Reducing Threats to Protected Areas
Lessons from the Field

A Joint UNDP and World Bank GEF Lessons Learned Study
Reducing Threats to Protected Areas

Lessons from the Field

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Abbreviations and Acronyms

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<tr>
<td>ANGAP</td>
<td>Association Nationale pour la Gestion des Aires Protégées (Madagascar)</td>
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<tr>
<td>BANGDA</td>
<td>Ministry of Home Affairs (Indonesia)</td>
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<td>BAPPENAS</td>
<td>Ministry of Planning (Indonesia)</td>
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<td>BMNP</td>
<td>Bale Mountain National Park (Ethiopia)</td>
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<td>CABI</td>
<td>Capitania del Alto y Bajo Isouz (Bolivia)</td>
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<td>CFUG</td>
<td>Community Forest User Group (Nepal)</td>
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<td>CNP</td>
<td>Chiloe National Park (Chile)</td>
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<td>COGES</td>
<td>Community Management Committees (Madagascar)</td>
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<td>DNP</td>
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<td>DYT</td>
<td>Dzongkhag Development Committee (Bhutan)</td>
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<td>EDC</td>
<td>Ecodevelopment Committee (India)</td>
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<td>EP2</td>
<td>Second Environment Program</td>
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<td>FIC</td>
<td>Federation of Indigenous Communities (Chile)</td>
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<td>GEF</td>
<td>Global Environment Facility</td>
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<td>GELOSE</td>
<td>Gestion Localisée Sécurisée (Madagascar)</td>
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<td>GDP</td>
<td>Gross Domestic Product</td>
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<td>GYT</td>
<td>Geog Development Committee (Bhutan)</td>
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<td>ICDP</td>
<td>Integrated Conservation and Development Project</td>
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<td>IDA</td>
<td>Indigenous Development Area (Chile)</td>
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<td>IEDP</td>
<td>India Ecodevelopment Project</td>
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<td>IPDP</td>
<td>Indigenous Peoples Development Plan (Bolivia)</td>
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<td>JDNP</td>
<td>Jigme Dorji National Park (Bhutan)</td>
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<td>KINP</td>
<td>Kaa-Iya National Park (Bolivia)</td>
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<td>KMT</td>
<td>King Mahendra Trust (Nepal)</td>
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<td>KSNP</td>
<td>Kerinci Seblat National Park (Indonesia)</td>
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<td>LIL</td>
<td>Learning and Innovation Loan</td>
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<td>Abbreviation</td>
<td>Full Form</td>
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<tr>
<td>LPG</td>
<td>Liquefied Petroleum Gas</td>
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<td>MOEF</td>
<td>Ministry of Environment and Forests (India)</td>
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<td>MSP</td>
<td>Medium-Sized Project</td>
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<td>NGO</td>
<td>Nongovernmental Organization</td>
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<td>NP</td>
<td>National Park</td>
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<td>NTFP</td>
<td>Non-Timber Forest Product</td>
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<td>PES</td>
<td>Payment for Ecosystem Services</td>
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<td>PHKA</td>
<td>Department of Conservation (Indonesia)</td>
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<td>PTR</td>
<td>Periyar Tiger Reserve (India)</td>
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<td>RCNP</td>
<td>Royal Chitwan National Park (Nepal)</td>
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<td>RTR</td>
<td>Ranthambore Tiger Reserve (India)</td>
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<td>SECS</td>
<td>Sudanese Environment and Conservation Society</td>
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<td>SERNAP</td>
<td>Servicio Nacional de Areas Protegidas (Bolivia)</td>
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<td>SHG</td>
<td>Self-Help Group (India)</td>
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<td>TCO</td>
<td>Tierra Comunitaria de Origen (Bolivia)</td>
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<td>THG</td>
<td>Traditional Healers Group</td>
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<td>UNESCO</td>
<td>United Nations Educational, Scientific and Cultural Organization</td>
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<td>UNDP</td>
<td>United Nations Development Programme</td>
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<td>USAID</td>
<td>United States Agency for International Development</td>
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<td>VDC</td>
<td>Village Development Committee (Sudan)</td>
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<td>WARSI</td>
<td>Warung Informasi Konservasi (Indonesian NGO)</td>
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<td>WCS</td>
<td>Wildlife Conservation Society</td>
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<td>WWF</td>
<td>World Wide Fund for Nature</td>
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Bibliography
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Executive Summary

Over the last 15 years, the World Bank (WB) and the United Nations Development Program (UNDP), with funding from the Global Environment Facility (GEF), have supported more than 250 projects—providing over $1.5 billion dollars in assistance—to strengthen the conservation of biodiversity in protected areas around the world. Projects in the portfolio of both agencies started working on individual protected areas, but recently have been working more beyond park boundaries and taking more of a landscape approach toward conservation, working with local communities and other stakeholders to further conservation objectives. Although projects still typically focus on building capacity and necessary infrastructure within parks, there is also an increasing emphasis on activities to mitigate and reduce threats emanating from the surrounding production landscape. This approach was emphasized in the “Beyond Boundaries” theme of the 2003 World Parks Congress and is also recognized in the GEF-3 and -4 Biodiversity Strategic Priorities.

OBJECTIVES

The UNDP and World Bank biodiversity teams undertook a study of a number of their GEF biodiversity-funded projects to identify and analyze the effectiveness of different intervention strategies in production landscapes and their impact in reducing pressure on protected areas. The intent of the study was to derive general lessons, both positive and negative, that would assist in improving the design and implementation of projects aimed at strengthening protected area systems. Given the development mandate of both UNDP and the Bank, the review team sought to gain a better understanding of the
synergies and challenges in linking livelihood decisions and conservation objectives.

The study focused on a sample of 10 case studies derived from UNDP and World Bank projects visited in the period 2003–04. Five project sites were visited by joint UNDP-WB teams as part of this study—one in Latin America, one in Asia, and three in Africa. For five other projects, additional information was gathered from site visits associated with the normal oversight and supervision functions of WB staff (Indonesia and India) and UNDP staff (Chile and Nepal). For each case study, the teams assessed whether the projects had followed any of the following approaches:

- The introduction and promotion of more sustainable land-use and harvesting practices consistent with supporting the ecosystem needs of protected areas.
- The reduction of pressures on protected areas through diversification of livelihood opportunities, including new and additional livelihood opportunities to reduce dependency on resource extraction.
- The use of participatory planning, zoning mechanisms and regulations within the protected areas and buffer zones, including joint planning with local government at landscape and ecosystem levels.
- The development of enabling policy, legislative, and institutional conditions.

RESULTS

The 10 projects covered a range of terrestrial ecosystems from forests to mountains and dry-land ecosystems. While the study did not review any marine protected areas and focused on terrestrial ecosystems, many lessons will also have relevance to projects in marine protected areas. Projects were implemented by a range of actors, including protected area management authorities, local and international NGOs, and local community organizations. All of the projects studied allocated resources for promoting alternative livelihoods and/or increasing income-generating opportunities. These range from agriculture and livestock improvement to tourism and the development of new business opportunities (such as mushroom-growing, honey production and handicrafts). All of the projects yielded information and lessons relevant to this analysis. Issues and lessons were often similar, even though sites were in different ecosystems and different geographical regions.

THREATS

Most of the protected areas we examined face a situation of disequilibrium, which is characterized by external pressures exerted on the protected area through both encroachment and degradation. The threats varied between locations. The main threats to protected areas can be summarized as follows:

- Habitat loss and degradation due to conversion to pastureland and agriculture
- Overexploitation of natural resources, including logging, collection of non-timber forest products (NTFPs), overfishing, and overgrazing by livestock

LESSONS LEARNED

The projects yielded important lessons concerning interventions designed to reduce pressures on protected areas emanating from activities in the surrounding landscapes. The lessons fall into three categories: (1) lessons for interventions at the policy, central, and system levels; (2) interventions to support individual protected areas; and (3) lessons specifically about livelihood strategies for conservation.

Lessons that apply at a policy or central level

- Integrating conservation into national and local development. Long-term sustainability of protected areas and conservation efforts will depend on establishing effective...
institutional mechanisms and interventions to better address the real causes of biodiversity loss. Protected area departments should try to work with central and regional planning agencies to exert influence on development plans at the national and local level that are compatible with the objectives of protected areas.

- **Policy changes to involve or benefit local communities.** Policy or legislative changes at the national or state level may be needed to increase local community involvement in protected area management and benefits from protected areas for local communities.

- **Funding sustainable development around protected areas.** Funding for protected areas rarely reflects the true costs of threat reduction, especially where such costs include modifying economic activities or introducing alternative livelihoods. Those agencies responsible for economic development have little incentive to encourage modification of local economic activities to reduce threats to protected areas. Regular protected area budgets are tightly constrained and rarely provide funds, training, and financing for livelihood support. Both projects and government need to devote much greater attention to budgeting.

- **Land tenure.** Weak and ambiguous rules over land ownership and access to resources can lead to overexploitation of community lands and further agricultural encroachment into protected areas. In some cases, titling of lands and acknowledgment of local rights can help stabilize the advance of the agricultural frontier. Though beyond the scope of protected area projects, this is an issue that should not be overlooked.

### Lessons that apply to individual protected areas

- **Clear threat analysis.** All interventions, whether strengthened enforcement or income-generating activities, must be designed based on a threats analysis across the landscape so interventions can reduce location-specific threats to biodiversity.

- **Institutional linkages between protected areas and the production landscape.** Most protected area agencies have little or no mandate for economic development beyond their boundaries. Protected area authorities increased their influence in the production landscape when they developed good working relationships with those agencies and players with the authority, expertise, and budget to support economic activities in the buffer-zone areas. A common institutional structure for management of production landscapes and protected areas can also increase opportunities to link buffer-zone economic development with protected area conservation goals.

- **Local government as partners.** Local governments can be valuable partners to ensure that development planning complements protected area activities. Protected area managers need to find ways to engage with local governments; such efforts may need support at the ministerial level.

- **Participatory conservation management.** Communication, consultation, and participation are key elements for constructive relationships between protected areas and local communities. It is important to strengthen the social organization of local communities and to collaborate with local stakeholders on issues concerning economic activities and protected area objectives. Social cohesion and organization of the communities around the protected area can contribute to improved negotiation, representation, and mobilization of communities against external threats.

- **Enforcement.** Conservation strategies, including development activities, are unlikely to be effective in the absence of active enforcement. Local communi-
ties, as well as protected area staff, can be effectively involved in protection and enforcement activities, especially where they are protecting their own rights to access resources.

- **New financial mechanisms.** Projects need to be much more rigorous in defining exit strategies and identifying post-project sources of sustainable financing, both for protected area management needs and appropriate local development.

- **Ecosystem services and economic benefits of protected areas.** There is a need for further economic analysis of the benefits that can be derived from protected areas, complemented by an aggressive outreach program to inform decision makers of the value of protected areas in national and regional development and their contributions to watershed protection and as buffers against natural disasters.

- **Strengthening monitoring.** It is difficult to demonstrate the link between modifications to economic activities and improved biodiversity conservation due to complex causality. Furthermore, indicators used to measure the impacts are often hampered by lack of baseline data and the local capacity to undertake the monitoring.

**Lessons about livelihood strategies for conservation**

- **Linkages between livelihood support activities and conservation goals.** These need to be clear and endorsed by local stakeholders. One strategy is to oblige beneficiaries to make reciprocal commitments to conservation, such as forest steward patrols or participatory monitoring with public feedback on the status of threats. If project support focuses too much on economic development, it may not yield the desired conservation benefits. Local stakeholders, park staff, NGOs, and technical assistance providers often lose sight of the need to link interventions to conservation.

- **Targeting threats.** Unless the target beneficiaries for development investments are selected on the basis of location and intensity of threats, livelihood support programs may have little impact.

- **Substitutional effect:** Most new economic activities will be supplementary rather than alternative to on-going damaging activities. Even where genuine substitution occurs, large-scale underemployment and surplus labor mean that others may simply take over the damaging activities...There is also always the risk that fluctuations in economic conditions (for example, a down-turn in market prices) will lead to disappointment and a return to previous livelihood strategies. Modifying existing livelihood strategies to add value and make them less damaging may be more appropriate than attempting to introduce alternative livelihoods.

- **Duration:** Changing behavior of societies is complex and slow and investment of time and funds needed to build capacity and develop and maintain relationships with individual communities is often underestimated. When numerous and diverse communities are involved, the challenges multiply. Projects either failed to provide adequate training, or provided training too late, and for too short a time, for poorly educated farmers to learn the basics of running a business. This limited the results of livelihood support and intended conservation impact.

- **Institutional delivery of assistance:** New livelihood interventions will require additional skills and training for involved community members, including simple book-keeping skills as well as training in processing, quality control, and marketing for new cash products. However, protected area staff and conservation NGOs rarely have such skills so it is
essential that projects should identify appropriate partners and institutions which can provide the expertise and continue to do so over the long-term.

- **Microfinance**: The long-term provision of microfinance can substantially strengthen livelihood support schemes and hence in turn be important for conservation efforts. The level of effectiveness often depends on the institutional capacity of the micro-credit schemes.

- **Scale up**: In landscapes with high population, impact can only be achieved if new or improved livelihoods can be scaled up to allow a significant number of stakeholders to benefit. Projects tend to develop livelihoods only on a small pilot scale. Pilot activities tend to provide direct support to livelihood development instead of institutionalizing the support within local authorities and their programs. This leads to limited scale up and limited results for either development or conservation. Also, markets for products such as honey, mushrooms, or many NTFPs are rarely capable of absorbing sufficient quantities to allow effective scale-up.

- **Unexpected consequences**: Increased profits from cash crops may lead to investment in new technologies, such as additional chainsaws or guns for hunting; extensification of agricultural lands to increase crop area and encroachment to protected areas; or even encourage new in-migration to the area. Any livelihood support needs to be carefully monitored to assess conservation impact.

**RECOMMENDATIONS**

This study was able to conclude that there are some critical steps and actions that need to be taken into account in order to improve the design and supervision of protected areas projects. The fact that some of these recommendations have already been mentioned in previous studies does not diminish their value. Moreover, they indicate an imminent urgency to make a collective effort to better tackle the issues that have brought negative results in past interventions in order to improve project design. Project managers are encouraged to use the following set of recommendations when they work with government, NGOs, financiers and assess how close they can meet some of these recommendations while designing and implementing projects.

The recommendations are grouped in eight critical themes that were present in a positive or negative form in each of the case studies. Some of these themes are under the control of the protected areas managers and in these cases they were more successfully implemented. Given limited budgets and resource constraints, as well as restrictions imposed by the larger political and legal context, the good practices identified here will sometimes be challenging to implement in the short or medium term and only possible over the long term. The material presented can be used as a planning framework with a menu of options and ideas, which each PA management team can use to build their own long-term approach to addressing threats from the productive landscape, appropriate to their situation.

**Threat Analysis**

1. Carry out a thorough threat analysis to identify sources of threat and appropriate measures and activities to address those threats and identify the root causes of threats, particularly policy and incentive barriers, as these are critical to assess project risks and priorities.

2. Based on the threats analysis, develop clear and explicit linkages between community development programs and threat reduction. Assess the financial and impact trade-offs between in-situ management costs and ex-situ threat reduction investments and allocate PA resources accordingly.
Conservation and Development Planning

3. Develop a clear definition of protected area objectives and conservation targets, with management, zoning and development activities that support those objectives. Support an eco-regional planning process that looks beyond the PAs boundaries to ensure that local development activities of the surrounding areas are harmonized with the conservation objectives inside the PAs.

4. Work across ministries to promote high level political support, coordination and policy compatibility between sectors. Influence government regional spatial planning and public investment decisions likely to impact on the PAs and ensure that the protected area and conservation activities are integrated in regional development plans and avoid conflicting strategies between different government agencies, such as public works and conservation. Encourage PA manager’s participation in EIA and SEA processes when large development impacts are the major threat to the PA.

5. Although resolution of conflicts regarding land tenure is beyond the authority of the protected areas agency, develop an understanding of the land tenure, rights and uses in the landscape around the PA and apply it in the planning process.

Participatory PA and buffer zone management

6. Include participatory processes to the management of protected areas, especially with local and indigenous communities, through consultations during planning and implementation, establishment of multi-stakeholder PA councils, joint or partial annual work program agreements, and small grants programs jointly managed for community development. If needed, support the strengthening of community organization and social cohesion and their own planning processes.

7. Develop clear and agreed boundaries of the protected areas with the local communities involved in their demarcation. Promote an effective enforcement of boundaries, park regulations and land use rules, through local community and local government structures as well as conservation agencies.

Institutional linkages for PA compatible local economic development

8. Build up appropriate institutional arrangements and strong partnerships with local and municipal governments to share expertise and responsibilities for joint land use planning, investment and training programs. Institutionalize the delivery of services to support local economic development compatible with PA since improving livelihoods can take longer than the duration of projects.

PA value awareness and community outreach

9. Support education and outreach programs aimed at all stakeholders, from local communities to policy makers, to increase awareness of protected areas values and benefits, including ecosystem services.

10. Provide capacity building opportunities for PA managers and local community organizations on linking local development and threat reduction in PAs and how to support livelihoods to reduce the threats.

Economic incentives for land use changes

11. Assess existing land use impacts to PAs and promote well targeted and designed community development programs and incentives to bring about land use changes in the surrounding landscape that reduce threats and can increase conservation. Modifying existing livelihood strategies to add value, and make them more profitable,
and simultaneously less damaging, may be more appropriate than attempting to introduce alternative livelihoods.

12. Involve local rural finance institutions to provide credit for livelihood support with conditions of credit provision tied to compatible economic activities and threat reduction and also involve private sector financiers and private land owners in these programs.

13. Develop payments for ecosystem services as a form of valuation of certain land uses critical to support conservation objectives (i.e. increasing connectivity or reforesting degraded areas).

**Long-term sustainable financing**

14. Develop revenue generation mechanisms, and fund management and allocation systems to provide adequate and sustained financial support to PAs. The level of financial support should aim to cover both recurrent management costs and support for sustainable and biodiversity-friendly development activities that benefit local communities. Strengthen transparency and accountability by promoting annual budget planning and performance-based reporting for both PA management and community development activities.

**Monitoring**

15. Develop appropriate indicators to monitor the biodiversity, social and management effectiveness impact of the PA and surrounding landscape activities with the monitoring used for adaptive management.
BACKGROUND AND PURPOSE OF STUDY

There are now more than 100,000 protected areas worldwide, covering 13 percent of the world’s terrestrial surface. Almost 34 percent of these parks and reserves are in developing countries, including some of the most biologically rich habitats on Earth (UNEP-WCMC, in press). These protected areas are the cornerstones of biodiversity and species conservation. Since its inception, the Global Environment Facility (GEF) has committed more than $1.5 billion for new and existing protected areas, targeting more than 1,500 protected areas covering a land area of 300 million hectares, some 17 percent of all land protected globally (GEF, 2005). More than 250 of these GEF-funded projects have been supported through UNDP and the World Bank. With cofunding, these projects represent a total cumulative investment of $4.6 billion.

Over the last 15 years, conservationists have begun looking beyond park boundaries and taking more of a landscape approach toward conservation, working with local communities and other stakeholders to further conservation objectives. This approach was emphasized in the “Beyond Boundaries” theme of the 2003 World Parks Congress. The focus of UNDP and World Bank projects reflects this new paradigm. Although projects still typically focus on building capacity and necessary infrastructure within parks, there is an increasing emphasis on activities to mitigate and reduce threats emanating from the surrounding production landscape. Projects have tested different approaches, including:

- The introduction of alternative and more biodiversity-friendly livelihood options to reduce pressure on protected area resources.
Reducing Threats to Protected Areas: Lessons from the field

- The promotion of biodiversity conservation within the production landscape itself through protecting biological corridors and developing mosaics of public and private protected lands.
- The adoption of landscape approaches, including improved management of the watershed and ecosystems within a targeted protected area and beyond their limits.
- The introduction of innovative financial mechanisms—such as trust funds and payments for environmental services payments (PES)—to fund both park management and local community development.
- A focus on system-wide constraints—such as the legal or policy environment—or gaps, weaknesses, or ambiguities in the mandates of public and private agencies.

Many of these projects can be classed as integrated conservation and development projects (ICDPs). This term has been applied to a diverse range of initiatives, all with a common goal: linking biodiversity conservation with local social and economic development (Wells and Brandon 1992; Wells et al. 1999). Most ICDPs target both the protected area (by strengthening management) and local communities and other stakeholders, often by providing incentives such as additional development opportunities to reduce pressures on natural habitats and resources. ICDPs have proven popular with donors. They offer an almost irresistible combination of potential gains, including biodiversity conservation, increased local community participation, more equitable sharing of benefits, and economic development for the rural poor.

ICDP projects have evolved over time (Hughes and Flintan 2001), partly in response to a more critical examination of their impacts. As long ago as 1992, a review of ICDPs by Wells and Brandon (1992) noted that:

- Most projects lack adequate understanding of the socioeconomic context.
- There was a general failure to specify exactly how ICDP development activities were expected to lead to enhanced protected area management.
- Few projects have identified viable alternatives to the extensive resource-use practices that threaten many protected areas.
- The social and economic benefits flowing to local people as a result of ICDP development activities are difficult to identify and are unevenly—sometimes narrowly—distributed.
- Links between subsidized community services, such as schools and health clinics, and protected area management objectives have not always been clear.

