rights for short-term financial benefit	31.0	50	33.3	0	36.4	33.3	26.7
b) Government subsidies	10.3	25	33.3	0	0.0	8.3	26.7
c) Non-internalization of costs	34.5	12.5	33.3	0	18.2	25.0	40.0
3 Barriers to more sustainable livelihoods							
a) Access to capital	27.6	37.5	66.7	66.7	9.1	33.3	53.3
b) Technical information	24.1	75	33.3	33.3	27.3	41.7	33.3
c) Market access (due to remoteness and/or institutional barriers)	0	37.5	33.3	33.3	9.1	0.0	20.0
4 Government failure							
a) Inappropriate planning procedures	27.6	62.5	33.3	33.3	45.5	16.7	33.3
b) Weak governance	6.7	0	0	0	0	15.4	0

Annex 4

CLASSIFICATION OF PROJECT INTERVENTIONS

1 Protected areas management
- **1-a** Strengthening of reserve management operations, including formulation of management plans
- **1-b** Strengthening of reserve management infrastructure
- **1-c** Training enforcement and antipoaching units
- **1-d** Establishment of sustainable development in buffer zones
- **1-e** Implementation of adaptive and participatory Reserve management
- **1-f** Use of integrated conservation and development area concept in conservation areas
- **1-g** Development of rare and endangered species plans
- **1-h** Purchase of significant site or restriction through environmental easements

2 Institutional capacity-building
- **2-a Government**
  - **2-a-i** Reinforcement of local decision-making
  - **2-a-ii** Training of government staff
- **2-b Local communities**
  - **2-b-i** Community-based natural resources management
  - **2-b-ii** Community-based biodiversity assessment and monitoring
  - **2-b-iii** Community-based enforcement programme
  - **2-b-iv** Community participation in planning processes

3 System-wide capacity-building
- **3-a** Adoption and implementation of legislative arrangements governing land and resources ownership
- **3-b** Protection of critical biodiversity sites through appropriate legal mechanisms
- **3-c** Improved planning, including zoning, prioritization of conservation areas, inter-sectoral coordination
- **3-d** Establishment of regulatory and institutional framework for conservation
- **3-e** Policy harmonization (intra- or internationally)

4 Sustainable financing
- **4-a** Revolving fund
- **4-b** Endowment fund
- **4-c** Establishment of incentives for resource users
- **4-d** Creation of a framework for protected area management on private lands

5 Information and education
- **5-a** Increased national and local awareness, including environmental education
- **5-b** Strengthening of communications and information-sharing

6 Facilitation/demonstration of sustainable livelihoods
- **6-a** Design and implementation of ecotourism strategies
- **6-b** Demonstration of sustainable forest management
- **6-c** Demonstration of sustainable agricultural systems
- **6-d** Development of sustainable grazing management system
- **6-e** Demonstration of use of non-timber forest products on a sustainable basis

7 Research and assessment
- **7-a** Scientific investigation and valuation of biodiversity
- **7-b** Detailed inventory of species and site characteristics, including monitoring
- **7-c** Development of biodiversity research strategy
- **7-d** Establishment of functional GIS
- **7-e** Development of an integrated information management system

8 Other
- **8-a** Control of exotic weeds and animals
- **8-b** Ecological restoration

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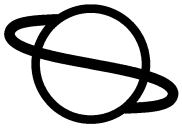
Agricultural expansion, whether by small-holders or as part of a planned economic development programme, represents the major threat to forest ecosystems.



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