The conservation literature has continued to question the success of ICDPs in achieving either appreciable conservation or development objectives (Brandon et al. 1998; Larson et al. 1998; Oates 1999; Wells et al. 1999; UNDP 2000; MacKinnon 2001; McShane and Wells 2003). Critical questions have also been asked about the value of promoting alternative livelihoods to modify community behaviors in park buffer zones, especially whether such interventions are designed more to defuse local opposition than to improve livelihoods (Neumann 1997). Newmark and Hough (2000), in a review of 50 projects in 15 African countries, identified several challenges to promoting conservation through development, including:

- Provision of additional livelihood opportunities is based on the unproven assumption that increasing income or improving livelihoods will change behaviors and reduce pressures on protected areas.
- Incentives to communities in the form of public goods (schools, roads, etc) will often not be effective in changing individual behavior.
- Communities are rarely homogenous. The groups within the communities who
benefit from incentives may not be those that generate threats.
• Communities may not embrace conservation objectives even if benefiting from incentives, either because of the poor linkage between incentives and conservation or weak social cohesion within stakeholder groups.

Nevertheless, ICDPs have continued to be a key element in donor strategies to deliver conservation as part of an overall agenda to promote development and poverty alleviation. The results have been mixed. A study of 16 rain forest conservation projects in 11 countries in Africa found that 80 percent included an ICDP-like approach, yet less than half of those projects improved incomes for the local stakeholders by more than 2.5 percent, and some resulted in no improvement at all (Struhsaker et al. 2005). The same study found no correlation between the adoption of an ICDP approach and the quality of conservation achieved. However, protected areas in Tanzania, which routinely allocated 7.5 percent of their revenues to community projects, reported higher levels of favorable relations between park management and local stakeholders.

Throughout this debate, a central challenge remains: how to influence the behavior of local stakeholders, and especially their economic and livelihood activities, to reduce threats to biodiversity inside protected areas. The complexity of attempting to achieve both conservation and socioeconomic benefits means that no simple recipe for success has emerged (MacKinnon and Wardojo 2001). Approaches that have succeeded in some cases have failed in others. While there may be no simple solution, both successes and failures can help to identify the factors that determine where and when one approach may prove to be more effective than another. For this reason, UNDP and the World Bank Biodiversity teams undertook a study of a number of their GEF biodiversity-funded projects to identify and analyze the effectiveness of different intervention strategies in the production landscapes and their impact in reducing pressure on adjacent protected areas.

The study particularly focused on:

The introduction and promotion of more sustainable land-use and harvesting practices consistent with supporting the ecosystem needs of protected areas.
• The reduction of pressures on protected areas through diversification of livelihood opportunities, including new and additional livelihood opportunities to reduce dependency on resource extraction.
• The use of participatory planning, zoning mechanisms and regulations within the protected areas and buffer zones, including joint planning with local government at landscape and ecosystem levels.
• The development of enabling policy, legislative, and institutional conditions.

The intent was to derive general lessons, both positive and negative, that would assist in improving the design and implementation of projects aimed at strengthening protected area systems. Given the development mandate of both UNDP and the World Bank, the review team sought to gain a better understanding of the synergies and challenges in linking livelihood decisions and conservation objectives.

Chapter 2 describes the case study settings, intervention strategies, and factors that influenced conservation effectiveness for the targeted protected areas. Chapter 3 presents an analysis and overview of the most common intervention strategies and where and when they proved effective. Chapter 4 provides conclusions and recommendations for future projects.

**METHODOLOGY OF STUDY**

The study focused on a sample of 10 case studies from UNDP and World Bank proj-
Reducing Threats to Protected Areas: Lessons from the field

Projects visited in 2003–04. Selected projects had (a) a clear emphasis on addressing threats to the protected areas from communities living nearby; (b) ongoing implementation for a number of years (and were beyond midterm); (c) a variety of socioeconomic and ecological systems (but excluding marine ecosystems); (d) a significant investment in the production landscapes around protected areas; and (e) implementation teams willing to participate.

Five project sites were visited by joint UNDP-WB teams as part of this study—one in Latin America, one in Asia, and three in Africa. Additional information about five other projects was obtained from site visits associated with the normal oversight and supervision functions required of World Bank staff (Kerinci-Seblat National Park in Indonesia, and the two protected area sites in India supported through the India Ecodevelopment Project) and UNDP staff (Chitwan National Park, Nepal and Chiloe National Park, Chile). Table 1.1 provides details.

The key questions posed during the study were:

1) What is the range of activities that were undertaken inside and outside the protected area to address the threats to the integrity of the protected area? The study teams placed particular emphasis on activities related to economic opportunities available to local stakeholders living in, or nearby, the protected areas.

2) Have these activities reduced the threats to the protected area? Where possible, the study teams posed this question to the local stakeholders or used evidence produced by the project team.

### Table 1.1 Projects and Protected Areas included in the Analysis

<table>
<thead>
<tr>
<th>Country</th>
<th>Project and Individual Protected Areas</th>
<th>GEF Implementing Agency</th>
<th>GEF Project type*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bhutan</td>
<td>Integrated Management of Jigme Dorji National Park</td>
<td>UNDP</td>
<td>Full</td>
</tr>
<tr>
<td>Bolivia</td>
<td>Sustainability of Protected Areas (Kaa’ Iya N.P.)</td>
<td>WB</td>
<td>Full</td>
</tr>
<tr>
<td>Chile</td>
<td>Conservation and Sustainable Use of Chiloe Globally Significant Biodiversity (Chiloe N.P.)</td>
<td>UNDP</td>
<td>MSP</td>
</tr>
<tr>
<td>Ethiopia</td>
<td>Conservation and Sustainable Use of Medicinal Plants (Bale Mountains N.P.)</td>
<td>WB</td>
<td>Full</td>
</tr>
<tr>
<td>India</td>
<td>India Ecodevelopment (Periyan Tiger Reserve)</td>
<td>WB</td>
<td>Full</td>
</tr>
<tr>
<td>Indonesia</td>
<td>India Ecodevelopment (Ranthambore Tiger Reserve)</td>
<td>WB</td>
<td>Full</td>
</tr>
<tr>
<td>Madagascar</td>
<td>Second Environment Program Support (Andasibe-Mantadia N.P.)</td>
<td>WB/UNDP</td>
<td>Full</td>
</tr>
<tr>
<td>Nepal</td>
<td>Landscape-scale conservation around Chitwan National Park (Barandabhar Forest)</td>
<td>UNDP</td>
<td>MSP</td>
</tr>
<tr>
<td>Sudan</td>
<td>Conservation and Management of Habitats and Species, and Sustainable Community Use of Biodiversity in Dinder National Park</td>
<td>UNDP</td>
<td>MSP</td>
</tr>
</tbody>
</table>

* The GEF distinguishes between full projects, in which the GEF contribution to the project financing plan is greater than $1 million, and medium-size projects (MSP), in which the GEF contribution is less than $1 million. Typically, the GEF contributes between 20 and 40 percent of the total project costs.
3) Who were the key players in addressing the threats? This question examined the extent to which the protected area authority itself was engaged in modifying the economic activities of local stakeholders, or whether other governmental or nongovernmental agencies were entrusted with the task. The study also reviewed how the protected authority worked with the local government and other stakeholders to manage the threats beyond their boundaries.

4) What interventions worked or did not work and why? In each case study, the study teams assessed the impact of interventions on economic activities and whether there was any evidence of linkage to strengthened conservation.

5) What factors contributed to strengthening or weakening the conservation effort?

Using these five questions, in each case the study teams extracted general lessons that can guide future project design and implementation.
Analysis and Synthesis of the Case Studies

The analysis presented here is based on data in the case studies, which are presented in detail in Section 2.

The projects reviewed covered a range of terrestrial ecosystems from forests to mountains and dry land ecosystems. All of the projects yielded information and lessons relevant to this analysis. Often, issues and lessons were similar, even though sites were in different ecosystems and different geographical regions.

THREATS

Most of the examined protected areas face a situation characterized by disequilibrium, where external pressures are exerted on the protected area through both encroachment and degradation. The threats vary between locations. The main threats to protected areas are (a) habitat loss and degradation due to conversion to pastureland and agriculture; and (b) overexploitation of natural resources, including logging, the collection of non-timber forest products (NTFPs), overfishing, and overgrazing by livestock.

The underlying causes of these threats are numerous, but include (a) population growth and immigration; (b) the open-access nature of resources in protected areas; (c) insecure land tenure; (d) government development plans and investments, such as roads that open up access to park resources and promote immigration into fragile ecosystems near protected areas; (e) weak law enforcement; (f) local dependency on natural resources due to limited alternative economic opportunities; (g) lucrative markets for illegal
goods (timber, wildlife etc); (h) cultural habits; and (i) weak incentives and the failure of markets to capture the economic values of biodiversity and ecosystem goods and services.

Often, threats arise from legal, large-scale government-endorsed activities—including commercial initiatives—that respond to development agendas, policies, and decisions generated far away from the site. In contrast, most project activities focus on the small-scale—often illegal—activities of local communities in and around the protected area. In a few cases, projects have also focused on some aspects of national policy and legislation. This analysis has focused primarily on local threats, often arising from the activities of local communities (see Table 2.1).

**COMMON INTERVENTION STRATEGIES**

The most common project interventions to reduce these threats are listed below and in Table 2.2. They include:

- Strengthened protected area management, including clear demarcation of boundaries and enforcement
- Provision of new, alternative livelihoods, such as nature-based tourism, or harvesting of non-timber forest products (NTFPs)
- Introduction of modified land use practices, including livestock management, agricultural diversification, and social forestry
- Environmental awareness programs, including community outreach
- Social organization and community development
- Participatory conservation and development planning and monitoring
- Recognition of land tenure and other use rights
- Support for development of new national- or state-level policies
- Support to local and regional government planning

### Table 2.1 Threats Across the Case Studies

<table>
<thead>
<tr>
<th>Threat</th>
<th>Bhutan</th>
<th>Bolivia</th>
<th>Chile</th>
<th>Ethiopia</th>
<th>India (Periyar)</th>
<th>India (Ranthambore)</th>
<th>Indonesia</th>
<th>Madagascar</th>
<th>Nepal</th>
<th>Sudan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuelwood collection</td>
<td>![Black Box]</td>
<td>![Green Box]</td>
<td>![Green Box]</td>
<td>![Green Box]</td>
<td>![Green Box]</td>
<td>![Green Box]</td>
<td>![Black Box]</td>
<td>![Green Box]</td>
<td>![Green Box]</td>
<td>![Green Box]</td>
</tr>
<tr>
<td>Illegal logging</td>
<td>![Black Box]</td>
<td>![Black Box]</td>
<td>![Black Box]</td>
<td>![Green Box]</td>
<td>![Black Box]</td>
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<td>![Green Box]</td>
<td>![Black Box]</td>
<td>![Black Box]</td>
<td>![Black Box]</td>
</tr>
<tr>
<td>Livestock grazing</td>
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<td>![Black Box]</td>
<td>![Green Box]</td>
<td>![Green Box]</td>
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<td>![Black Box]</td>
<td>![Green Box]</td>
<td>![Black Box]</td>
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</tr>
<tr>
<td>Agricultural encroachment</td>
<td>![Black Box]</td>
<td>![Black Box]</td>
<td>![Black Box]</td>
<td>![Green Box]</td>
<td>![Green Box]</td>
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<td>![Green Box]</td>
<td>![Black Box]</td>
<td>![Black Box]</td>
<td>![Black Box]</td>
</tr>
<tr>
<td>NTFP collection &amp; medicinal plants</td>
<td>![Green Box]</td>
<td>![Green Box]</td>
<td>![Green Box]</td>
<td>![Green Box]</td>
<td>![Green Box]</td>
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<td>![Green Box]</td>
<td>![Green Box]</td>
<td>![Green Box]</td>
<td>![Green Box]</td>
</tr>
<tr>
<td>Hunting/ poaching</td>
<td>![Black Box]</td>
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<td>![Green Box]</td>
<td>![Green Box]</td>
<td>![Green Box]</td>
<td>![Green Box]</td>
<td>![Black Box]</td>
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</tr>
<tr>
<td>Fire</td>
<td>![Black Box]</td>
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<td>![Black Box]</td>
<td>![Green Box]</td>
<td>![Green Box]</td>
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<td>![Green Box]</td>
<td>![Black Box]</td>
<td>![Black Box]</td>
<td>![Black Box]</td>
</tr>
<tr>
<td>Mining</td>
<td>![Black Box]</td>
<td>![Black Box]</td>
<td>![Black Box]</td>
<td>![Green Box]</td>
<td>![Green Box]</td>
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</tr>
</tbody>
</table>

**Legend:**
- Black boxes mean: absence
- Green boxes mean: presence
The case studies are arranged in terms of population density, which create different pressures and a need for different intervention strategies. Projects in areas with higher population density have often made greater efforts to address livelihood concerns. In Bolivia and Bhutan, where parks had low population pressures, the projects did not attempt to introduce alternative livelihoods. At high-density sites—such as Periyar (India), Ranthambore (India), and Kerinci-Seblat (Indonesia)—addressing livelihood and employment needs was a dominant component of the strategies to reduce threats. Strengthening enforcement was a key characteristic of projects in areas of higher population density. In contrast, the low-density sites focused much more on community planning and integrating protected area planning with local development planning. Social

### Table 2.2 Different Types of Interventions Across the Case Studies

<table>
<thead>
<tr>
<th>Low population density</th>
<th>Intermediate population density</th>
<th>High population density</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bhutan</td>
<td>Bolivia</td>
<td>Chile</td>
</tr>
<tr>
<td>Strengthening enforcement</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>Income improvement</td>
<td>Alternative livelihoods</td>
<td>[ ]</td>
</tr>
<tr>
<td></td>
<td>Modified sustainable land uses</td>
<td>[ ]</td>
</tr>
<tr>
<td>Environmental awareness and community outreach</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>Social organization</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>Land use rights</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>National/state-level policy</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>Participatory planning and monitoring</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>Local and regional government planning</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>Sustainable financing</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
</tbody>
</table>

Legend:
- Black boxes mean: absence
- Green boxes mean: presence

- Sustainable financing for protected areas and community development
organization was a common strategy irrespective of population density.

**Analysis**

Intervention strategies include increasing enforcement activities; promoting income generation for communities; developing alternative livelihoods; providing microfinance; promoting tourism benefits for communities; building capacity for communities; linking conservation to development; promoting institutional linkages between the protected area and production landscape; matching the scale of interventions to the scale of the threat; encouraging long-duration investments; taking social heterogeneity into account; adding value to current practices; and identifying other sources of financing.

**Enforcement**

Most of the projects invested in strengthened protected area management, including improved resources and capacity for patrolling and enforcement. These activities proved critical in increasing conservation effectiveness. Patrols by park guards and local community groups, and even the presence of tourist guides, helped reduce illegal activities inside the protected area. In Madagascar, for instance, improved forest protection is directly linked to strengthened staff capacity both at Andasibe and other parks in the protected area network. Improved park patrolling in Dinder reduced many threats, though livestock grazing remained a problem. Conversely, at Kerinci-Seblat N.P. in Indonesia, weak enforcement and a breakdown in law-and-order led to an increase in illegal logging and forest encroachment within park boundaries.

It is clear that enforcement is a necessary, if not sufficient, part of any conservation strategy. Where strong enforcement is combined with significant investments and attention to communities, it may also be possible to involve local communities themselves in enforcement activities as a reciprocal commitment toward conservation. Both the Barandabhar forest in Nepal and the Periyar Tiger Reserve in India benefit from increased enforcement through villager patrols. In the Nepal case study, it was estimated that patrolling by community forest user groups (CFUGs) reduced the collection of firewood and timber by outsiders, even though CFUGs lack formal authority over the forest. Village patrols, including women’s groups, have been effective in several of the Indian parks and have continued to function long after the project has closed.

**Income generation for communities**

The support of local stakeholders for protected areas will be influenced by a range of factors, including their personal needs and economic status. Helping local villagers to improve their livelihoods and income may help to gain their acceptance of conservation goals. In Bhutan, the protected area management team is involved with local economic development planning to improve local livelihoods as well as conservation. Where laws permit, some parks have been able to reinvest a portion of visitor entrance fees in local community projects (Madagascar, India). Such reinvestment constitutes a direct incentive for biodiversity conservation, as the communities benefit directly from the existence of the protected area. Nevertheless, a strategy that depends on improving livelihoods and incomes has to be assessed carefully. Not all protected areas have the ability to generate additional income or the resources and capacity to promote business opportunities for communities.

**Alternative Livelihoods**

All of the projects studied allocated resources for promoting alternative livelihoods and/or increasing income-generating opportunities. These range from agriculture and livestock improvement (Ethiopia, India, Indonesia, Nepal,
Sudan) to development of new businesses such as mushroom production, handicrafts, and tailoring (Nepal, Chile, and India). Although the notion of addressing both conservation and poverty alleviation is intrinsically appealing, there are many challenges. Project activities may increase community goodwill toward the protected area, but it is often difficult to demonstrate real and long-lasting benefits for conservation.

These case studies offer little evidence that new income-generating opportunities are effective in reducing threats across the landscape. Even where individuals or households changed resource use and behavior, the impact of such changes tended to be local and generally small compared to the scale of the threat. Many new livelihood activities are supplementary rather than alternative and benefit only a small number of households in the targeted communities. Some of the poorest and most resource-dependent were often least able to access benefits from project activities, especially when they were required to raise cofunding contributions (as in India). In Bolivia, Bhutan, and Chile, the introduction of alternative livelihoods (with the exception of tourism) appeared unlikely to benefit more than a very small proportion of stakeholders.

Project implementers tend to work most closely with those communities and individuals who demonstrate the greatest willingness to take action. This does not always correspond with conservation priorities or household needs. For example, early adopters of relatively costly biogas units in India and Nepal have tended to be the wealthier members of the community, who may not be the primary source of threats in terms of fuelwood harvesting. Some projects tried to explicitly address the inequitable distribution of benefits. During implementation, the India Ecodevelopment Project changed the emphasis at all sites from the provision of development grants to individual households to funding projects that benefited whole communities, such as the provision of new water points for cattle and villagers as a way to ensure that the poorest members of the communities also benefited.

Microfinance

Several projects tested micro-credit schemes, from revolving funds for agricultural credits to sponsorship of self-help savings groups (SHGs). The success or failure of these schemes often depends on the conditions attached to the loans, how the funding is used, and peer pressure to encourage repayment. In India, for instance, where there was already considerable experience with SHGs, the creation of new funds has proven extremely effective, especially where establishment of such funds is linked to reciprocal actions for conservation such as forest patrols. In Sudan, however, where revolving funds were used to provide credits for agriculture, many of the debts had to be written off after floods washed away crops.

Tourism benefits

Tourism provides one of the few opportunities for enhanced community income to be linked directly to protected area conservation, both through direct employment and livelihood opportunities (India, Nepal), as well as from sharing of tourism area revenues with communities in the production landscape (Bhutan, Chile, India, Madagascar, Nepal). In Madagascar, for example, 50 percent of the income received through park visitor fees is reinvested to fund micro-projects identified by the communities themselves. A less direct system exists in Bhutan, where all tourists pay a fee of $200 per day, of which $65 accrues to the Ministry of Finance and is then utilized for park management and local development activities.

Capacity building for communities

Projects were generally good at training protected area staff, but much weaker at building
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capacity in communities for improved livelihoods or more sustainable land and resource use. New livelihood interventions usually required additional skills and training for involved community members in processing, quality control, and marketing for new cash products. Projects either failed to provide adequate training, or provided training too late and for too short a time for poorly educated farmers to learn the basics of running a business. Often, there were no mechanisms to continue and refresh training or provide technical assistance beyond the project lifetime. A few projects addressed this issue explicitly by providing training to community representatives in basic skills such as bookkeeping, as well as information on ongoing government training and development schemes to empower communities to better access other available resources.

Linking conservation to development

Although all projects provided resources for development activities and awareness campaigns, there was little clear evidence of the link between such development and reduced threats to protected areas or conservation of natural resources. For example, in Madagascar it is debatable whether the observed reduction of traditional slash and burn (tavy) in the buffer zone is due to the new development activities such as rice intensification and ginger cultivation, or to the stronger enforcement of regulations in the park and surrounding areas.

Local stakeholders, park staff, NGOs, and technical assistance providers often lost sight of the need to link interventions to conservation. As a result, project support sometimes focused too much on economic development without necessarily yielding the desired conservation benefits. In a few case studies, explicit links could be drawn between development opportunities and improved conservation. In Periyar (India), community beneficiaries were expected to reciprocate through participation in forest patrols and monitoring. Several case studies also provided evidence that there may be additional social incentives for individuals to engage in conservation efforts, such as community recognition, social status, and empowerment. Social capital and goodwill toward the protected area emerged as some of the most useful byproducts from working with communities.

Institutional linkages between the protected area and production landscape

Most protected area agencies have little or no influence on economic development beyond their boundaries and are dependent on good working relationships with those agencies and players that do influence economic activities in the buffer zone area. In India, for instance, good working relationships with district collectors facilitated voluntary resettlement of villages out of the park onto revenue lands. In Bhutan, the park management authority works with local government on local development planning and control of forest use. In Madagascar, a mining company is cooperating with ANGAP to regulate activities within its concession area.

Different sectoral agencies have different priorities. The Kerinci project (Indonesia) made explicit provision for a regional impact assessment, spatial planning with local government agencies, and provincial steering committees. Yet conflicts continued, especially over local government plans for new roads and mining, which would have opened up the park to further agricultural encroachment (MacKinnon 2005). Moreover, in the Kerinci project, different government institutions were responsible for the protected area and village development activities, so that conservation was not always the primary objective. The issue of different agencies with different and often conflicting mandates and priorities may be a particular challenge in projects that link different funding sources, including development funds, where the primary objective is poverty alleviation.

A common institutional structure for management of production landscapes and
protected areas increases opportunities to link buffer zone economic development with protected area conservation goals. For both CABI in Bolivia and ANGAP in Madagascar, the same key organization is directly involved both in support of economic activities in the production landscape and in management of the protected area. In Bolivia, CABI has responsibility for both social and economic development of buffer zone communities and for comanagement of KINP. Because the threats to KINP do not arise from the buffer zone area, CABI is able to play both roles without encountering issues related to decisions on “trade-offs” or conflicts of interest. In more typical cases, an organization having such a dual role would need to be subject to a system of checks and balances to ensure that it does not favor development or conservation.

In the Madagascar and Bolivia case studies, the institutional arrangements are unusual. More typically, in GEF-funded projects the project executor or protected area agency attempts to establish relationships with each buffer zone community. This is the case in India (Periyar, Ranthambore), Indonesia, Sudan, Ethiopia, and Nepal. Such relationships can be inherently unsustainable as funding levels decline, diverting time and resources of protected area staff away from their primary responsibilities for park management and creating unrealistic expectations of the conservation agency as a long-term development provider. Such arrangements can also create jealousies and conflicts between those communities that benefit from project activities and those that do not.

**Scale of interventions versus scale of threat**

The scale of interventions is usually much smaller than the scale of the threat. This is a particular challenge when promoting development activities to reduce threats. Because of limited resources and capacities, alternative livelihoods are usually developed only on a small pilot scale, with limited planning and resources for scaling up and replication. Pilot activities tend to provide direct support to livelihood development instead of institutionalizing the support within local authorities and their programs. This leads to limited scale-up and limited results for either development or conservation.

In almost all cases, not all communities living adjacent to the protected area benefited from development activities. In Nepal, the main beneficiaries were communities that had already worked with KMT. At Periyar and Ranthambore (India) as well as Kerinci (Indonesia), only some of the original targeted villages benefited from village development funds. Even within villages, only certain individuals and households benefited. These are not always the most needy households, or the households causing the greatest threat to the protected areas. Although project activities may reduce pressure at specific points, there will be continued pressure from other communities across the landscape.

**Duration of investments**

The investment of time and funds needed to build capacity and develop and maintain relationships with individual communities is often underestimated. Changing the behavior of societies is complex and slow. It is important to understand the incentives for certain kinds of behavior. Consulting and organizing community members and facilitating their participation in protected areas or livelihood planning can take considerable time. When numerous and diverse communities are involved, the challenges multiply.

**Social heterogeneity**

Interventions designed to influence the behavior of stakeholders in the production landscape—or to improve livelihoods—frequently treat stakeholders as a homogeneous and internally organized entity. But communities and villages are often multifaceted, with
several or many distinct stakeholder groups and complex patterns of social interrelationshps. In Sudan, nomadic pastoralists and their large herds generate many of the threats to long-term conservation in Dinder National Park. The pastoralists represent a distinct and rather powerful group, for whom culturally acceptable alternatives are difficult to identify because of their nomadic lifestyle and independence. Effective interventions need to take account of this complex social organization so as to ensure that the relevant stakeholder groups are targeted in ways that emphasize conservation benefits. The Periyar and Ethiopia projects addressed this issue by working with specific user groups.

Options to mitigate threats

Proposed interventions often focus too much on alternative livelihoods without giving adequate consideration to opportunities to modify existing activities to add value or make them more sustainable. For example, in Bolivia substantial efforts were invested in novel enterprises such as honey production, or the use of a native tree to produce a coffee substitute, but few efforts were made to modify the dominant economic activity, namely cattle grazing. Opportunities for alternative livelihoods are inherently more risky with additional barriers to overcome, such as developing new markets. Good opportunities may exist, however, to add value to current practices, such as the conversion to organic farming of pepper and spices at Periyar.

Sustainability

Project resources were often channeled through protected area agencies, including funds for development activities. While such a process can facilitate project implementation, it can create unrealistic expectations among communities that the park authority will continue as a development provider. Where park management does not have a regular mandate or budget for community development, it is essential to identify other sources of long-term funding and facilitate relationships and activities with normal development agencies.

ENABLING CONDITIONS INFLUENCING CONSERVATION EFFECTIVENESS

Enabling conditions are often critical to conservation success. Such conditions range from physical attributes of the protected area itself (such as large size and altitudinal representation) to social factors, such as population density and social organization, as well as the existence and capacity of supporting institutional frameworks (see Table 2.3).

Attributes that impacted negatively on project success included factors such as population pressure, immigration, and other social issues; weak legal and regulatory frameworks, often compounded by poor enforcement; lack of cooperation, and conflicting agendas between government departments; competing economic development opportunities; and poor governance (see Table 2.4). These constraints were often compounded by poor identification of threats and weak linkages between project development activities and conservation.

Analysis

An analysis of factors governing conservation effectiveness and the analysis from these ten projects reveals some common messages. Some of these are expected. For example, conservation planning and operations are generally simpler and more effective for large protected areas in landscapes with low population density. Other lessons relate to the importance of appropriate enabling policy and legislation and social and institutional structures. Finally, analysis of the case studies provides much useful information on the effectiveness and challenges associated with different project interventions.
### Table 2.3. Positive Factors Influencing Conservation Effectiveness

<table>
<thead>
<tr>
<th></th>
<th>Bhutan</th>
<th>Bolivia</th>
<th>Chile</th>
<th>Ethiopia</th>
<th>India (Periyar)</th>
<th>India (Ranthambore)</th>
<th>Indonesia</th>
<th>Madagascar</th>
<th>Nepal</th>
<th>Sudan</th>
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<tbody>
<tr>
<td><strong>Physical</strong></td>
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<tr>
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<td>Low population density/ population distribution</td>
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### National and regional policies and legislation

Interventions were generally focused too closely on site-based problems. There was little attention to the existence or development of appropriate mechanisms, including supportive policies and the regulatory environment, to promote local coordination between protected
Reducing Threats to Protected Areas: Lessons from the field

areas and surrounding landscapes. This narrow focus was further compounded by the fact that large donor and government sectoral projects were rarely coordinated with protected area management needs.

The lack of an enabling policy environment can be a key constraint. In Chile, the protected area authority cannot legally generate revenues and is not able to engage directly with stakeholders outside the protected area boundary. Although the project has succeeded in creating a forum where stakeholder issues can be discussed, project impacts have been more difficult because of the legal constraints. On the other hand, Madagascar has put in place a national policy framework for natural resource use rights that provides a strong incentive for sustainable use. Clear management policies that benefit local communities have promoted community involvement in developing new forest zoning plans and forest management. Well-managed resource use in the buffer zone

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Black boxes mean: absence  
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is key to maintaining the protected areas and the integrity of the forest corridor.

Policies for returning part of tourism and protected area revenues to local communities have proven critical in Madagascar, Bhutan, and India. Bhutan already had a national policy in place. In Madagascar, donor interventions through the Second Environment Program facilitated promulgation of the new national policy. The India Ecodevelopment Project facilitated a similar process of sharing park tourism revenues at the state level in India. It is interesting to compare differences between the two Indian sites, Periyar and Ranthambore. In Kerala, the new state law facilitated establishment and support of the Periyar Foundation to continue activities with local communities. In Rajasthan, the state government’s failure to return ecodevelopment revenues to Ranthambore limits opportunities for the park to benefit local communities.

Social organization

In several of the case study areas, social cohesion and organization of the communities around the protected area contributed to improved negotiation, representation, and mobilization of communities against external threats. Strong social cohesion is frequently evident when the local stakeholders are indigenous peoples who have maintained their traditional social institutions and culture. In Chile and Bolivia, indigenous organizations effectively represent the interests of local stakeholders. In contrast, when there are high levels of heterogeneity among stakeholders, such as in Madagascar and Sudan, it may be much harder to forge effective relationships between the park and local communities.

Even in situations of high population density and/or stakeholder heterogeneity, it is possible to create social cohesion by establishing new social organizations or capitalizing on existing community structures. Although threats in Nepal are more serious than in Bhutan, Bolivia, and Chile, social cohesion and long-term experience in community organization facilitates conservation activities in Nepal. Similarly, in the Indian project investment by the protected area authorities in establishing new ecodevelopment committees—as well as building the capacity of community organizations in neighboring villages—reaped significant benefits. Interventions were particularly effective at Periyar, where community interventions were organized around specific user groups rather than village structures. In recognition of their low income and status as members of local communities, lower level reserve staff at Periyar were also organized into a “professional” committee to benefit under project activities.

Land tenure

Security of land tenure and/or user rights is often considered a necessary precondition for securing successful conservation outcomes. Weak and ambiguous rules over land ownership and access to resources can lead to overexploitation of community lands and further agricultural encroachment into protected areas. In some cases, titling of lands and acknowledgment of local rights can help to stabilize the advance of the agricultural frontier. If their own rights to land and resources are secure, locals are often more likely to invest in intensified agriculture or tree crops and sustainable management of forests, as well as to act together against outside threats.

In both Madagascar and Bolivia, an integral part of buffer zone management strategies involved the resolution of land tenure and use rights issues. Land and resource rights are complex issues. Resolution can be a time-consuming and difficult process, as both case studies showed. Moreover, secure tenure may not be sufficient on its own to ensure conservation. In Kaa-Iya National Park in Bolivia, the community may also need to develop and implement a natural resource management plan to ensure long-term sustainable use of the ecosystem.
Although resolution of conflicts regarding land tenure is normally beyond the remit and authority of the protected area agency, it may be possible to endorse limited resource rights as part of the park management plan. In Periyar, the reserve’s managers have worked successfully with user groups—such as thatch and firewood collectors—to agree on harvesting restrictions in certain areas. The collectors themselves patrol to keep non-sanctioned harvesters out of the park. Elsewhere, private lands and/or indigenous access rights within protected areas have been recognized within the park management plan and zoned for traditional use.

Culture

The attitude of local stakeholders toward biodiversity conservation and protected areas varies according to culture, religious beliefs, social status, and social history. There are often important differences in attitude, for instance, between long-term local residents and new immigrants. In India, Bhutan, and Nepal, strong conservation and self-help ethics facilitated community organization in support of conservation objectives. Local knowledge and cultural traditions can be useful tools to support conservation initiatives. It may be worthwhile exploring whether elements of local culture could be utilized or revived and as a result of such activities biodiversity conservation could be improved.

Long-term investment and sustainable financing

Several of the case studies illustrate the benefits of long-term investment and sustainable financing, both for building protected area capacity (Madagascar) and for supporting community initiatives (Bhutan). Because of its exceptional biodiversity value, Madagascar has always received significant donor contributions. This sustained, well-coordinated long-term donor support has built up capacity in ANGAP to create a strong and effective management agency and enabled innovative partnerships with communities to reduce the pressure on forest resources. Similarly, the long-term involvement of the King Mahendra Trust in the Chitwan buffer zone and Bharandabar forest in Nepal has built up trust among communities.

Many of the projects cast the protected area authority in the role of development provider, but this can create unrealistic long-term expectations among local communities unless other forms of sustainable financing can be found to cover future activities. Several projects addressed this need through creation of trust funds, either at the protected area system level (Bhutan) or at the level of the individual protected area (Periyar Foundation). Other projects have been successful at tapping in to other government or donor funds to provide additional benefits to communities. At Ranthambore (India), the protected area authorities were able to mobilize additional funds under the national Food for Work program to provide employment opportunities on construction works that benefited both the villagers and the reserve. The Dinder project was so successful at working with local communities that UNDP agreed to provide funding for a follow-on project from its normal development funds. Several projects, including those in India, have also focused on empowerment, awareness-raising and training for community members to enable them to better access other forms of regular government budgets for development.

ACTORS WHO IMPLEMENTED STRATEGIES

Projects were implemented by a range of actors, including protected area management authorities, local and international NGOs, and local community organizations. Success varied depending on implementing agency capacity, individual commitment, partnerships, and champions. The engagement of a strong and cooperative local government was helpful, but not always necessary for success. For example,
the situation in Bhutan was greatly helped by a strong local government and, more particularly, a close and collegial relationship with central government agencies. Conversely, in Bolivia and Nepal, local government played almost no role, but a strong NGO presence compensated for the lack of government presence.

Experience with NGOs varied. In Kerinci-Seblat (Indonesia), for instance, NGO involvement meant that the park authorities did not interact directly with communities. The NGO interface did not promote strong trust between the communities and park officials. In Periyar (India) the park staff, including a dedicated social scientist, interacted directly with communities to forge effective working relationships with ecodevelopment committees. Where government presence is weak, however, long-term NGO commitment to a site can foster trust and promote conservation, as evidenced by the long involvement of the King Mahendra Trust at the Chitwan National Park in Nepal.

A recent study of a much larger sample of GEF projects (GEF 2006) reported that those projects that involved NGOs in project execution or as significant stakeholders tended to be more successful than government-executed projects, both in the delivery of alternative income generation activities and more sustainable use. This success was attributed to the fact that NGOs typically had a stronger local presence and more consistent participatory approaches to involve communities in the identification and design of alternative approaches. Although this study does not provide evidence to support this finding, it would be interesting to test this hypothesis further.
The projects reviewed for this study are typical of many of the protected area projects in the GEF biodiversity portfolio. Each of the case studies yielded important lessons concerning interventions designed to reduce pressures on protected areas emanating from activities in the surrounding landscapes. Some of the lessons derived from these case studies are not new; many have been reported in previous studies (Wells and Brandon 1992; Brandon et al. 1998; Wells et al. 1999; Oates 1999; Terborgh et al. 2003; McShane and Wells 2004). The study reemphasizes two major weaknesses common to many ICDP interventions: (a) a failure to correctly identify the source of threats to biodiversity and target interventions accordingly; and (b) poor monitoring, which makes it difficult to effectively link improved conservation to project activities.

Previous studies have highlighted the increased complexity of implementing ICDP-type interventions as the scale increases (Larson et al. 1998). The ten case studies included in this analysis covered protected areas ranging in size from 77,000 hectares at Periyar (India) to 3.5 million hectares at Kaa Iya (Bolivia). Rather than scale itself generating complexity, it is the level of heterogeneity in environmental, social, and economic factors that complicates interventions aimed at modifying economic behavior. The largest protected area studied was Kaa-Iya, in Bolivia, but because of social homogeneity and low population density, it is surrounded by a relatively simple economic landscape. Experience from other protected areas suggests that strategies to modify behaviors and economic activities are easier to implement if targeted toward relatively homogeneous stakeholder groups, such as a strong indigenous organization or specific user group. In a het-
Reducing Threats to Protected Areas: Lessons from the field

erogeneous social and economic environment, actions to link changes in economic behavior to improved conservation may require several different approaches and more sophisticated strategies targeted to specific threats and needs.

While many authors have tended to become increasingly pessimistic about the benefits of an ICDP-like approach, few have attempted to propose realistic alternatives. Since the broad mandates of both UNDP and the World Bank are poverty alleviation and sustainable development, the greatest challenge will be how to mainstream biodiversity conservation and protected area management into national and local development programs; that is, how to better link conservation with development. This will become more urgent as donors are increasingly focusing their overseas development assistance (ODA) on poverty alleviation. Even the GEF is assessing its portfolio to determine how GEF resources can achieve local as well as global benefits (GEF 2006).

From the analysis in Chapter 2, it is clear that some lessons are of only local significance, but many appear to be widely relevant to the management of protected areas and the interaction between protected areas and their surrounding areas. Some lessons are relevant at the policy or central level, while others apply more directly to site-level management at the protected areas themselves. Popular interventions such as development and alternative livelihood activities present specific challenges because of divided mandates and the very real—but often overlooked,—trade-offs between economic development and conservation. Also, project interventions in production landscapes need to be designed and implemented with a clear objective of reducing threats to biodiversity within the protected areas. All stakeholders need to be continuously aware of this link. If this linkage is lost, there is a real risk that the project—and the protected area authority it supports—become engaged simply in economic development activities.

**LESSONS THAT APPLY AT A POLICY OR CENTRAL LEVEL**

Lessons that apply at a policy or central level include integrating conservation into national and local development; policy changes to involve or benefit communities; and funding sustainable development around protected areas.

**Integrating conservation into national and local development.**

Long-term sustainability of protected areas and conservation efforts will depend on establishment of effective institutional mechanisms and interventions to better address the real causes of biodiversity loss. In virtually every case, the majority of threats to protected areas arise outside their territory from economic activities in the surrounding production landscape. This does not mean that the protected area mandate should be expanded to cover land use in those neighboring lands, but rather that considerations about park integrity and conservation should be integrated with local and regional planning. This requires legal and regulatory instruments to provide sufficient powers to protected area managers and their agencies to engage with and influence economic and development activities in the broader production landscape. In some cases, such integration can be achieved through a single agency having responsibility for both protected area management and development planning (see Box 3.1). However, this is the exception rather than the rule. In most cases, protected area departments will need to work within existing administrative systems and national and regional planning committees to exert influence on development plans at the national and local levels.

**Policy changes to involve or benefit communities.**

Options to more directly involve communities in protected area management and/or increase
benefits to communities may require policy or legislative changes at either a national or state level. This applies as much to options for co-management or zoning of some parts of the protected area for traditional use as for mechanisms to share protected area revenues and visitor fees with local communities.

**Funding sustainable development around protected areas.**

Our study showed that the level of funding for protected areas rarely reflects the true costs of threat reduction, especially where such costs include modifying economic activities or introducing alternative livelihoods. Those agencies responsible for economic development, including local governments, have no responsibility for conservation and therefore little or no incentive to encourage modification of local economic activities. Typically, conservation projects provide funding for rangers, community officers, and livelihood specialists to work with local communities, but such efforts are often unsustainable beyond the project lifetime. Regular protected area budgets are tightly constrained and rarely provide funds, training, and financing for livelihood support. Where livelihood interventions are a critical strategy for reducing threats to protected areas, much greater attention needs to be paid to identifying long-term financing for these activities. Mechanisms can include revenue generation from park fees, establishment of specific ecodevelopment funds, and/or better alignment of other government-funded or private programs to support conservation objectives. This issue comes up regularly in GEF portfolio evaluations. For example, the 2003 GEF paper entitled “Review of Financial Arrangements in GEF-Supported Biodiversity Projects” provides information that is complementary to our study. Specifically, the paper recommends: (a) conducting thorough reviews of options for revenue-generating activities; (b) developing a business plan that includes market analysis, financial projections and flows, and assessment of funding needs; (c) providing measures to reduce costs and increase management effectiveness; (d) examining the compatibility of proposed financial arrangements with the current policy and legal framework; (e) putting together a qualified team to develop sustainable finance solutions; (f) including capacity building activities on financial fundraising and management; (g) supporting adequate institutional transparency in collection, transfer, and

**Box 3.1 Integration of conservation and development planning: the case of Madagascar**

The government agency ANGAP is in charge of both tourism and protected area management. Tourism is an important source of revenue for the country, with nature-based tourism representing half of total tourism income. A recent study on economic valuation of biodiversity conservation in Madagascar was key to raising more funds to support protected areas development and for the government to create new protected areas for the country. Tourism is an important source of revenue for the country and nature tourism represents half of the total tourism income. The emphasis on the links between conservation and poverty alleviation was key to raising more funds for conservation and for creating new protected areas. Tourism fees from reserves are also used to support community development. ANGAP has invested significant resources and training to manage tourism and agricultural development in buffer zones to minimize damage to the economic assets that the protected areas represent.
reinvestments; and (h) promoting portfolio diversification.

LEGGIONS THAT APPLY TO INDIVIDUAL PROTECTED AREAS

Lessons that apply to individual protected areas include clear threat analysis; institutional linkages between the protected area and production landscape; participatory conservation management; engaging local governments as partners; promoting alternative livelihood strategies; promoting other community benefits; strengthening enforcement and monitoring; identifying sources of sustainable financing; and improving the public’s understanding of the value of ecosystem services.

Clear threat analysis

Not all economic activities threaten protected areas and not all threats to protected areas are from local communities. All interventions, whether strengthened enforcement or income-generating activities, must be designed based on a threat analysis across the landscape. Project design should focus on the identification of activities that can reduce location-specific threats to biodiversity. There should be a clear causal link between proposed activities and expected conservation benefits.

Institutional linkages between the protected area and production landscape

Most protected area agencies have little or no mandate for economic development beyond their boundaries. PA authorities increased their influence in the production landscape when they developed good working relationships with those agencies and players that have authority, expertise, and budget to support economic activities in the buffer zone areas. A common institutional structure for management of production landscapes and protected areas can also increase opportunities to link buffer zone economic development with protected area conservation goals.

Participatory conservation management

The recognition that resident populations around, and in some cases within, the protected area have valid interests in protected area management—whether or not supported by traditional or formal rights—has led to an increasing focus on social issues. Most protected area managers recognize the need to consult with local stakeholders. Communication, consultation, and participation are key elements for constructive relationships between protected areas and local communities. Where appropriate, it will be important to provide resources and capacity building to strengthen the social organization of local communities and to collaborate with local stakeholders on issues regarding economic activities and protected area objectives.

Local governments as partners

Protected area authorities usually have responsibility only for management within the reserves, yet most threats emanate from outside boundaries. Local governments can be valuable partners to ensure that development planning complements protected area activities. Local governments, however, often view protected areas as national priorities and of marginal local benefit. Even worse, they are often perceived as a lost economic opportunity or source of conflict. Exceptions are protected areas with high visitor potential, which brings economic benefits to the region. It is critical that protected area managers be engaged with local government authorities so that they are consulted on development decisions and enjoy good support from the local police and judiciary. Ensuring such cooperation requires not only good personal relationships, but may require strong support and coordination at the
Lessons Learned and Recommendations

state/province level and between ministries at the national level. In Bhutan, for instance, strong local government support for conservation promotes both economic development and conservation (Box 3.2).

Community Livelihood Strategies

Promotion of alternative livelihood strategies is a common element of many projects and is likely to remain so. Community benefits and small grants are a good way to engage a broad range of stakeholders and elicit support for conservation projects. Yet the challenges in linking support for livelihood strategies to conservation are manifold, including identification of suitable alternatives to current practices, appropriate targeting of beneficiaries to reduce threats, capacity building, and sustainability beyond the project lifetime. Too often, project managers focus more on delivery of grants and economic opportunities rather than on the causal linkages between threats and biodiversity outcomes. Even if livelihoods improve for some beneficiaries, it may not lead to a reduction in threats (Box 3.3). This topic is addressed in more detail below.

Other community benefits

Promoting new livelihood opportunities is just one way to benefit local communities. Other strategies may be more effective in encouraging long-term support for protected areas and/or changing economic behavior in the production landscape. These include:

- Community benefits through sharing park visitor fees. This is well-illustrated in the India and Madagascar studies and especially appropriate where protected areas have high tourism potential and revenue-sharing arrangements.
- Establishment of community funds for conservation. This can be especially effective and sustainable when linked to cofunding contributions raised by the communities themselves and to reciprocal and monitorable conservation commitments from the involved communities.

Box 3.2 Local government support for conservation: the case of Bhutan

Bhutan has a well-organized system of local government that is critical to the empowerment and development of local communities. The country is divided into 20 districts, known as dzongkhags. Each of these districts is divided into a number of sub-districts, called geog, each with a development committee. Local government, at both the dzongkhag and geog level, plays a strong role in supporting socioeconomic development of the local communities. Community development planning is bottom-up, with each geog preparing a 5-year plan plus an annual plan based on the needs and priorities identified by the communities themselves. Such plans typically cover road construction, health and education facilities, as well as interventions to support livestock improvement and the promotion of alternative income opportunities such as NTFP commercialization. There is no difference in the administration of local government within and outside protected areas except that geogs and dzongkhags within protected areas prepare “integrated conservation and development plans” instead of simple development plans. Park staff members are represented on geog and dzonkhag development committees and are fully integrated into local planning processes. The role played by park staff in marking timber for community use directly mirrors the role of territorial district forest officers outside the park.
Direct payments for biodiversity conservation or protection of other ecosystem services, such as watershed protection or carbon sequestration. Community members will often engage in conservation-related activities for social reasons as well as financial benefits. Social incentives can include community recognition, social status, and empowerment (Boxes 3.2 and 3.4). Social capital and goodwill for the protected area may be among the most tangible and useful byproducts from project activities with local communities.

**Enforcement**

The case studies show that enforcement plays a critical role in protecting habitats and protected areas and is a crucial activity in supporting conservation. Enforcement alone may not be sufficient to totally reduce threats or protect key conservation targets. But other conservation strategies, including development activities, are unlikely to be effective in the absence of active enforcement. The conservation literature is increasingly polarized between those that emphasize the critical role of enforcement (Kramer et al. 1997; Terborgh

**Box 3.3 Failure to link livelihood modification to threat reduction in the Barandabhar Forest, Nepal**

A market feasibility study identified several business opportunities as suitable to support development and operation by the forest corridor communities. They include honey production, mushroom farming, wool spinning, off-season vegetable farming, banana farming, and ecotourism. However, not all of the 70,000 households living in the vicinity of the corridor use the forest resources unsustainably and are a threat to the protected area. Because of a poor threat analysis and NGO priorities, much of the investment in livelihood modification has targeted an area where a national NGO has already invested much effort in community support and thus households are open to new ideas. Yet because of the long-term NGO activity, this area is one where threats are lowest. Success in terms of the number of families engaging in honey production or ecotourism will therefore have virtually no impact on reducing overall threats to the forest.

**Box 3.4 Contested land tenure and conservation: progress in the face of conflict in Chile**

In Chile, the Chiloé National Park has established close links with diverse local stakeholders through the establishment of a participatory management board. Despite conflicts among competing indigenous community organizations, the protected area managers, supported by the project staff, have continued to work with all stakeholder groups as equals in promoting sustainable forest management in support of conservation. The indigenous communities along the western border of the park have long-standing land claims, which overlap park boundaries. Initial land claim settlements have now been settled, resulting in some areas being excised from the park, but other areas added in compensation. The process has built substantial “social capital,” with indigenous groups increasingly supportive of the protected area managers.
et al. 2002) and those that believe there can be no effective conservation initiatives that do not address more equitable benefits and the livelihood concerns of local communities (Hutton et al. 20005). As the case studies show, local communities, as well as protected area staff, can be effectively involved in protection and enforcement activities, especially where they are protecting their own rights to access resources (Box 3.5).

Strengthening Monitoring

This and other studies have noted the difficulty in demonstrating a link between modifications to local economic activities and improved biodiversity conservation. Causal linkages are often complex and unproven, making it difficult to determine whether the project activities are having the intended effects. When monitoring focuses more on numbers of beneficiaries than biodiversity outcomes, it is increasingly difficult to understand when (and where) interventions are being effective for conservation. The most appropriate measure of success is a reduction in intensity and extent of threats, but projects are often hampered by lack of baseline data, lack of simple but meaningful indicators, and weak capacity and minimal resources for monitoring.

Several of the case studies, including those in India, illustrate the benefits of participatory monitoring involving community members as well as protected area staff. Participatory techniques, such as “threat reduction assessments”

Box 3.5 Converting smugglers to forest protectors – working with former bark collectors

Illicit collection of *vayana* bark (*Cinnamomum* sp.) had always been a serious problem in the Periyar Tiger Reserve (PTR) in India. In 1997, PTR began to work with a group of collectors who were previously engaged in illegal harvesting and were highly antagonistic toward the Forest Department. A local NGO facilitated the formation of the Ex-vayana Bark Collectors Ecodevelopment Committee (EDC). Utilizing its members’ knowledge of the forest, this EDC developed a new and innovative model of ecotourism linked to protection. The Adventurous Trekking and Camping program takes small groups of tourists into the tourism zone to camp for one or two nights, areas where the bark collectors previously poached. Their presence is sufficient to ward off other poachers and smugglers. The EDC entered into an agreement with a travel agency to promote the tourist packages and won a local award for best ecotourism experience. A major part of the earnings (70 percent) goes into the EDC account to be distributed equally among the members, while 10 percent goes to government revenue and honoraria to accompanying forest field staff, 10 percent for food expenses, and the remaining 10 percent to the community welfare fund. The scheme was developed in a highly participatory manner with local NGOs, especially the Thekkady Wildlife Society, hoteliers, PTR staff, and tour operators.

Although the members earned more previously from sale of *vayana* bark, a major portion of those earnings were used for fines, bribes to various officials, and cuts to middlemen. With the new program, earnings went down but there was considerable enhancement in members’ social status and improvement in their relationships within the community. In 2000, ecological monitoring indicated that regeneration of *vayana* has improved from about 6 percent to more than 13 percent and that debarking damage was much reduced. EDC members have caught other offenders and booked cases against them. With increased patrols, animal sightings in the tourism zone have increased (see www.periyartigerreserve.org).

(Adapted from Uniyal and Zacharias 2001)
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(Margoulis and Salafsky 2001) or other kinds of participatory monitoring (Danielsen et al. 2005), can supplement monitoring undertaken by the protected area staff. These techniques also provide immediate feedback to communities and local decision makers on the linkages between threats and economic activities.

New financing mechanisms

Most protected areas lack adequate regular budget even for management activities, yet ICDP projects often leave local communities with the expectation that the protected area authority will continue as a development provider. Projects need to be much more rigorous in defining exit strategies and identifying post-project sources of sustainable financing, both for protected area management needs and appropriate local development, including innovative payments for ecosystem services and direct conservation payments based on performance. Such approaches require a careful cost-benefit analysis and a funding source for long-term financial commitments.

Ecosystem services and economic benefits of protected areas

There is a general lack of public understanding regarding the benefits that protected areas can provide to local economies through the ecosystems services they provide. As the Madagascar case study demonstrates, there is a need for further economic analysis of the benefits that can be derived from protected areas. This needs to be complemented by an aggressive outreach program to inform decision makers of the value of protected areas in national and regional development and their contributions to watershed protection and as buffers against natural disasters. Such analysis could provide an argument for conservation payments to communities for habitat protection.

LESSONS ABOUT LIVELIHOOD STRATEGIES AS A TOOL FOR CONSERVATION

Many World Bank and UNDP projects, including those studied here, have focused considerable time and effort on promoting livelihood strategies to reduce threats. Questions abound as to whether this is a successful or cost-effective strategy, especially since few projects make any real attempt to link such benefits to reciprocal conservation commitments or to monitor associated biodiversity outcomes. The results of our study complement the 2006 GEF Local Benefit Study, which found that, in general, income-generating activities and ecotourism were not able to act as a substitute for livelihood sources lost as a result of projects. In the context of poor local communities, they were regarded as additions to the range of available opportunities, without rejecting the natural resource use intended to be displaced. The study also found that when market contexts for alternatives and ecotourism were favorable and the project undertook preparatory socioeconomic assessment, benefits for livelihoods and the global environment were attainable. The study recommends that when working with resource uses and the environment, the different trade-offs need to be assessed at different levels such as policy support, institutional strengthening, and income generation.

This study has stressed in particular the following conclusions:

- **Linkages between livelihood support activities and conservation goals.** Unless the linkages between project activities and conservation goals are clear and endorsed by local stakeholders, offering new livelihood opportunities is unlikely to lead to conservation benefits. One strategy is to oblige beneficiaries to make reciprocal commitments to conservation, such as forest steward patrols or participatory monitoring with public feedback on the status of threats.
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- **Targeting threats.** The introduction of alternative livelihoods can only yield benefits if it leads to a change in behavior of those stakeholders identified as causing damage to natural resources. Unless the target beneficiaries for development investments are selected on the basis of location and intensity of threats, such programs may have little impact. One simple technique is to identify communities or user groups as red (high threat), yellow (medium), or green (low threat) according to their level of threat, and to target appropriate interventions accordingly.

- **Substitutional effect.** Alternative livelihoods do not necessarily substitute for existing income generation activities. Low-income households often have limited choices for subsistence and income generation and may rely on utilizing natural resources to meet basic subsistence needs or to provide a safety net. Experience indicates that most new activities will be supplementary rather than alternative. It can be difficult and time-consuming to introduce new and profitable livelihood options. In addition, there is always the risk that fluctuations in economic conditions (for example, a downturn in market prices) will lead to disappointment and a return to previous livelihood strategies. Modifying existing livelihood strategies to add value and make them less damaging may be more appropriate than attempting to introduce alternative livelihoods. Even where genuine substitution occurs, large-scale underemployment and surplus labor mean that others may simply take over the damaging activities (Box 3.6).

### Box 3.6 Diverting labor and capital away from biodiversity damaging activities

Project designs often assume that individuals who are provided with a new means of income will forego their previous income-generating activity. In reality, however, this is not often the case. Even if some labor is attracted to new activities, there will not necessarily be a reduction in available labor for environmentally damaging activities. The ability to divert labor, particularly in low-income communities, faces four key challenges:

1. People do not have fixed-income targets. Instead of substituting one economic activity for another, a worker might try to do both to increase his or her income as much as possible. For example, one person may work on a plantation during the day and continue to hunt at night or early morning; another may work in tourism in the dry season and continue to log forests illegally in the wet season.

2. Where there is underemployment there will be surplus labor. It will therefore be difficult to develop economic activities that divert sufficient labor away from damaging activities. Surplus labor, or even underutilized potential labor, including children and women, may fill a labor need. New migrants may take over activities previously abandoned by the locals for more biodiversity-friendly activities.

3. New activities that rely on technology and are not labor-intensive will not divert much labor and therefore will not have significant impact on the labor market.

4. Cultural traditions and reluctance to take on more work for small incremental gain may make local communities less receptive to new business ventures, especially if they have already invested capital in existing activities and are concerned about the risk of failure. Without assistance or incentives to exit from existing activities, individuals may be unable or unwilling to transfer their labor to alternative businesses.

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• **Duration.** Changing behavior of societies is complex and slow. The investment of time and funds needed to build capacity and develop and maintain relationships with individual communities is often underestimated. When numerous and diverse communities are involved, the challenges multiply. Projects either failed to provide adequate training, or provided training too late and for too short a time for poorly educated farmers to learn the basics of running a business. This limited the results of livelihood support and intended conservation impact.

• **Institutional delivery of assistance.** Any new livelihood interventions will usually require additional skills and training for involved community members, including simple bookkeeping skills as well as training in processing, quality control and marketing for new cash products. Protected area staff and conservation NGOs rarely have such skills. Protected areas should not be expected to take the lead in delivering livelihood support in production landscapes around their boundaries. So it is essential that projects should identify appropriate partners to assess the feasibility of the new business and to link businesses to appropriate markets. Some training can be provided through government extension services (e.g. soil conservation techniques, improved crop management). Other training may require new partnerships, preferably with private sector entrepreneurs who will continue to work with the communities after the project. If a direct support modality is used during project implementation, the protected area authority should have an exit strategy and encourage communities to seek future assistance from the local government agencies with primary responsibility for development. No new business or livelihoods should be introduced without identification of appropriate technical assistance or financing available beyond the project.

• **Microfinance.** The long-term provision of microfinance can substantially strengthen livelihood support schemes and hence in turn be important for conservation efforts. The level of effectiveness often depends on the institutional capacity of the micro-credit schemes.

• **Scale-up.** In landscapes with high population, impact can only be achieved if new or improved livelihoods can be scaled up to allow a significant number of stakeholders to benefit. Projects tend to develop livelihoods only on a small pilot scale. Pilot activities tend to provide direct support to livelihood development instead of institutionalizing the support within local authorities and their programs. This leads to limited scale-up and limited results for either development or conservation. In addition, markets for products such as honey, mushrooms, or many NTFPs are rarely capable of absorbing sufficient quantities to allow effective scale-up.

• **Unexpected consequences.** There can be unexpected consequences from additional income generation. Increased profits from cash crops may lead to investment in new technologies, such as additional chainsaws or guns for hunting; extensification of agricultural lands to increase crop area, and encroachment into protected areas. It can even encourage new in-migration to the area. Any livelihood support needs to be carefully monitored to assess conservation impact.

**LOOKING FORWARD AND RECOMMENDATIONS**

Lessons that have emerged during this study provide some guidance for strengthening the sustainability of protected area networks and improving project design and implementation.
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to better address the threats from surrounding production landscapes. Greater emphasis needs to be focused on better threat analysis and expected linkages between project interventions and expected outcomes, particularly in the design of appropriate incentives (and disincentives) to encourage changes in behavior to promote conservation. All case studies show that achieving biodiversity outcomes requires long-term commitment and financing and much better integration of conservation objectives and protected areas within development agendas.

This study found that there are some critical steps and actions that need to be taken into account in order to improve the design and supervision of protected areas projects. The fact that some of these recommendations have already been mentioned in previous studies does not diminish their value. Moreover, they might indicate an imminent urgency to make a collective effort to raise the issues that have brought negative results in past interventions in order to improve project design. In a general sense, we encourage project managers to use the following set of recommendations when they work with governments, NGOs, and financiers. They should assess how closely they can meet some of these recommendations while designing and implementing projects. These recommendations are grouped in eight critical themes. Some of these themes are under the control of the protected areas managers; in these cases, they were more successfully implemented. Given limited budgets and resource constraints, as well as restrictions imposed by the larger political and legal context, the good practices identified here will sometimes be challenging to implement in the short or medium term and only possible over the long term. The material we present can be seen more as a planning framework with a menu of options and ideas, which each PA management team can use to build their own long-term approach to addressing threats from the productive landscape that are appropriate to their situation.

I. Threat Analysis

1. Carry out a thorough threat analysis to identify sources of threats and appropriate measures and activities to address those threats and identify the root causes of threats, particularly policy and incentive barriers, as these are critical to assess project risks and priorities.

2. Based on the threat analysis, develop clear and explicit linkages between community development programs and threat reduction. Assess the financial and impact trade-offs between in-situ management costs and ex-situ threat reduction investments, and allocate PA resources accordingly.

II. Conservation and Development Planning

3. Develop a clear definition of protected area objectives and conservation targets, with management, zoning, and development activities that support those objectives. Support an eco-regional planning process that looks beyond the PA’s boundaries to ensure that local development activities of the surrounding areas are harmonized with the conservation objectives inside the PAs.

4. Work across ministries to promote high-level political support, coordination, and policy compatibility between sectors. Influence government regional spatial planning and public investment decisions likely to impact on the PAs and ensure that the protected area and conservation activities are integrated in regional development plans. Avoid conflicting strategies between different government agencies such as public works and conservation. Encourage participation by PA managers in EIA and SEA processes when large development impacts are the major threat to the PA.

5. Although resolution of conflicts regarding land tenure is beyond the authority of the protected areas agency, develop an
understanding of land tenure, rights, and uses in the landscape around the PA and apply it in the planning process.

III. Participatory PA and buffer zone management
6. Include participatory processes in the management of protected areas, especially with local and indigenous communities, including consultations during planning and implementation; establishment of multi-stakeholder PA councils; joint or partial annual work program agreements; and small grants programs jointly managed for community development. If needed, support the strengthening of community organizations and social cohesion and their own planning processes.

7. Develop clear and agreed boundaries of the protected areas, and make sure local communities are involved in their demarcation. Promote an effective enforcement of boundaries, park regulations, and land use rules through local community and local government structures as well as conservation agencies.

IV. Institutional linkages for PA-compatible local economic development
8. Build up appropriate institutional arrangements and strong partnerships with local and municipal governments to share expertise and responsibilities for joint land use planning, investment, and training programs. Institutionalize the delivery of services to support local economic development compatible with PA, since improving livelihoods can take longer than the duration of projects.

V. PA value awareness and community outreach
9. Support education and outreach programs aimed at all stakeholders, from local communities to policy makers, to increase awareness of protected areas values and benefits, including ecosystem services.

10. Provide capacity building opportunities for PA managers and local community organizations on linking local development and threat reduction in PAs and how to support livelihoods to reduce the threats.

VI. Economic incentives for land use changes
11. Assess existing land use impacts to PAs and promote well-targeted and designed community development programs and incentives to bring about land use changes in the surrounding landscape that reduce threats and can increase conservation. Modifying existing livelihood strategies to add value, and make them more profitable and simultaneously less damaging, may be more appropriate than attempting to introduce alternative livelihoods.

12. Involve local rural finance institutions in providing credit for livelihood support with conditions of credit provision tied to compatible economic activities and threat reduction; involve private sector financiers and private land owners in these programs.

13. Develop payments for ecosystem services as a form of valuation of certain land uses critical to support conservation objectives (i.e. increasing connectivity or reforesting degraded areas).

VII. Long-term sustainable financing
14. Develop revenue generation mechanisms, and fund management and allocation systems to provide adequate and sustained financial support to PAs. The level of financial support should aim to cover both recurrent management costs and support for sustainable and biodiversity-friendly development activities that benefit local communities. Strengthen transparency and accountability by promoting annual budget planning and performance-based
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reporting for both PA management and community development activities.

VIII. Monitoring
15. Develop appropriate indicators to monitor the biodiversity, social, and management effectiveness impact of the PA and surrounding landscape activities with the monitoring used for adaptive management.
Case Studies

The key findings for each site are briefly presented, focusing on a description of each park, threats to its biodiversity, key players, actions taken, and the effectiveness of the actions, and especially factors that strengthened or weakened conservation efforts. The cases are listed alphabetically by country and then by name of the protected area.
Case Study 1. Bhutan: Jigme Dorji National Park

Jigme Dorji National Park (JDNP), the largest protected area in Bhutan, covers 434,900 hectares in the northwest of the country. The park rises from 1,400 meters in the south to mountain peaks over 7,000 meters on its northern border along the Tibetan Plateau. This physiographic complexity is reflected in the diversity of ecosystems, ranging from subtropical forests in the south, through warm and cool temperate forests, conifer and subalpine forests, to alpine meadows and scrublands at higher elevations. To date, 1,434 species of plants have been identified in the park, 300 species of birds, and at least 31 species of mammals, including several species that are rare or endangered elsewhere in the world, such as takin (Budorcas taxicolor), blue sheep (Pseudovis nayaur), Himalayan black bear (Selenarctos thibetanus), and red panda (Ailurus fulgens). The park is believed to be the only location in the world with populations of both tiger (Panthera tigris) and snow leopard (Uncia uncia). The park protects an international watershed, the source of major tributaries of the Brahmaputra, which flows through India and Bangladesh to the Bay of Bengal.

There are 13 sub-districts (geogs) within the park, each with several villages, with a total population of 6,500. Since these communities were present prior to the designation of the park, the government recognized their right to remain and use park resources. At low elevations, the communities depend mainly on arable agriculture, with terraced, rainfed rice fields of approximately three hectares per household. Households typically also have a small number of livestock such as cattle, chickens, and pigs. At higher elevations, communities rely on yak herding and the production of yak products for their livelihoods. Products such as butter, cheese, wool, and meat are sold or
bartered for goods such as rice and vegetables that cannot be produced locally.

**THREATS**

At low elevations threats are limited, reflecting the stable subsistence agricultural livelihoods of the population. Some timber and fuelwood are collected illegally to avoid paying royalties, but the level of this threat is very low because of the small population size, large area of forest, and effective monitoring and control by authorities. Collection of leaf litter for composting is so intense in some localities that it prevents forest regeneration, but the total area subject to this threat is limited.

At high elevations, the main threats are overgrazing and herb collection. Overgrazing by yaks results in changes in the species composition of grasslands, with elimination of some alpine species. The underlying causes of overgrazing are both economic and cultural, since herd size is considered an indicator of wealth. There has also been a recent increase in demand for yak products from local and urban markets. Most highland households collect medicinal plant species for domestic use, but there are also a few professional collectors who sell to the only legal market, the Institute of Traditional Medicine in Thimpu. Each year the institute sets a quota for each species, based on quantities in stock, and purchases only the specified amount from the professional collectors. Although this system controls harvests for domestic needs, there is still a major threat from harvesting for international markets, especially for exports to China through Tibet.

**KEY PLAYERS**

Bhutan has a well-organized system of local government with 20 districts or dzongkhags. Within each district are smaller units called geogs. Each geog has a development committee (GYT) which submits an annual development plan to the dzongkhag development committee (DYT). The DYT determines activities to be funded from its annual budget allocation from the Ministry of Finance. The GEF-funded project has worked with the protected area management authority to strengthen the management of JDNP to work with the geogs to promote sustainable livelihoods. A strong community development planning unit undertakes strategic planning across the protected area network and provides technical backstopping to local community development officers.

**CONSERVATION ACTIVITIES**

The project has provided support to implement selected elements of each geog’s “Integrated Conservation and Development Plan” (ICDP). Because of the limited opportunities and low level of potential income from investment in agricultural development, the greatest opportunities for supplementary livelihoods in JDNP are from tourism development. The project is working with local communities to promote ecotourism in line with the ICDP and national tourism plans.

Have activities reduced threats?

The project provided support for national policy development as well as a number of activities at the site level, including strengthening park management; community planning for both development and conservation; alternative livelihoods based on tourism and nontimber forest products (NTFPs); and promotion of more sustainable use through agricultural diversification, social forestry, and environmental education. During the course of the project, local threats such as illegal fuelwood and timber collection and livestock overgrazing were reduced. Effective mechanisms were established to enable the park management to work more closely with the communities to maintain a positive relationship between the production landscape and the park’s conservation goals. More limited progress was achieved
on sustainable livelihood activities. Although success varied among different GEF-funded activities, the overall combination of GEF and non-GEF interventions was deemed effective in strengthening conservation efforts.

**Positive factors that support conservation**

**Culture and social cohesion**
Low population density and a high level of ethnic and cultural homogeneity promote social cohesion. Two elements of Bhutanese culture are critical in supporting conservation effectiveness: (1) religion (Buddhism), which respects nature as a central tenet; and (2) respect for the monarchy. Bhutan has a stable political system based on the monarchy, with an absence of party politics. The king is a strong supporter of environmental goals.

**Strong environmental legislation**
The government has passed strong legislation to create an enabling environment for conservation. This legislation includes the 1995 Forest and Nature Conservation Act and the 2002 DYT and GYT acts, which set the framework for development at the dzongkhag (district) and geog (sub-district) level. Strict application of the Forest and Nature Conservation Act prohibits clearing of additional forestland and should prevent agricultural expansion along new roads constructed to expand the national road network. For example, a thorough environmental impact assessment influenced the routing of a new road away from the Pho Chhu valley, an area of valuable takin habitat.

**Strong local government structures**
Dzongkhag extension officers for livestock, agriculture, and forestry provide strong technical support to the planning process. Local officials enjoy a high level of education and training. This technical capacity, combined with low population numbers, allows penetration of control and planning processes to all levels of society.

**Good coordination between park management and local government bodies**
The park management staff integrates well with local government structures; an example is marking timber for community use and coordinating with the local development planning and ICDP process.

**Sustainable financing**
Bhutan receives strong donor support for environmental, as well as social and economic development activities, including support for education and high salaries and other incentives for park staff. Additional revenues derive from tourism fees. All foreign tourists pay private tour operators a government-established fee of $200 per day. Of this amount, $65 is paid to the Ministry of Finance; some of this money is then re-allocated through local development plans.

**Negative factors that undermine conservation**

**Economic development**
The path of economic development, and especially the expansion of tourism, could increase threats to JDNP if it is not carefully managed.

**Poaching across the international border**
The relatively easy access across the park’s long and porous border with China along the Tibetan plateau facilitates poaching of wildlife and medicinal herbs.

**Conflicting development agendas**
Different departments of the Ministry of Agriculture seem to be pursuing goals that are sometimes conflicting. For example, livestock extension officers promote increasing herd sizes despite the problem of overgrazing.
Kaa-Iya National Park (KINP) is the largest protected area in Bolivia, covering almost 3.5 million hectares. The climate is semi-arid, with an intense dry season of 6–8 months between March/April and October/November. The topography is mostly flat, with a few small hills, and large areas of swamp (banados), especially in the southeast and northwest sections of the park. The park supports an array of ecosystems, including xerophytic Chaco forest, dry deciduous forest, and transitional semi-evergreen forest. It has an estimated 1,500 plant species and more than 500 animal species. The climate and low soil productivity are limiting factors for the type of production systems feasible in the area.

Adjacent to the western boundary of KINP is an indigenous peoples territory, or Territorio de Communidad de Origin (TCO) of the Isozu-Guarani indigenous population, covering 1.9 million hectares. Although not formally a buffer zone, the TCO was considered as such for the purposes of this case study. The population in the TCO is estimated at approximately 12,000, mostly Isozu households. These households practice a subsistence lifestyle based on cultivating yucca and maize, raising domesticated animals, and some traditional hunting. However, more than 700,000 hectares of the TCO is privately owned and used mainly for commercial cattle ranching. The Isozu community has maintained a strong sense of ethnic independence and social cohesion, which is reflected in a strong representational organization, la Capitanía del Alto y Bajo Izozo (CABI).

When KINP was created in 1995, CABI was designated as the co-management agency, in partnership with the state protected area agency, Servicio Nacional de Areas Protegidas (SERNAP). A management plan for
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The park is under implementation (2000–06). This plan has identified six zones of different land uses within the park: (1) a strictly-protected zone; (2) an extensive, non-extractive use zone (scientific research, ecotourism); (3) an extensive, extractive use zone (harvesting of construction timber, posts, firewood, hunting, and fishing, only by indigenous people); (4) an intensive extractive use zone (sustainable grazing); (5) a restoration zone; and (6) a special-use zone (around the Bolivia-Brazil gas pipeline).

The park benefits from a $1 million trust fund established by CABI and a consortium of petroleum companies, as part of the mitigation compensation negotiated for the construction of gas pipelines through the protected area. A foundation manages the annual expenditure of the trust fund to support the management of the protected area. Currently, the fund covers about 30 percent of the annual costs for the park. The TCO has also benefited from external financing from a $3.7 million allocation for implementation of an Indigenous Peoples’ Development Plan (IPDP) as part of the mitigation package for the gas pipeline.

**THREATS**

The three most significant threats to the protected area are hunting, cattle ranching, and potential future natural gas exploration and exploitation. The Isozu’s legal subsistence hunting in the TCO and KINP is not a threat to biodiversity. The main hunting threat comes from sport and commercial hunting by non-indigenous hunters. Illegal hunting is encouraged by a low risk of capture or punishment, the park’s proximity to the town of Santa Cruz (where there is a small market of bush-meat restaurants), and a hunting culture among the urban population. Overgrazing by cattle kept by non-Isozu ranchers destroys the natural habitat of the TCO, creates an edge effect along the park boundary, and reduces biodiversity within the TCO itself.

Commercial natural gas exploration concessions established before the creation of the park represent a potential future threat if exploration activities lead to new commercial extraction of gas from the area.

**KEY PLAYERS**

GEF project support was directed mainly toward the conservation-related activities directed through the park management authority, SERNAP. Support for social and economic activities has come from the existing trust fund and the IPDP grant, managed by the indigenous organization (CABI). The park has also benefited from other donor and NGO support, including technical support to develop the management plan from the Wildlife Conservation Society (WCS) (Redford and Painter 2006).

**CONSERVATION ACTIVITIES**

At the national level, the project is helping to develop a protected areas law that will set limits for economic activities within protected areas. The GEF project provides 70 percent of the annual costs for park management and financial support to the management council (CABI and the park management) and for capacity-building programs within SERNAP. The National Protected Areas Fund (FUNDESNAP), also funded by GEF, is designed to provide park operational costs once the GEF project is completed.

The GEF project is undertaking limited interventions in the TCO, consisting of support to environmental education programs targeted at communities and schools. The $3.7 million investment for the IPDP, for which CABI is implementing agency, covers issues of land tenure resolution and community-based social and economic development projects. Federal, state, and municipal governments finance basic services, such as education, health, housing, and road construction. External donors
also contribute to conservation and development activities. Funding for formulation of the KINP management plan was provided by the U.S. Agency for International Development (USAID).

Have activities reduced threats?

Collaboration between CABI and SERNAP has been effective in mobilizing strengthened park management and support against external threats. Additional support through the WCS has led to zoning of the park and TCO for conservation objectives. Support to the management council and capacity building and educational programs have been effective in strengthening local capacity for protected area management. Most of the buffer zone activities were supported through CABI funds and not by the GEF project. The role of CABI in both protected area management and local socioeconomic activities encourages synergies between conservation and local development. Nevertheless, illegal hunting remains a threat to park wildlife; this is clearly an enforcement issue.

CABI has been effective in achieving a variety of social and economic outcomes for buffer zone communities, including mobilization of communities against external threats, negotiation with external institutions, and programmatic allocation of funds within the territory and across the communities. A large portion of the buffer area has been titled to the indigenous community in the TCO. This has been an expensive and time-consuming process, yet land tenure alone will be insufficient to achieve conservation unless a management plan is agreed to regulate use of natural forests and ecosystems.

Positive factors that support conservation

Low population density and population distribution
A density of only 0.63 persons per square kilometer in the TCO and the concentration of settlements along the river system means that most communities are located at significant distances from the park boundary.

Difficult conditions for production systems
The arid climatic conditions and poor soil productivity throughout much of the TCO limit opportunities for increasing the intensity of grazing systems.

Strong social organization of the buffer zone communities
The presence of a strong indigenous organization representing buffer zone communities has benefited both conservation and economic development. The strength of CABI is due to the inherent social cohesion among the Isozu. The Isozu have a lengthy history of traditional authority structures, now merged with the needs of a community-based organization acting in a modern political and economic setting.

A common institutional structure for buffer zone and protected area
CABI’s dual role of representing Isozu communities and being a park comanagement agency ensures a link between the social and economic development options supported by CABI and conservation management within the KINP. However, this situation has the potential to create a conflict of interest if community priorities change and pressure on the protected area becomes more intensive.

Availability of local financing for buffer zone and protected area activities
The unusual financial strength of CABI (due to the financial package negotiated for the Bolivia-Brazil pipeline) has been a huge factor in its success both as a development and a conservation agency, and contributes to conservation in KINP. Additional financial sustainability for the park’s management is provided
through the National Protected Areas Fund (FUNDESNAIP).

**Negative factors that undermine conservation**

**Poor enforcement of the National Hunting Law**
The nationwide ban on hunting (excepting indigenous peoples’ subsistence hunting) is poorly enforced; illegal hunting continues to be a threat to wildlife in KINP. One possible reason for the poor enforcement is the involvement of politically influential individuals, who enjoy sport hunting and own bush-meat restaurants.

**Legal framework supporting hydrocarbon development**
The national constitution and laws support gas exploration and development, including within KINP. However, exploration and extraction could be limited to multiple-use zones of the park under revisions proposed for a new protected area law.
Case Study 3. Chile: Chiloé National Park

The Chiloé Archipelago is located in the south of Chile, covering approximately 930,000 hectares. The park includes 30 inhabited and 40 uninhabited islands, the largest of which is the Great Island of Chiloé (or Isla Grande). The Chiloé Archipelago contains the last relatively undisturbed tracts of Valdivian temperate forest in Chile, and is classified among the highest priority ecoregions in Latin America, with globally significant biological distinctiveness at risk and a priority for conservation (Dinerstein et al. 1995). It is one of the few unglaciated forests in the Southern Cone and is made up of a rich diversity of forest types and tree species. Much of the western side of the Great Island (some 43,057 hectares) lies within the park. The island is home to many endemic and endangered species of fauna, including the river otter (*Lutra provocax*), spotted wild cat (*Felis guigna*), Chilote black fox (*Pseudalopex fulvipes*), Chiloé mole rat (*Notiomys valdivianus chiloensis*), Chiloé tree rat (*Irenomys tarsalis longicaudata*), Smoky foot rat (*Phyllotis micropus fumipes*), and the monito del monte (*Dromiciops gliroides*), a small nocturnal marsupial and “living fossil” that has survived from the period when South America formed part of Gondwanaland.

**THREATS**

Much of the Chiloé National Park is still inaccessible and threats inside the park are minor. Where access is easier, the land typically belongs to large landowners, most of whom are conservation-oriented. Consequently, threats from local communities are largely restricted to the southern and southwest-
ern boundary of the park. The threats arise mainly from land use outside the park. These threats result from the interaction of traditional society with a market economy. Until recently, access to Chiloé National Park was difficult and communities lived at subsistence level. Now expansion of the road network has increased access to markets, which has led to greater harvesting of forest products. The tendency of young men to move temporarily to urban centers to take salaried work has created a demand for consumer goods, thus increasing incentives to generate income from forest resources. Local residents rely on the Chiloé forests for firewood. Fuelwood collection is also one of the few sources of income for poor farmers and a major threat to the forests. Further forest loss arises from the use of fire to clear land for pasture for cattle grazing. Since soils are poor, grazing land is soon exhausted, obliging farmers to open up more forest for their livestock.

**KEY PLAYERS**

The project was designed to protect a representative area of the diverse Valdivian temperate forest ecosystem by strengthening the management of the Chiloé National Park (CNP) based on a full partnership with local indigenous communities, and by demonstrating biodiversity-friendly conservation planning and management for the Great Island of Chiloé. It was designed to complement a Canadian-funded project to establish the Chiloé forests as a model forest with more sustainable management. The key players were the park management authority, representing the state protected areas agency (CONAMA); local government agencies, represented by Municipios De Chiloé; and the Council of Chiefs, a traditional indigenous organization.

At the beginning of the project, there were no financial institutions working with the lowest income communities in rural Chiloé. The project team worked with Fundación Ayuda y Esperanza, an urban micro-credit fund working in various parts of Chile, to introduce a micro-credit scheme in rural Chiloé. The result was Fondo Minga, designed by adapting the Fondo Esperanza model for application in rural areas and incorporating biodiversity conservation. Using the Chiloé Model Forest partnership, Fondo Minga established agreements with two municipalities and two public institutions to support the microfinance scheme.

During project implementation, a new indigenous organization emerged, the Federation of Indigenous Communities (FIC). Although the FIC was not represented on the Board of the Chiloé Model Forest, all communities were able to accept a common vision for forest management.

**CONSERVATION ACTIVITIES**

Because of the limited threats to the park, there has been no need for the classic strengthening of protected area management, envisaged originally as an output of the project. Instead, conservation activities have been undertaken in the context of creation of the Chiloé Model Forest to foster participation and organization of communities in productive management of forests; applied research and transfer of technology; environmental education; and promotion of tourism and culture. Under the project, support has been provided for community-based projects to promote sustainable use of forest resources and to develop tourism, social housing, and handicrafts. Awareness programs and networking have helped to share experiences at the local, national, and international levels and strengthen the local partnership for biodiversity conservation and sustainable forest management.

**Have activities reduced threats?**

Impact indicators suggest that project activities have addressed many of the threats to biodiversity within the park. For example, total forest cover increased by over 1 percent,
forest infractions were reduced, and the total available habitat for some monitored endangered species increased. Furthermore, the percentage of stakeholder groups undertaking conservation programs increased from 25 percent to 55 percent. Part of this increase can be attributed to agreement between the government and three indigenous communities located to the southwest of the park to settle land claims. Communities were given formal title to about 4,500 hectares of land. Part of this land was previously within the park and the rest was state land outside the park. The agreement prohibits sale of any land for at least 25 years, but does create opportunities for exploitation of natural resources by the local community.

Positive factors that support conservation

Strong social cohesion
Long-standing indigenous institutions, some of which have existed for centuries, support a collective action ethic. The communities located in the vicinity of the national park are mostly recognized as indigenous communities and even those not formally recognized as indigenous include a high proportion of indigenous families.

Culture and livelihood strategies are relatively homogeneous
Virtually all families pursue similar livelihood strategies, involving subsistence agriculture and harvesting of marine resources. Livestock production and surplus marine resources provide opportunities for income generation. The indigenous culture supports community action. Although land may be allocated to individual families, it is often used in a communal fashion. Exploitation of natural resources is also communally based, with individuals pooling their harvests and undertaking communal marketing. Involvement of indigenous communities in tourism has also been at the community level.

High tourism potential
Income generation from tourism is a viable option. The island of Chiloé receives about 400,000 tourists each year; about half of these visit the national park. International tourists comprise about one-third of the total. Some facilities, such as cabins and campsites, already exist. Negotiations are under way to transfer responsibility for these facilities from the park management to the communities.

Designation as an “Indigenous Development Area”
Designation as an Indigenous Development Area (IDA) should soon be approved in the area and will involve indigenous communities to the south and southwest of the park, where the project has been most active. Project support for community action on conservation and development was cited by the Corporacion Nacional de Desarrollo Indigenas as a major reason for designating the area as an IDA. Designation should increase the financial resources available for social development, such as road and bridge improvement, and promote improved medical service, education, and housing, as well as mobilizing funding to assist in the development of sustainable livelihood options.

Enactment of Native Forest Law
This law, enacted in 2005, makes funding available to promote good practices in forest management.

Negative factors that undermine conservation

Competition between indigenous institutions
During the design of the project, extensive consultations were held with the Council of Chiefs, a traditional organization that has existed for over 400 years based on hierarchical and hereditary principles. An alternative organization, the Federation of Indigenous Communities (FIC), has now emerged and about half of the indigenous communities have transferred their
allegiance to it. The emergence of the new organization and inter-community conflict has complicated planning and cooperation among communities.

Project activities are concentrated in seven communities. Three are represented by the FIC, two by the Council of Chiefs, and three are not considered to be indigenous communities, even though many families are indigenous. FIC requested but was denied a seat on the board of Chiloé Model Forest. Because the communities represented by the Federation lacked representation on the board, they were unwilling to accept board decisions, even if they held no objections.

*Capacity of the protected area authority is weak.*

The protected area authority has no legal right to collect or receive revenue from park operations, or even from donations. Any income, including entrance fees, is surrendered to the central exchequer, and no benefits accrue to the park. Until recently, the protected area authority’s policy was to manage protected areas without consideration of surrounding communities.

*Improving access to markets*

A road across the island to the southern boundary of the park has been completed in the past six years, and will soon be extended along the western boundary of the park. This road will give tourists easier access to the park, but it will also give fuelwood collectors easier access to markets, thereby encouraging increased harvesting of fuelwood and pressure on forests.
Case Study 4. Ethiopia: Bale Mountains National Park

The Bale Mountains National Park (BMNP), established in 1970, protects an area of 2,400 square kilometers (240,000 hectares) in the Bale massif, the largest and most important protected area in Afrotropical habitat in the whole of Africa. The area is of global biodiversity significance and an area of outstanding natural beauty. The national park protects a broad altitudinal range of habitats from 1,500 meters in the southern lowland deciduous woodlands through moist montane forest and ericaceous shrubland to Afro-alpine habitat on the Sanetti plateau, which lies above 4,000 meters with the highest peak, Tullu Dimentuu, at 4,370 meters.

The park supports high levels of species richness and endemism with 1,650 plants, one-third of which are endemic to Ethiopia (177 of these 600 Ethiopian endemics are unique to the Bale region). To date, 78 mammals and 278 bird species have been recorded in BMNP; 22 of these mammals, 16 birds, and 7 of the 8 recorded amphibians are Ethiopian endemics, with some species only recorded in the Bale massif. The largest concentrations of mammals occur in the northern woodlands around park headquarters at Dinshu, notably the endemic mountain nyala (*Tragelaphus nyala*), Ethiopian wolf (*Canis simensis*), serval (*Felis serval*), and Menelik’s bushbuck (*Tragelaphus scriptus meneliki*), as well as Bohor reed buck (*Redunca redunca*), zorilla (*Ictonyx striatus*), and the giant mole rat (*Tachyoryctes macrocephalus*), which is endemic to the mountains. In the *Harenna* forests below the southern escarpment, bushpig (*Potamochoerus porcus*) and Colobus monkeys (*Colobus guereza*) occur. Notable bird species include endemic blue-winged goose (*Cyanochen cyanoptera*), wattled ibis (*BOstrychia cauculata*), Rouget’s rail (*Rallus rougetii*), as well as breeding visitors such as wattled crane (*Grus ca-
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rerunculatus) and many Palearctic migratory birds, including raptors, which overwinter around the lakes of the Sanetti plateau, feeding on rodents. The area supports highland wetlands and large blocks of little-disturbed Afromontane habitats, which provide sources of water and grazing for native wildlife and excellent opportunities for wildlife viewing.

The BMNP is also a source of traditional phytomedicines used by herbalists in healthcare. More than 340 medicinal plants are recognized in BMNP. Ninety-five percent of the households around BMNP routinely use medicinal plants to treat common ailments and for pre- and post-natal care.

Surrounding the park are several other areas under protected status, including national forest priority areas, controlled hunting areas, and a wildlife reserve. The national forest priority areas are buffer zones meant to protect water catchments and wildlife corridors. However, there is considerable settlement and degradation in these areas. The Bale Mountains are an important water catchment and the source of more than 40 rivers and streams, including four major rivers: Wabe Shebelle, Web, Dumal, and Welmel. The Wabe Shebelle is a critical water source for lowland areas in Ethiopia and neighboring Somalia, especially in the dry season.

THREATS

The main pressures on the park are agricultural encroachment, village expansion, overgrazing by livestock (especially in highland ecosystems), fire, and timber and firewood harvesting. In 1974, land reform—followed by immigration and agricultural expansion—caused large-scale forest destruction and land clearance. This pattern continues today, especially in the southern lower-level forests. Local communities are encroaching on park boundaries in the eastern and northern parts of the park to cultivate coffee and barley and to collect fuelwood and construction materials.

Within the park, overgrazing by livestock is damaging the fragile highland ecosystems. In the lowland areas, especially to the valleys east of Gaysay and ridges north of Boditi–Goda Dima, pastoralists and their herds of cattle, sheep, and horses are increasing. At higher altitudes, the ericaceous vegetation is subject to burning and browsing, and even the Helichrysum vegetation on the upper plateau shows signs of overgrazing. The presence of cattle and herders’ dogs also makes the park’s carnivores vulnerable to disease transmission, including rabies.

Harvesting of medicinal plants is currently not a threat to the park, since only four native plants are collected in large quantities: Hagenia abyssinica, Thymus schimperi, Senna itlaica, and Embelia schimperi. Encroachment, livestock gazing, and wood collection are known to threaten at least eight medicinal plant species, as well as other park resources. In addition to firewood, honey, and other nontimber forest products (NTFPs) such as bamboo are collected on a small scale. Honey collection is not a serious threat since hives are lodged in tall trees, which adds value to retaining existing forest cover. Clearance of low vegetation for coffee growing as part of agroforestry systems disturbs natural forest processes.

KEY PLAYERS

The project is implemented by the Ethiopian Biodiversity Institute, which has a strong interest in ex situ conservation. The project provides funds for park management as well as medicinal plant management outside BMNP. Park management is highly committed but lacks resources and is understaffed. Management is further complicated by the decentralization process, which has placed the park under the responsibility of the Oromia state government, which is also short of staff and resources. The BMNP manager and his staff collaborate with the Biodiversity Institute to work with local communities and traditional healer groups (THGs).
BMNP has received other donor support for conservation. A German-funded project promoted community forest management in the Dodola area, including sustainable use of timber and other forest resources, controlled livestock grazing, and ecotourism and horse trekking in the Adaba-Dodola area. World Wildlife Fund (WWF) has provided resources to update a management plan and build some needed infrastructure in the park. WWF supported a community-based natural resources management project in the Mena Angetu forest area to promote new livelihood activities, such as manufacture of bamboo furniture, handicrafts, and ecotourism home stays in Rira. Opportunities exist to strengthen linkages with other development projects and add value through associating honey production and medicinal plants with the park brand name.

CONSERVATION ACTIVITIES

GEF funding was integrated with a small Learning and Innovation loan (LIL) from the World Bank to promote conservation and more sustainable use of medicinal plants, which are used routinely in Ethiopia for human and livestock healthcare. GEF funds were specifically targeted toward activities in and around the Bale Mountains, a recognized collection locality for medicinal plants. Funds were provided to improve BMNP management through training and zoning of key areas, as well as to support activities with local communities to reduce collection pressure in the park.

The project supported creation of traditional healers groups and socioeconomic surveys to identify which villages are harvesting medicinal plants from the park. Data from these surveys will feed into zonation of the park, including designation of use zones. Guidelines for sustainable harvesting are also being developed. In order to meet domestic demands for medicinal plants, the project is encouraging development of tree nurseries and medicinal gardens in five woredas (districts) under the management of communities and traditional healers.

Have activities reduced threats?

Harvesting of medicinal plants is currently not a threat to the park since only four native plants are collected in large quantities, but harvest levels should be monitored to establish sustainable harvesting levels. For local communities, medicinal herbs are a source of supplementary income, with many households already cultivating herbs or food items with established markets. The top nine medicinal plants are common species, including garlic and ginger, and only two of the cultivars of interest are threatened plants. Farmers are generally unwilling to tie up land growing perennial and tree species. Herbalists in five woredas are now involved in establishing medicinal gardens as field gene banks and nurseries for native medicinal plants to reduce collections from wild tree species, and restock degraded forest communities.

Native medicinal plants, as well as other park resources, are threatened by overgrazing and encroachment. Implementation of the park management plan and zoning for appropriate land use should help to address these threats.

Positive factors that support conservation

Large size of the protected area
The area is large enough to maintain viable populations of native large mammals, including rare and endemic species such as the Ethiopian wolf and mountain nyala.

Effective championing of conservation.
The park managers are effective in raising awareness of conservation values. A diligent scout force provides the basis for developing effective management and monitoring, and building good relations with surrounding communities.
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Tourism potential
The high-altitude habitats are in relatively good condition and accessible because of a road through the Afro-alpine habitats (the highest road in Africa). There are excellent opportunities for viewing rare and endangered mammal and bird species.

Long-term research project and NGO support
The park benefits from long-term support from the World Conservation Society (WCS). The WCS Ethiopian Wolf Conservation project runs a monitoring and training project and works with communities to address the risk of canine diseases spreading to the endangered wolves.

Negative Factors that undermine conservation

Lack of specific legislation and policy concerning BMNP
To date only two national parks in Ethiopia, Simien and Awash, are legally gazetted. BMNP falls under the jurisdiction of the Oromia state government, with day-to-day management under the Oromia Rural Land and Natural Resources Administration Authority. The state of Oromia needs to finalize a regional policy and legislation to manage its parks and reserves and to stabilize the institutional structure of the park.

Boundary uncertainty.
In some areas, the status of park boundaries is unclear, creating potential conflicts with local communities, especially in lowland forests. Internal park zoning will designate areas for cattle grazing, collection of medicinal plants, and tourism.

Pastoralism
Pastoralists have probably always made some limited use of the park, especially around the small settlements at Konteh. As grazing opportunities outside the park have been reduced, pastoralists are putting greater pressure on the park, causing damage to fragile alpine habitats, competition with native wildlife, and potential for disease transfer. As part of zoning, cattle should be excluded from important conservation areas, including the Harenna forests and important wildlife corridors around Dinsho.

Complex institutional arrangements
The various stakeholders, from state government to project implementers, lack cohesion. They pursue different objectives and hold differing perceptions of the value of conservation activities. Such differences are common when conservation activities are linked to donor funding for development. The priorities of the National Biodiversity Institute, the project implementer, are focused on research and ex situ conservation rather than in situ conservation activities in the protected area. The project focused initially on working with local healers associations, but was slow to mobilize resources to strengthen park management.

Inadequate collaboration among development projects.
With several other rural development projects operating in the vicinity, there is obvious potential to link conservation with development, but as yet such linkages have not been created. There also needs to be a common message regarding conservation. For example, plans to allow hunting in a “community area” within the park sends a confusing message concerning the legality of hunting within the conservation area.
Case Study 5. India: Periyar Tiger Reserve

Periyar Tiger Reserve (PTR) extends over 777 square kilometers (77,000 hectares) in the southern Western Ghats, a biodiversity hotspot notable for its scenic beauty, religious and cultural heritage and rare, endangered, and endemic species of tropical rainforest flora and fauna. It is the oldest and largest wildlife sanctuary in Kerala, established in 1935, with today’s boundaries dating from 1950. PTR forms the largest compact tropical forest block in the Western Ghats and plays a key role in maintaining regional connectivity in an otherwise fragmented forest landscape. PTR represents approximately half the biodiversity richness of Kerala, with 1,965 flowering plant species, 153 gymnosperms and pteridophytes, 62 mammals, 315 birds, 45 species of herpetofauna, 55 fishes, and 160 butterflies. Species richness is especially high among bryophytes, orchids, amphibians, and invertebrates. Many species are endemic or endangered or both, including key mammal species such as tiger (*Panthera tigris*), elephant (*Elephas maximus*), gaur (*Bos gaurus*), Nilgiri langur (*Presbytis johni*), lion-tailed macaque (*Macaca silenus*), Nilgiri tahr (*Hemitragus hylocrius*), and wild dog (*Cuon alpinus*). The reserve also supports high populations of deer and antelope, as well as rainforest birds and amphibians.

In addition to its biodiversity values, PTR protects a major watershed. The reservoir of the Mullaperiyar dam covers about 26 square kilometers within PTR and provides water to the state of Tamil Nadu for irrigation, drinking water, and power generation. The beauty of Periyar Lake and surrounding forests attract about half a million visitors annually. About 225,000 people, including tribals and scheduled castes, reside within two kilometers of the reserve. Some 35,000 of these people depend on the resources of PTR.
The literacy rate is high, but the people are generally poor.

The reserve was one of seven parks supported by the India Ecodevelopment Project (IEDP), which is funded through Bank lending and GEF. The project aimed to reduce the impact of surrounding communities on the protected area and to reduce the pressure of the protected area on the communities. It adopted a community-based approach, encouraging durable partnerships between forest staff and local communities for responsible management of natural resources. Accordingly, the project supported a range of activities within and around the reserve to strengthen protected area management to conserve biodiversity; increase the collaboration of local people in conservation efforts; and provide effective support for community development, including development funds, capacity building, and environmental education and awareness.

THREATS

A number of threats come from tribals and other fringe dwellers that engage in market-oriented agriculture but also use forest products. It is estimated that 57 percent of fringe-area dwellers use PTR for fuelwood collection, 28 percent for grass, 13 percent for non-wood forest products, and about 1 percent for illegal activities, including tree cutting and poaching. Prior to the project, some 1,500 cattle grazed in PTR, and annually approximately 30,000 tons of fuelwood was collected. About 53 percent of fringe-area dwellers depend on PTR, both for subsistence and supplemental purposes. Unemployment in many of the surrounding villages is high, at 60 percent. Tea and cardamom plantations were established on Periyar’s fringe from the early 20th century and more than 24 settlements of plantation workers also use forest resources.

The park exerts some negative impacts on fringe dwellers (especially the tribals) that are denied access to traditional use areas. Wildlife—especially wild boars, sambar, elephants and tigers—damage some crops and property in the settlements, which leads to conflicts between PTR staff and local people.

Tourism and visitor management in and around PTR is a major issue. Kumily, the main township, caters to both national and international visitors. Each year, more than 500,000 tourists visit Mullaperiyar Lake and adjacent park habitats. The Sabarimala temple, which lies within the reserve, is visited by more than 4 million pilgrims over a two-month period to worship Lord Ayappa, the mountain god who rides a tiger.

Other threats stem from an inter-state dispute on raising the water level of the Mullaperiyar dam reservoir, which would submerge important wildlife habitat; extraction of eucalypts from a corner of the park for newspaper production; illicit marijuana cultivation; smuggling of timber, especially sandalwood; poaching; and proposed development activities such as road and rail projects. As in other protected areas, the resource use and harvesting in PTR depends on distant market demands and complex trade chains, something over which local field staff have little control.

KEY PLAYERS

Under the India Ecodevelopment Project, the Ministry of Environment and Forests (MOEF) provided funds to seven states, including Kerala, for support to key protected areas. Under the Kerala Forestry Department, PTR staff worked with local communities to establish flexible institutional mechanisms by forming 72 ecodevelopment committees (EDCs). PTR staff worked with the EDCs to implement development activities and to promote reciprocal conservation commitments to reduce pressures on the reserve. A state-level coordination committee and a protected area implementation committee were empowered to coordinate conservation and development efforts.
CONSERVATION ACTIVITIES

Staff training, patrolling camps, and upgraded infrastructure have enhanced PTR management. PTR staff worked with local communities to establish ecodevelopment committees (EDCs) and focused self-help groups (SHGs). Microplans were implemented for 72 EDCs, covering 5,407 families, and village development funds were established. EDCs and PTR staff explored innovative solutions to problems such as timber poaching and pilgrim management. Conservation-oriented activities included measures to enhance villagers’ livelihoods, including training as tourist guides, organic agriculture, and fuel-saving stoves. Some EDC activities have been linked to development initiatives supported by the panchayat (local government). There has also been a deliberate effort to further engage communities in ecotourism in the landscape around the reserve. Small-scale research and monitoring projects with local academic institutions and education and awareness campaigns promoted a conservation constituency for PTR. The establishment of the Periyar Foundation in 2004 and re-allocation of visitor fees to ecodevelopment will contribute to sustainability of the ecodevelopment initiatives.

Have activities reduced threats?

Principal outcomes include improved planning and protection, a transformed tourism policy, habitat recovery, development of social capital among the very poor, and enhanced awareness of PTR values, as well as establishment of the EDC program. These efforts have addressed threats by extending management zoning for inclusion of habitats outside the reserve’s boundaries and proscribing management requirements for pilgrimages and tourism. Project activities benefited local communities and encouraged transparency, capacity building, and equity through the EDC system. Conservation values were mainstreamed into ecodevelopment activities, with beneficiaries expected to engage in reciprocal conservation commitments. Park staff members were creative in finding innovative solutions to problems. For example, converting sandalwood poachers and other trespassers into eco-tourism guides has reduced poaching, and ecodevelopment has helped tribals escape long-term debt cycles. Improved management of the millions of pilgrims who visit the Sabarimala temple has brought benefits to the park (e.g., reduced fuelwood collection, litter) as well as income benefits to EDC communities (Uniyal and Zacharias 2001).

A particular achievement of the project was the formation of EDCs and the establishment of community development funds to continue ecodevelopment activities. Strategic capacity building sustained the EDCs and SHGs and built commitment to conservation in and around PTR. The inclusion of the poor and women in EDCs as well as targeted income-generating activities, supported by short-term credits, gave credence to the objectives of the IEDP and fostered productive and transparent relationships between PTR and concerned village communities. A major challenge will be to sustain these gains following the project’s completion. The Periyar Foundation, formed to sustain ecodevelopment, appears to be functioning well; it has attracted national attention for possible applications in other protected areas in India. The EDCs still await institutional recognition under the Kerala Forest Rules, and there needs to be further linkage of EDC activities with local governments to encourage conservation-friendly development.

Positive Factors that support conservation

Highly committed staff
The selection and posting of well-qualified lead officers from the Forest Department for extended periods and their support by contract staff, especially a sociologist, provided effective teams for establishing EDCs and consistent and creative support to EDCs during the project.
Community groupings based on needs and dependencies

The PTR staff recognized that different social and ethnic groups have different levels of dependency on reserve resources. Accordingly, EDCs were organized into three categories based on social patterns and resource use: (1) neighborhood EDCs, which were based on tribal, scheduled caste, and agricultural settlements/hamlets consisting of about 50–80 households; (2) user-group EDCs, such as graziers, fuelwood and thatching grass collectors, and vendors operating on forest routes during the Sabarimala pilgrimage; and (3) professional group EDCs, such as ex-smugglers of the bark of the vayana tree (Cinnamomum sp.), day laborers, and tribal guides. These groupings allowed for more targeted microplanning to meet EDC needs.

Community commitments

To be eligible for village grants, communities or households had to raise a 25 percent counterpart contribution themselves. This requirement ensured ownership in the activity and also provided core funds for a community development fund available to the EDC beyond the project lifetime. Additionally, EDCs were expected to make reciprocal conservation commitments, such as patrolling the forest.

Improved forest-community relationships

The EDCs worked well and threats were reduced. A major focus of the project was a deliberate effort to improve relationships between protected area staff and local communities to develop effective partnerships. The project also improved relationships between PTR staff and other state government staff at the field level, as well as with the panchayats. At a number of IEDP project sites, especially PTR, investment in social capital helped mobilize civil society in favor of biodiversity conservation.

Support at State level

PTR benefited from strong support at the state level, especially from the chief wildlife warden and Kerala’s secretary for forests, who were key in securing the establishment of the Periyar Foundation and re-allocating part of the visitor fees to this fund.

Negative factors that undermine conservation

Tea plantations on Tamil Nadu border

To date, there has been no resolution of conflicts with tea estates on the Tamil Nadu border. As tea prices fall, many estate workers are losing their jobs and becoming increasingly reliant on forest resources. This situation is a new challenge for Periyar.

Additional villages awaiting EDC benefits

Establishing ecodevelopment committees and microplanning is a lengthy process. Not all villagers around Periyar benefited from membership in EDCs under the project. More park neighbors, including those on the Tamil Nadu boundary, would like to join EDCs if funds become available.

EDC sustainability

Other challenges faced by the EDC system include maintaining commitments and establishing mechanisms to offset fluctuating prices of agricultural products farmed by the EDCs (and the re-emergence of moneylenders and consequent increased pressures on the reserve and area resources). It will also be important to streamline ecodevelopment decision making and assure transparency in the working arrangements between the EDCs, PTR, and staff of the Periyar Foundation.
Ranthambore Tiger Reserve (RTR) covers 133,400 hectares with a core area of 39,300 hectares notified as a national park in 1980. The reserve is located on the left bank of the Chambal River in the state of Rajasthan. It links a chain of wildlife sanctuaries and is a watershed for many reservoirs and other impoundments, which makes it a lifeline for local people in this dry state. Ranthambore is one of India’s most famous tiger reserves as well as a site of scenic, archaeological and cultural significance. The park supports key predator-prey communities with carnivores such as tiger (*Panthera tigris*), caracal (*Felis caracal*) and sloth bear (*Melursus ursinus*) and high populations of prey species such as chital (*Axis axis*), blackbuck (*Antilope cervicapra*), nilgai (*Boselaphus tragocamelus*) and sambar deer (*Cervus unicolor*). Situated in one of India’s poorest states, the reserve is subject to heavy pressures from the neighboring 332 villages of some 200,000 people and 100,000 cattle.

The ecodevelopment programs in India began as a new tool for managing the conflict between parks and people while conserving the biodiversity in the parks. Like Periyar, Ranthambore, is a tiger reserve recognized for its global biodiversity value and a beneficiary under the India Ecodevelopment Project. The project focussed on strengthening management in the Ranthambore national park and the Kela Devi wildlife sanctuary, both part of the RTR.

**THREATS**

RTR is an “ecological island” of natural forests and grazing areas in a densely-inhabited, semi-arid environment. Poverty levels are high and communities
depend on agriculture and cattle raising. Rajasthan suffers from periods of intense drought with three consecutive years of low rainfall during the period of project implementation. Under such conditions the park remains one of the few sources of grazing, water, and fuel wood. Grazing by village livestock is a major threat both because of competition for resources with native wildlife and the danger of disease transmission from domestic cattle to reserve fauna. Crop damage caused by reserve herbivores, such as nilgai, creates further conflict between communities and RTR.

Another key management issue is tourism, both inside and outside the reserve. RTR is a favorite tourism destination to view tigers. Management of tourism falls under the mandate of the State Tourism Department and there is continuous tension between conservation objectives and pressure to increase visitor numbers, with consequent impacts on reserve wildlife. Over 300 hotels in Ranthambore derive substantial benefits from the reserve (estimated at US$ 5–10 million annually) yet provide very limited financial support to RTR operations and only limited employment opportunities to neighboring villages. The hotels make few attempts to finance the development of local crafts, employ local people, or use local resources such as food produce.

Of greater concern is the issue of water supplies. The hotels use large quantities of water, thereby drawing down ground water levels, reducing access to water for wildlife and neighboring communities. Illegal hotels in the reserve’s buffer zone, often built on grazing land, have invoked the anger of local people and resulted in the recent destruction of 26 hotels by local authorities in accordance with regulations that limit the building of tourist infrastructure in, and around, protected areas.

KEY PLAYERS

The India Ecodevelopment Project is implemented through MOEF with funds dispersed through forest departments in seven states to support activities in key reserves. In Rajasthan the key players are the staff of RTR under the jurisdiction of the Rajasthan Forest Department. RTR staff have worked with local communities to develop ecodevelopment committees (EDCs) and implement ecodevelopment activities. There was little NGO support except for development of an educational program.

CONSERVATION ACTIVITIES

Under IEDP, RTR had access to the same package of activities as Periyar with provision to strengthen protected area management, including improved infrastructure and facilities for field staff; village ecodevelopment activities; research and monitoring; and education and awareness activities. RTR staff worked with local communities to establish ecodevelopment committees (EDCs) and develop and implement microplans. Of the original target of 100 villages, 62 EDCs were established (31 in the Keladevi buffer zone and 31 in the villages fringing the national park). They were organized along village lines, but also include women and poorer members of the community. At least one woman serves on the EDC steering committee. Village ecodevelopment activities have included construction of water harvesting facilities, crop protection walls and roads, and provision of canisters of liquefied petroleum gas (LPG) to reduce reliance on fuel wood from the reserve. Micro planning through EDCs and other arrangements led to creation of water points, strong social organizations and provision of much needed infrastructure. Environmental awareness and education was initiated, but has not been well sustained, partly because of competing priorities for RTR staff. Nevertheless very successful nature camps are organized annually with EDC participation. Monitoring of faunal populations is being conducted within the reserve as is participatory monitoring to assess the impact of EDC activities in reducing threats such as firewood collection. Reserve staff have been successful in accessing non-project resources...
for ecodevelopment activities through national programs such as the Working for Food drought relief program.

**Have activities reduced threats?**

RTR has benefited from improved infrastructure such as construction of guard facilities, boundary demarcation, and equipment as well as staff training. Poaching has been markedly reduced during the last few years although incidents of tiger poaching still occur. Domestic livestock grazing, fuel wood extraction, and human-wildlife conflicts have been progressively controlled along parts of the reserve boundary largely through construction of boundary walls, built at the request of EDCs. These walls to protect crop fields were built with village labor, financed by project resources and the Working for Food program. RTR staff have been creative in accessing both IEDP resources and funds from the Rajiv Gandhi Foundation to restore medieval water points and step wells, both within the reserve and surrounding villages to increase access to water resources.

Conservation benefits under IEDP include improved control of illegal grazing, a decline in poaching, reduction in illegal use of trees for fuel wood, reduced encroachment on the reserve, and improved water resources. EDC villages benefited from infrastructure improvements such as roads, drinking water facilities, community buildings, and water ponds along with the construction of crop protection walls and enhanced recharge of ground water. One village was voluntarily resettled from within the park onto revenue lands.

Micro planning sought to protect reserve resources through investments in the EDCs, including establishment of Village Development Funds and Self-Help Groups (SHGs). Unfortunately post-project only 50 percent of the EDCs remain active and some of the excluded villages continue to exploit reserve resources. Overall, however, relationships between RTR and buffer villages improved through the ecodevelopment activities. Currently, there are tensions between RTR and the *panchayats* over water availability and the dedication of EDC funds for activities that protect RTR rather than develop infrastructure. The requirement for a 25 percent beneficiary contribution to ecodevelopment activities created tensions with the poorest villagers often unable to find this amount. To compensate the project increased the emphasis on community projects rather than ecodevelopment benefits to individual households.

Questions remain about the sustainability of ecodevelopment activities. Although Ranthambore has charged an ecodevelopment fee as part of its visitor fee for the past ten years, the Government of Rajasthan does not return these funds to the park, despite pressure from the World Bank. Given lack of funding to continue the ecodevelopment program, there is a real danger that goodwill will be lost and the communities will revert to using reserve resources out of necessity. The planned development of a water resources management plan for the reserve and adjoining landscape could help mobilize needed financial and human resources to offset these needs.

**Positive factors that support conservation**

**Strong commitment of protected area staff**

RTR benefits from highly committed senior and field staff, often working in extremely difficult conditions with restricted budgets and considerable interference from powerful political and commercial interests. RTR staff showed diligence in furthering ecodevelopment and protection activities with limited support and resources under the project.

**Support from local government**

Good relationships between reserve management and local government, such as the District Collector, have facilitated difficult management actions such as prevention of cattle grazing in the park and voluntary resettlement of villages to revenue lands.
Reducing Threats to Protected Areas: Lessons from the field

Development funding for conservation
Reserve staff were effective in working with EDCs to mobilize project ecodvelopment funds and additional development funding to further both conservation and village objectives such as the wall constructed to reduce human-wildlife conflicts and the construction and restoration of water points to remove pressure on RTR.

Negative Factors that undermine conservation

Poverty and drought
The villages around Ranthambore live in conditions of extreme poverty. The rate of unemployment is 80 percent in some villages and the area is highly vulnerable to drought. During difficult conditions, villagers fall back on the reserve for access to grazing and water for livestock.

Weak support at the state level
In spite of its high profile, RTR has not received the necessary support from the Government of Rajasthan in terms of staff and budget allocations, timely release of budgeted funds, or clearance of contracts for consultants or infrastructure. A key outstanding issue is the delay in returning ecodvelopment revenues from visitor fees to RTR, even though these charges are meant for ecodvelopment in the region.

Conflicting policies
National policies regarding national parks and protected areas are contradictory. Removal of an invasive alien tree species, Prosopis, was funded under the project as part of habitat improvement. This activity could be continued with non-project resources if local entrepreneurs were allowed to collect the trees and convert them to charcoal for sale. However, the Wildlife Act bans the sale of resources harvested from national parks, even though such harvesting of invasives could benefit both biodiversity and local communities.

Institutional weaknesses
RTR is currently understaffed and many of the field staff are approaching retirement age. A moratorium on new recruitment seriously impairs protection capability, especially if range officers must take on the additional duties of ecodvelopment.

Women's empowerment
Rajasthan is a very conservative society. Of the seven protected areas under IEDP, RTR probably benefited the least in terms of women's empowerment. Although the project provided resources to employ a women's development officer, RTR was unable to take advantage of this offer.

Financial sustainability
There are serious concerns as to whether RTR can sustain the EDCs and involve the remaining villages targeted for inclusion. The resource base of the reserve could be strengthened if the Government of Rajasthan would return the ecotax charged on visitor fees, but there are no signs of action. The state government has also been slow to establish vocational programs to enhance eco-friendly activities—such as fisheries, poultry, and dairy farming—in consultation with reserve authorities and local communities.
Kerinci-Seblat National Park (KSNP) is one of the largest conservation areas in Southeast Asia. Extending south along the Barisan range, the park straddles four provinces and nine kapupatens (districts) and covers more than 1.4 million hectares of habitat—from lowland forests to highland wetland systems, montane forests, and subalpine habitats on Mount Kerinci, Sumatra’s highest mountain at 3,805 meters. The park harbors more than 4,000 plant species, 350 bird species (including 14 of the 20 Sumatran mainland endemics), and 144 mammal species (73 percent of the Sumatran mammal fauna and one-thirtieth of the world total). It protects some of the last viable populations of rare and endangered mammals, such as the endemic Sumatran hare (*Nesolagus netscheri*), small Sumatran rhinoceros (*Dicerorhinus sumatrensis*), clouded leopard (*Neofelis nebulosa*), Sumatran tiger (*Panthera Tigris*), Malay tapir (*Tapirus indicus*), and elephant (*Elephas maximus*). Many of the wide-ranging large herbivores and predators require large areas of lowland forests to maintain viable populations. The park provides watershed protection for two of Sumatra’s major rivers, the Batanghari and Musi, which supply millions of hectares of downstream farmlands.

**THREATS**

The park was declared in 1982 but almost immediately the Ministry of Forestry excised the species-rich lowland forests for logging concessions, a policy decision with major implications for conservation efforts. The in-
Integrity of the park and its biodiversity values are threatened by agricultural encroachment, including cinnamon plantations; small-scale artisanal mining; commercial mineral exploration concessions that overlap park lands; poaching of tigers and rhinos; and legal and illegal logging in the lowland and hill forests of the park and its buffer areas (Jepson et al. 2001; MacKinnon 2005). With the fall of the Suharto government, decentralization and devolution of responsibilities to local governments fueled demands for greater local development and increased the pressures on park forests from agricultural expansion and logging. Provincial plans for new roads threaten to fragment the park and open up forest areas for further encroachment.

KEY PLAYERS

The Kerinci Seblat Integrated Conservation and Development Project began in 1997, financed with a World Bank loan and a grant from the Global Environment Facility (GEF), with the objectives of protecting forests and biodiversity both within and beyond park boundaries, including the surrounding logging concessions. Project implementation involved the park management authority under the Conservation Department (PHKA) and the Department of Forest Production, all under the Ministry of Forestry. The Department of Regional Development (BANGDA) within the Ministry of Home Affairs took the lead on village development. WWF-Indonesia was the NGO coordinator and facilitator for village conservation agreements. The project also relied on close collaboration with the Ministry of Planning (BAPPENAS) and local provincial and district governments.

CONSERVATION ACTIVITIES

The project provided financing to strengthen park management, spatial planning tools for development planning, and grants to adjacent communities to develop alternative livelihoods in return for commitment to conservation agreements. Considerable resources were provided for village facilitators from WWF to work with local communities to designate boundaries, map resources, and develop conservation commitments. More than 75 villages received development assistance. Relevant government agencies in the four provinces were linked through an inter-provincial coordinating committee. In surrounding forest concessions, the project funded surveys to identify high biodiversity areas and reviews of management practices—but plans to improve forest management were abandoned as illegal logging became rampant across Sumatra. Instead, the project worked with local bupatis (regents) and kabupaten governments to establish teams to apprehend illegal log shipments.

Have activities reduced threats?

In 1999, after lengthy consultations with adjacent communities, the boundaries were agreed to and the park was legally gazetted. KSNP was the first national park in Indonesia to achieve this status. Nevertheless, after six years and more than $18 million of investment, the ICDP failed to achieve its conservation objectives. Today, KSNP is still under threat from agricultural encroachment and illegal logging. Park staff members were unable to stop land clearance and illegal logging, even with generous resources for patrolling, training, and equipment. Few of the beneficiary communities maintained their reciprocal commitments to respect park boundaries. Some beneficiaries continued their incursions into the forest, and were often a greater threat than villages that received no benefits. It was probably not realistic to expect that providing development options would induce local communities to reduce their impact on Kerinci’s forests, especially since much of the agricultural expansion is not for subsistence but for wealthy planters to expand a valuable cash crop, cassiavera *Cinnamomum burmanni*.
The substantial investments in expensive technical assistance, facilitation, and development grants could probably have been more effectively spent to strengthen enforcement, including prosecution of known offenders. Funds might also have been better spent on a more aggressive outreach campaign to raise local awareness of the park’s linkages to ecosystem services, such as flood control. WWF-Indonesia—funded to provide community facilitation because of its long-term commitment to the area—walked away at the end of the project, just like other contracted technical assistance.

Despite the establishment of an inter-provincial planning committee, regional development strategies continue to threaten park integrity. Local governments press for roads that would bisect the park, fragment forest habitats, and provide further access for agricultural expansion and poaching. Three mining companies have exploration concessions that overlap park boundaries. Embattled park staff members continue to challenge and oppose transport and mining plans, which conflict with park management objectives. Although the project provided resources for improved forest management in neighboring concessions, plans to provide training for reduced-impact logging were abandoned in the face of extensive illegal logging within the concessions and even within the park. Local authorities proved unwilling, or unable, to close down illegal sawmills, which often had the backing of high political and military figures (Jepson et al. 2001).

Although illegal logging was a serious threat, and park patrols were met with increasing violence, KSNP appears to have suffered less deforestation, both within the park and in the broader ecosystem, than other Sumatran parks. Post-project, the biologically rich Sipurak Hook area was finally incorporated into the park in 2005 after cancellation of the logging concession. Dedicated tiger and rhino anti-poaching patrols continue to work effectively, with NGO support through Flora and Fauna International. A new consortium of local NGOs, Warung Informasi Konservasi (WARS), has subsequently become an effective force for conservation and change in the region. KSNP is still one of the most important conservation areas in Southeast Asia.

### Positive factors that support conservation

**Large size of the park**
The large size of the Kerinci ecosystem across an altitudinal gradient effectively contributes to conservation. Nevertheless, encroachment and opening up of the species-rich lowland forests is a serious threat to the viability of key park species. The park’s recent designation as a World Heritage Site should focus more attention on effective protection.

**Locally based conservation NGO programs**
The park continues to benefit from the commitment of locally based NGOs. A new consortium of local Sumatran NGOs, WARS, which gained experience under the project, has become an effective supporter of the park and conservation elsewhere in surrounding provinces.

### Negative Factors that undermine conservation

**Poor linkages between conservation and development**
The project design was an ambitious attempt to integrate the national park and conservation objectives within regional planning. Both the donor and the government agreed that the ICDP design was too complex with too many objectives and too much funding over too short a time period. Over time, the emphasis narrowed from regional planning to small-scale village development activities, often with no clear link to conservation.

**Lack of political commitment**
Although the global conservation community often complains about inadequate funding for
parks and protected areas, the Kerinci story illustrates that even generous budgets will not ensure success where there is little political commitment or local support for conservation.

**Political change and breakdown in law and order**
The economic crisis in Indonesia, combined with political upheaval, decentralization, and the breakdown of law and order led to rampant illegal logging and unprecedented pressures on Indonesia’s forests and national parks.

**Complex institutional arrangements**
Various institutions had different and sometimes conflicting agendas. BANGDA and provincial governments were primarily interested in development, whereas PHKA’s primary goal was conservation with village development grants serving merely as tools to achieve conservation. The focus on development led to disbursement of grants to villages that showed little commitment to conservation. Overall, there was poor cooperation between institutions, even those within the same ministry. For example, in the Ministry of Forestry, the departments of forest production and planning provided poor support to their sister department of conservation and failed to address concession violations and repatriation of forest areas to KSNP.

**Unrealistic expectations**
The emphasis on village development was based on the unproven assumption that poverty and lack of alternative livelihoods was driving deforestation. In fact, some of the villages targeted were some of the wealthiest villages in Sumatra. Additionally, much of the forest clearance for cash crops and illegal logging were instigated by wealthy and influential individuals, often based far from the park. Under such conditions, unenforceable conservation agreements with local villages are unlikely to be effective. Development grants through the ICDP were always regarded as supplementary rather than alternatives to high-earning crops such as cinnamon.

**Weak law enforcement and governance**
Law enforcement and park protection was poor, even before reformation and decentralization. After decentralization, illegal logging and land clearance continued unchecked and un-checkable. Even with project-sponsored activities to address logging, *bupatis* and *kabupaten* governments showed little commitment to close down illegal sawmills.
Case Study 8. Madagascar: Andasibe-Mantadia National Park

Situated in the eastern province of Toamasina, the corridor of Zahamena-Ankeniheny is one of the largest remaining blocks of forest in the eastern ecoregion, one of the richest ecosystems in Madagascar. The forest corridor stretches 220 kilometers from the Zahamena National Park in the north to the Ankeniheny Forest Reserve in the south, covering about 485,000 hectares over a length of 160 kilometers. It varies in width from 35 kilometers in parts of the north to about 15 kilometers further south. The tropical high forests between Zahamena National Park and Andasibe-Mantadia National Park are biologically rich with high levels of endemism: 77 percent of the plant species and 80 percent of the animal species are restricted to this part of Madagascar. Twelve species of lemurs occur in the area, including the indri (Indri indri), Propithecus diadema, Eulemur fulvus, E. rubriventer, Hapalemur griseus, Daubentonia madagascariensis, as well as species of Microcebus, Allocebus, and Lepilemur. Other endemics include carnivores such as the Malagasy civet (Fossa fossana) and fossa (Cryptoprocta ferox), as well as frog species of the genus Mantella.

The southern tip of the corridor is an interesting complex of various types of protected areas (integral nature reserves, national park, and special reserves) and production landscape. It includes the Mantadia National Park (15,489 hectares) and the small Analamazotra Special Indri Reserve (810 hectares) separated by a heavily populated corridor around the village of Andasibe. The subject of focused donor assistance over the past 10–15 years, this area is one of the best-studied parts of Madagascar.

The case study forests fall within two municipalities (“communes”), Andasibe and Ambatovola, with a total population in 2001 of about 22,000.
About half live in the 80,600-hectare Peripheral Zone in 33 hamlets and 44 villages. There are no permanent settlements inside the boundaries of the protected areas. The main economic activities in the buffer zone are agriculture, graphite mining (two enterprises), charcoal production, forestry exploitation (15 companies), extraction of essential oils (one company), and hotels (four establishments). Households often combine salaried employment with small-scale subsistence agriculture. The main agricultural crops are rice (paddy and rain fed), corn, cassava, banana, ginger, vegetables, and some cash crops like coffee. Overall agricultural activity is low, both in terms of income generated and land surface occupied (only 11 percent of arable land in the Andasibe municipality is cultivated). The area also includes a small community-managed forest under the new privatization arrangement promoted by the Forestry Department, with initial transfer agreements for three years and the potential to extend for 10–20 years.

**THREATS**

The main threats to the park are traditional slash and burn (*tavy*) agriculture, timber extraction, harvesting of other forest resources, and mining. *Tavy*, which is practiced by local communities on the periphery of the park, has been the major cause of habitat destruction and fragmentation. Charcoal production is a common activity among local communities, with production for home use and sale. Precious woods are extracted for sale and lower grade logs taken for local construction and furniture. These illegal and unsustainable activities occur in the areas of the buffer zone that are still primary forest. Illegal collection of nontimber forest products focuses on fern plants and chameleons. Artisanal miners extract rubies, sapphires, and other stones in the buffer zone by digging large ditches and holes and using the river water to wash out sediments. Most miners operate without permits. Some communities that have acquired transfer agreement rights have removed the miners from their zone.

**KEY PLAYERS**

The National Network of Protected Areas is managed by Association National Pour la Gestion des Aires Protegees (ANGAP), under the supervision of the Ministry of Environment and Water and Forests. ANGAP is mandated to set up the park management system and coordinate protected area management and rural development activities in the peripheral zone. In line with national policy, ANGAP has decentralized its operations. Management of a protected area may legally be delegated to a third public or private party with satisfactory technical and financial capacity. Most protected areas are under direct management by ANGAP, but some are managed under subcontracts to NGOs; for example, Conservation International manages Zahamena National Park. Both under the GEF project and other donor programs under the Second Environment Program (EP2), international NGOs have provided valuable technical assistance.

**CONSERVATION ACTIVITIES**

GEF funding—through the World Bank under EP2—focused on strengthening park management by completing management and business plans for both the Mantadia park and the Analamazaotra reserve. The GEF project covered about 70 percent of the costs of implementing the management plan, including law enforcement. The core area of the park has been zoned as an “intact core zone” for research and ecotourism. The park management also developed a management plan for development of the buffer zone. The buffer area includes five land use and access zones that allow agriculture, forestry, and mining.

GEF, through UNDP, funded the elaboration of two municipal development plans for Andasibe and Ambatovola, which are nested in
the regional development plan. The management plan for the Peripheral Zone is an integral part of the buffer zone. The project also piloted land tenure transfer agreements to local communities under the 1996 GELOSE law (Gestion Localisée Securisée), which enables communities to sign a contract with the state to manage specific natural resources on their lands. Other alternative income generation activities include community-based tourism, collection and marketing of NTFPs, promotion of new crops (ginger, cinnamon, vegetable gardens), fish farming, handicrafts, and apiculture. The project has also encouraged improvement of existing agricultural practices through intensified agriculture, irrigated rice production, and improved forest use (planting of useful trees, wood poles, and medicinal plants). All of these programs have been supported with an active program of environmental education, including construction of a visitor center, production of awareness materials, children’s programs, and support to an association of tourist guides.

At the macro level, the project provided support to address governance in the forestry sector, including formulation and implementation of specific forest sector action plans; establishment of a Forestry Sector Observatory as an independent, multi-stakeholder watchdog to oversee the sector and identify areas in need of management improvements; review of logging contracts; cancellation of illegal contracts and legal contracts in arrears; and restructuring of payment arrangements with operators in good standing. As a result, the collection of fees from logging permits increased from 17 percent to 68 percent of all logging permits. These activities strengthened biodiversity protection and created an enabling environment to pilot community-managed forests.

Following an agreement between the Government of Madagascar and the donors, half the visitor fees from protected areas are allocated to local communities for development projects. Mantadia National Park is one of the most visited ecotourism sites in the country. Its entry fee system has generated significant income, half of which was earmarked for reinvestment in development for surrounding communities. Under the project, Community Management Committees (COGES), with representation from each village, were set up to manage these revenues and review applications for funding. Park funds have contributed to a market building in Andasibe, improvement of city hall, communication equipment (satellite dish for TV), and school buildings.

Other donors have provided funding for conservation and sustainable use of natural resources in the study area within the overall framework of EP2 and more specifically within the ecoregional approach applied to the Zahamena-Ankeniheny Forest Corridor. The U.S. Agency for International Development (USAID) has been an active donor in promoting ANGAP institutional strengthening, support to specific sites, and NGO technical assistance. USAID also promoted transfer of forest management to local communities, new legislation including the Contractual Forest Management decree, and the development of several forest management plans, including one for the Ankeniheny National Forest Reserve. USAID supported community-centered interventions to reduce slash and burn agriculture and encourage farmers to adopt farming systems that are more intensified, sustainable, and profitable. Several NGOs are also active in the study area. Conservation International assists communities with forest management transfer agreements to produce a private network of community-based forest reserves, while the Wildlife Conservation Society (WCS) is supporting establishment of the Torotorofotsy Marsh as a Ramsar site.

**Have activities reduced threats?**

The interventions of the Government of Madagascar, with assistance from the donor community within the framework of EP2 and support from international NGOs, have
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been effective in stabilizing the extent of forest cover and have slowed forest degradation. The deforestation rate in protected areas is four times lower than outside the parks. Improvements in capacity for protected areas management is reflected in improvement of two key indicators—*tavy* incidence and a biodiversity index. The occurrence of *tavy* encroachment in the protected areas decreased from 2 percent to about 0.6 percent (the target was 0.8 percent). The biodiversity loss index was also reduced, from 1.66 percent to 0.62 percent over the duration of EP2. Mantadia National Park has been extended by inclusion of an adjacent forest reserve. Satellite images and aerial photography show a gradual increase in forest cover along the degraded eastern boundary. Outside the protected areas and forest reserves there is little intact forest. Regular surveys show healthy populations of key conservation target species in the national park and special reserve.

National policy development has established an enabling framework for conservation with a national protected areas code, revised national forest policy and legislation, and the introduction of ecoregional planning frameworks. The introduction of forest resources transfer agreements to local communities supports improved natural resource use in important biodiversity areas. Redistribution of park visitor fees to the communities has won support for conservation.

The project had a strong focus on community participation and community benefits from conservation, including establishment and functioning of local committees for development grants; transfer of forest management; and promotion of alternative livelihoods and more sustainable practices. Interventions have focused on spatial planning and strengthening local organization structures, such as volunteer associations and cooperatives to improve natural resources management and reduce threats to the park. Nevertheless, the link between development-related activities and the achievement of conservation outcomes is by no means clear. The role of enforcement and strengthened park management, on the other hand, undeniably achieves biodiversity conservation inside protected areas.

A number of GELOSE contracts for community-managed forests in the corridor were issued, but transfer of land tenure titles was a lengthy process and only a few communities benefited. Instead, later initiatives focused on contractual forest management, whereby the forest use and management rights were transferred to the local community for a specified period. This mechanism provided many of the same community benefits, but land remains under the overall management of the Forest Service. Contractual forest management arrangements are planned for a large number of forest reserves, making up most of the forest corridor.

Many donor activities, including GEF-funded activities, have focused on assisting communities to reduce the extent of *tavy* practices by supporting alternative livelihood and/or more sustainable use practices, including community-managed forests. *Tavy* and rainfed rice production, although not very productive, is a highly attractive economic model for farmers, since it requires relatively little labor and allows the farmer to invest in other activities, thus spreading his risks. Productivity levels are much higher with irrigated rice culture, but the system is so time-consuming that the farmer has no time to engage in off-farm work and other income-earning activities.

The main benefits to communities come from 50 percent of park entrance fees that are returned to local communities. Community management committees are an attractive decision-making mechanism, but problems have surfaced over the distribution of funds and weak capacity to appraise, supervise, and monitor proposed activities. Most beneficiaries would prefer direct funding and individual assistance rather than communal projects under ANGAP oversight. The current level of funding is insufficient to really make a difference,
as the projects do not generate enough alternative income to substitute for current patterns of natural resource use. In Andasibe, the local population did not understand the intended link to conservation.

**Positive factors that support conservation**

**Long-term and coordinated donor support**
Long-term donor support has been critical in achieving many of the institutional and legislative changes to strengthen conservation in Madagascar and in developing the necessary capacity of the protected area management agency. There is a healthy multidonor dialogue, so that donor support is coordinated in support of the overall Second Environment Program.

**Strong and capable management agency**
ANGAP has benefited from capacity development and donor assistance over the last 12–13 years. It is now a relatively strong and capable agency compared to other countries in the region, able to ensure effective conservation and management of the country’s protected area network. ANGAP also has a development mandate, thereby allowing coordination of activities within the buffer communities.

**Strong government commitment**
Madagascar has made the environment central to its overall national development plans. The current president is highly supportive of the environment and extending the conservation estate. He has made the fight against *tavy* part of his personal campaign. This has translated into a strong willingness of the Forest Service to enforce the legislation banning *tavy*.

**Ecotourism development potential**
The unique biodiversity of the country creates real opportunities for ecotourism and revenue generation. By 2000, the tourism sector contributed 8 percent to the Gross Domestic Product (GDP) of Madagascar and has continued to grow as one of the main pillars of the economy. Protected areas are the principal tourist attraction, accounting for 55 percent of tourist time in country. Tourism provides direct benefits to communities around parks, both through direct employment and through redistribution of park fees for development activities. These benefits constitute a direct incentive for biodiversity conservation.

**Private sector support**
The private sector is also becoming involved in park protection. The owner of the graphite mine in the corridor between the Mantadia National Park and the Analamazaotra reserve is supportive of conservation and has invested in a private eco-lodge. The company, a major employer of local labor, monitors use of its service road, which forms part of the boundary to the park.

**Negative factors that undermine conservation**

**Extreme poverty**
The challenges faced by the rural populations living in and around the protected areas are enormous. Poverty is crushing, and the opportunity cost of creating protected areas is high in terms of lost opportunity to extend agricultural land and access forest resources.

**Potential expansion of mining activities**
New deposits of valuable minerals are being discovered in the rich geological formations underlying the forests of eastern Madagascar. Depending on world market conditions, the exploitation of these minerals is a matter of time. The actual mining operations may have a limited footprint, but opening access to new wild lands and concentrating large numbers of laborers in remote locations presents a serious threat to fragile ecosystems and rare endemic species.
Lack of transparency in assigning user rights
Forest concession rights are often awarded without any competition to “friends” or well-connected individuals. Absentee owners of forest exploitation concessions often practice destructive exploitation methods under minimal supervision.

Poor infrastructure
Limited transport infrastructure and the poor state of many roads severely limits access to markets and therefore the options for viable alternative livelihoods. It also limits the potential benefits from ecotourism.
The Royal Chitwan National Park (RCNP), created in 1973, covers an area of 932 square kilometers in the southern Terai of Nepal. The Barandabhar (Tikauli) forest lies in Chitwan District north of the RCNP. It stretches from the Rapti River north toward the foothills of the Mahabharat range. A World Heritage Site, RCNP is the most frequently visited national park in Asia and contains many endangered species, including the greater one-horned rhinoceros (*Rhinoceros unicornis*), tiger (*Panthera tigris*), wild Asian elephant (*Elephas maximus*), gavial crocodile (*Tomistoma schlegeli*), rock python (*Python reticulatus*), Bengal florican (*Houbaropsis bengalensis*), lesser florican (*Sypheotides indicus*), black-necked stork (*Ephippiorhynchus asiaticus*), and Sarus crane (*Grus antigone*). The area supports high populations of tigers and rhinos, which use the Barandabhar corridor as a refuge during monsoon floods, and possibly to migrate between RCNP and the Mahabharat range. The corridor also contains critical grasslands and wetland habitats that serve migratory and aquatic birds and are a stronghold for the mugger crocodile (*Crocodylus palustris*).

**THREATS**

With almost 70,000 people living in close proximity to the forest, threats are significant, especially in the north. Threats include fuelwood collection, grazing, animal poaching, and timber cutting, all facilitated by easy access from a highway that crosses the northern forest area. These threats stem from
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the perception of communities that they have open access to the resources, a notion that is encouraged by the minimal presence of the Department of Forestry and uncertainty over community rights. Recent social and political unrest, including the activities of Maoist insurgents and relocation of communities, further undermines the application of any authority over forest resources.

The east-west highway across the Barandabhar forest corridor is a threat to the forest’s function as a gene-flow corridor between Chitwan and Mahabharat. It also constrains the northerly movement of tiger prey and rhino into the Barandabhar forest corridor during the monsoon.

KEY PLAYERS

The management status of the Barandabhar forest corridor is complicated. The southern half of the forest is part of the buffer zone of RCNP, and therefore falls under the jurisdiction of the Department of National Parks and Wildlife Conservation (DPNWC). The northern half, lying outside the buffer zone, is officially under the jurisdiction of the Department of Forests. The Barandabhar forest has been designated “block” forest, officially under government management, but community forest user groups (CFUGs) have been established in several locations and claim the rights to almost all of the Barandabhar forest. The DNPWC has acknowledged the rights and roles of CFUGs in the south. In the north, the Department of Forestry does not formally acknowledge any rights of CFUGs, but local forestry staff members have provided some support and tacit approval for CFUGs, recognizing their own limited capacity to manage the forest. In many locations, including in the north, CFUGs have established patrols to monitor and control use of forest resources.

The project was implemented through a national NGO, the King Mahendra Trust for Nature Conservation (KMT), which has worked effectively with communities around Chitwan for many years. KMT has worked with communities in the southern part of the Barandhabar and is now replicating these initiatives in the northern forest block.

CONSERVATION ACTIVITIES

The GEF-funded project has focused on supporting moves to reduce grazing demands on the forest through introduction of higher-yielding cattle breeds that are fed in stalls. The project has also initiated alternative income-generating activities and supported introduction of alternative fuel sources such as LPG and biogas. CFUG committees were established and now undertake forest patrols to prevent illegal harvesting of forest resources by outsiders.

Based on a market feasibility study, the project identified several business opportunities for the forest corridor communities. These include honey production, mushroom farming, wool spinning, off-season vegetable farming, banana farming, and ecotourism. In times of political stability, RCNP is a major ecotourism destination. Numerous ecotourism facilities have been established in the buffer zone, some through previous support from KMT. Revenue-sharing schemes have been agreed to with local communities. The project proposes to extend this model to the northern end of the forest as part of the alternative livelihoods strategy.

Have activities reduced threats?

The introduction of higher-yielding cattle breeds and stall-feeding have led to a 50 percent decrease in livestock populations in the past few years and reduced grazing in the forest. The actions of the NGO and community forest user groups have succeeded in bringing illegal harvesting of forest products under control. One CFUG committee reported that, prior to the formation of the CFUG, some 400 bicycle loads of fuelwood and 100 bicycle loads
of timber were being removed from the forest each day by outsiders. CFUG patrols have controlled this threat despite their lack of formal authority in the forest.

Faced with the scale of the problem, the project worked most closely with communities and individuals who are most willing to take action. However, this does not always correspond with conservation priorities. For example, costly biogas units, introduced as an alternative to fuelwood collection, have gone mainly to influential and relatively wealthy individuals, who are not the primary source of fuelwood harvesting. Furthermore, although the project has identified additional income-generating options, more work needs to be done on investigating supply chains and ways to help link communities to the markets so that they can sell produce directly, with profits going to producers rather than to middlemen. It is still unclear, however, as to how these income-generating activities will be linked to conservation and reduce pressure on the forest.

Positive factors that support conservation

Long-standing NGO support to communities
The NGO responsible for project implementation, the King Mahendra Trust, has worked in the area for many years, focusing its activities in the south, adjacent to the border of the RCNP. Its assistance with community organization and livelihood diversification is widely acknowledged to have benefited local communities and improved the quality of the adjacent forest area. News of these successes has created widespread social acceptance for extending the CFUG approach to the north.

Strong community organization.
Communities have a tradition of collective action. The concept of community forest management is well-established and there is a wealth of experience among CFUGs in Nepal. Even though formal rights to community forests have not yet been established in northern Barandhabar, it has proven effective to mobilize CFUGs and organize conservation-oriented work.

High-profile conservation area
The Royal Chitwan National Park is a World Heritage site, and the major nature-based tourism attraction in Nepal outside the Himalayas. Even during periods of civil unrest, a significant number of tourists visit the area, and during more settled periods, the numbers of tourists are very high. The wildlife corridor, representing (but not formally designated as) a northern extension of the park, was formerly a royal hunting preserve and is viewed by most stakeholders as part of a larger protected landscape.

Negative factors that undermine conservation

High population pressure.
About 70,000 people live in close proximity to the wildlife corridor. Most of these residents are poor and rely on natural resources for fuel and grazing of livestock. Several communities were relocated here from within the national park, further increasing population pressure in the corridor.

Ambiguous status of wildlife corridor
Current national forest policy prohibits the designation of lowland forest as community forest. There are conflicting messages from the national government, which denies the legality of the CFUGs, yet provides local support to their operations. Consequently, despite the formation of CFUGs, authority for forest management rests with a largely absent Forest Department, so that incentives for communities to manage the resources sustainably are weak.

Open access to the forest.
The east-west highway and long forest border make effective control over access to forest resources difficult. It is particularly difficult to
ensure adequate protection for the park’s “flagship” species, including large vertebrates such as tigers and rhinos, which are susceptible to vehicular accidents and are targets for poaching.

*Sustainability*

Although the project is having some success in generating conservation and livelihood benefits, these are unlikely to be sustained without further support after the termination of the three-year GEF project. One proposed approach is the establishment of endowment funds to support activities—such as anti-poaching; veterinary services, and female education—under the direction of local management committees, but current funds seem inadequate to generate sufficient revenue to cover the costs of management and service provision.
Case Study 10. Sudan: Dinder National Park

Dinder National Park (DNP), established in 1935, is one of the oldest parks in Africa. It was established at 890,000 hectares, and then expanded in 1983 to over 1,000,000 hectares. DNP is located in east-central Sudan on the border with Ethiopia within the flat plains of the southern Blue Nile. The area is drained by two seasonal rivers. The climate is characterized by two seasons: a hot and humid rainy season (May-November), and a cool and dry season (December-March). Annual rainfall averages about 800 mm.

The vegetation consists of typical savannah woodlands, characterized by various Acacia species, Balanites aegyptiaca and Combretum hartmannianum. The fauna is typical for this ecosystem, with large numbers of ungulates such as tiang (Damaliscus korrigum tiang), reedbuck (Redunca redunca), waterbuck (Kobus ellipsiprymnus defasa), roan antelope (Hippotragus equinus), oribi (Ourebia ourebia) and red-fronted gazelle (Gazella rufifrons), as well as aardvark (Oryceteropus afer) and pangolin (Manis temmincki). Also present, but much rarer now, are buffalo (Syncerus caffer) and elephant (Loxidonta africana). Black rhinoceros (Diceros bicornis), hippo (Hippopotamus amphibius), and giraffe (Giraffa camelopardalis) used to be present, but have disappeared. Elephants are believed to migrate from Ethiopia into the southern part of the park near Maganao and Jebel Halawa during the rainy season. There is also a rich avifauna of about 158 species, including two species of bustards. One of the most striking features of DNP is the presence of so-called mayas (“meadows”) or seasonal flood plains and wetlands, which contain large quantities of fish during the dry season and serve as wintering grounds for many Palearctic migrants. With permanent water sources, DNP
supports large numbers of animals during the dry season. In the wet season, numbers are less as animals disperse outside the park boundaries. Despite the modesty of infrastructure and accommodation, a good number of both domestic visitors and expatriates visit the park in the dry season. The DNP is a biosphere reserve within the UNESCO network and was listed as a Ramsar site in 2005.

Records show that when DNP was established, the area was virtually uninhabited, having been abandoned during the notorious famine of 1888. Beginning in the 1950s, and intensifying in the following decades, resettlement took place through immigration from western Sudan and West Africa, driven by famine and the severe droughts of the 1980s as well as the civil war in southern Sudan. Many immigrants have settled along the riverbanks, increasing pressure on natural resources and the park. With the boundary extensions in 1983, 10 villages were incorporated into the park, with 38 more lying within 1 kilometer from the boundary along the Rahad River. These 48 villages have a combined population of more than 100,000, with about 10,000 people living within the park. The only indigenous community is the village of Magano in the southern part of DNP, incorporated into the park in 1983.

The main economic activities in the area surrounding DNP are large-scale, mechanized, rainfed agriculture (on farmlands owned by wealthy, Khartoum-based landowners) and small-scale subsistence agriculture using the gerif system (small plots along the river benefiting from seasonal flooding). Main crops include sorghum and millet, with some vegetables and fruits, especially mangoes. After the harvest, the land is usually rented out to nomadic pastoralists for livestock grazing on crop residues. Most people own goats, sheep, and poultry. Cattle are owned by the richer households (about 10 percent). Animal husbandry is the main economic activity of the nomadic tribes, Fulani, who move in and out of the area with large herds of livestock. The expansion of large-scale cereal agriculture on former natural grazing lands has squeezed livestock into smaller areas and less productive ecological zones, resulting in overgrazing and conflict with conservation needs.

THREATS

The main threat is incursion of livestock due to the seasonal movements of pastoralists’ herds moving south from the northern rangelands around Butana and entering the park during the dry season. Uncontrolled fires (often set to improve grazing) are also damaging. There are two categories of livestock: the small numbers of sheep and goats kept by sedentary villagers, and the large herds of mainly cattle (but also camels, sheep, and goats) kept by nomads. The pastoralists’ herds move into the area during the dry season as part of an annual migration. At first, the herds are grazed on crop residues on leased farmlands, but once these are exhausted they move into the park. This is the only place where there is both water and grazing land, since much of the original savannah habitat has been converted to agriculture. This leads to localized heavy overgrazing, particularly in the wetlands, creating direct competition with wildlife for limited resources and the danger of disease transmission.

Fire is an integral part of the ecology of this ecosystem. The park is subject to frequent, and often intense, burning. Many of the fires originate outside the park, set by nomadic herdsmen and farmers to provide fresh regrowth for livestock or to improve visibility for hunting. Fires are also set inside the park by poachers, trespassing nomads, and honey gatherers. Hunting is common—particularly close to park boundaries—to supply a local demand for meat and to remove crop-raiding animals. It has contributed to a dramatic decline in the populations of roan antelope and tiang. A small number of fishermen illegally exploit the productive water bodies. The fish is dried and sold in community markets. Other threats include fuelwood collection and tree felling for construction poles and charcoal, a main source
of fuel and income. There is limited collection of other NTFPs such as palm leaves, honey, wild fruits, and medicinal plants.

**KEY PLAYERS**

DNP overlaps three different states. Administratively, DNP falls under the General Administration for National Parks and Wildlife Conservation, which is part of the unified police forces of the Ministry of Interior. Consequently, national parks in the Sudan have been managed with a strong emphasis on patrolling programs and enforcement. Controlling poaching has been the main objective, resulting in increasing enmity between the park administration and local communities. DNP has a staff of 280, with 17 officers and the rest are game scouts. The park manager is stationed in Dinder, 150 kilometers from the park, but the rest of the personnel are stationed within DNP at the main camp and in 12 game posts along the boundaries. The GEF project was implemented jointly through the Higher Council for Environment and Natural Resources (HCENR) and the Wildlife Conservation General Administration (under the Ministry of Interior). HCENR housed the project implementation unit. An effective national NGO, the Sudanese Environment and Conservation Society (SECS), was involved as an interested stakeholder and a service provider to undertake the environmental public awareness campaign and to assist in establishing and training the Village Development Committees (VDCs).

**CONSERVATION ACTIVITIES**

The project, implemented between 2000 and 2004, adopted a two-pronged strategy to address the threats. One component focused on biodiversity conservation through strengthening the park management. The second targeted development assistance to the communities living within the park and in the buffer zone immediately adjacent to park boundaries.

A key activity was preparation and implementation of a management plan, which entailed a large number of studies, including an assessment of the water resources in the park, a census of wildlife populations, and vegetation surveys. Park infrastructure was improved, including improved water supply and sanitation at game posts and new visitor accommodation at the Galegu main camp; demarcation of park boundaries; rehabilitation of roads and firebreaks; and rehabilitation of wetlands to reopen feeder streams and create prime wildlife habitat. Improved patrolling protocols, provision of vehicles and camels for patrol, training in wildlife census techniques, and scheduling home visits boosted the morale of the scouts after prolonged duty in remote locations. Training for game scouts—in conflict management and awareness and outreach campaigns—was designed to improve relations between the park staff and the local communities. The project also supported a modest research program to monitor key species and nomination of DNP as a Ramsar site.

Development activities focused on promoting sustainable utilization and management of natural resources and enhancing livelihoods through community-focused projects in selected target villages and communities inside and outside the park. Socioeconomic surveys were undertaken, followed by intensive environmental and health awareness campaigns implemented by the Sudanese Environmental Conservation Society, which led to the election of VDCs in 25 villages in the three states. A central element of the strategy to support the VDCs was the establishment of revolving funds to provide credit to households to fund micro-projects such as alternative fuel sources (butane gas), village water pumps, rehabilitation of important wetlands in the buffer zone, and income generation projects, including improved agriculture, agroforestry, and growing and marketing of cash crops. The project held training sessions to build the capacity of the members of the VDCs in topics such as bookkeeping, plant nursery design, agroforestry
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techniques, apiculture, credit procedures, and management.

The project worked with the three states to assert the need for land use plans that would cater to the needs of all the land users, and in particular the pastoralists. In order to alleviate some of the pressure exerted by nomads and their livestock, the project made water points away from park boundaries. Assistance was also provided to state governments in the planning for dry season grazing lands and migration corridors for livestock movements.

Have activities reduced threats?

Boundary demarcation has been undertaken and park management strengthened. Improved patrolling efforts have reduced hunting and illegal resource harvesting, resulting in a notable increase in numbers of some species. Livestock grazing inside the park has been reduced, but not fully controlled and still remains the major threat to the park. A lasting solution would require establishment of more grazing grounds outside park boundaries. Establishment and capacity building of VDCs has strengthened village cooperation and reduced conflicts between the park and communities. Nevertheless, questions remain as to whether village development has been effective in reducing the threats to the park. The revolving funds have supported a range of projects, but most have little or no direct link to conservation outcomes.

New livelihood activities such as fish farming, handicrafts, and apiculture have been encouraged, but have probably benefited too few farmers to impact conservation outcomes. Existing livelihoods have been improved by intensifying agriculture production with irrigated vegetable gardens, forestry plantations, agro-forestry, and sheep and goat fattening schemes. Many of the revolving fund “investments” have been for agricultural credit. Unfortunately, many households lost their crops before harvest in 2003 because of unusual flooding, resulting in the need for credit write-offs. Introduction of LPG gas containers as an alternative energy source to encourage households to stop using fuelwood and charcoal has had limited success. Typically, households use LPG only occasionally, and continue to use fuelwood and charcoal, which can be collected by the women or children without any cash outlays. Although the VDCs are well-informed about the conservation value of DNP, it is unclear to what extent the awareness campaigns have spurred behavioral changes. Nevertheless, encouraged by community response to date, UNDP has committed to a follow-up village development project for another three years, funded from core UNDP resources.

In regard to issues of national policy and land use planning, the project has been unable to complete all that was planned. The key to long-term settlement of livestock trespassing can only be realized in adequate land use planning that fully accommodates the needs of the pastoralists. The pastoralists and their lifestyle are being progressively squeezed out of existence by the expansion of mechanized cereal farming over most of their dry season pastures. The DNP acts as a safety net; that is, as a vast “no-man’s land” of valuable grazing resources and water for livestock during the dry season. Without provision of alternative pastures for the pastoralist herds, the situation will not change.

Positive factors that support conservation

Motivated park management

The park management is highly motivated and keen to establish a reputation for producing results. As part of the unified police forces in Sudan, it has the authority for effective enforcement. Although enforcement creates some antagonism with the local communities, it is effective in terms of conservation and reducing threats to biodiversity inside the park boundaries.

Large size of the DNP and intact ecosystem.

The park is large enough to support viable populations of native mammals, including
the larger herbivores and predators. It shares a transnational ecosystem with Ethiopia, which allows seasonal migration of large mammals.

**Strong public support in Sudan**
The park enjoys strong public support and, for many years, has enjoyed close collaboration on research and advocacy with strong national NGOs such as SECS and national universities who have used it for fieldwork and training. The public views DNP as a national treasure that needs to be conserved for the future.

**Strong national capacity**
The park has good links to national institutions and can rely on technical assistance through SECS and local universities to support awareness and training activities.

**Negative factors that undermine conservation**

**Poverty**
Local communities are poor and highly dependent on natural resources. The opportunity costs of reduced access to park resources are high. Unless real alternative livelihoods and sustainable natural resource use models can be offered, poor people will continue to cause substantial park degradation.

**Immigration and settlement of internally displaced people (IDPs)**
Internal civil conflicts in Sudan have resulted in displacement and migration of rural populations. Almost everyone living around the park has migrated from elsewhere. Many come from different parts of the country with different ecological realities. The promotion of large-scale agriculture in surrounding lands has also attracted immigrants in search of work, thereby increasing the population close to DNP.

**Presence of nomadic herders**
The seasonal movements of the nomads and their large herds are the main threat to the long-term conservation of the park. They seem to represent a rather powerful, but difficult-to-control group because of their nomadic lifestyle and independence. Without access to other grazing lands, the pastoralists will continue to use the park for grazing in the dry season.

**Wildlife-human conflicts**
DNP is an island of natural habitat in an agricultural landscape dominated by large-scale mechanized cereal production. Animals that roam outside the park in the rainy season and cause damage to crops and livestock are consequently hunted. Although the amount of such wildlife damage is relatively small, it can be devastating to an individual farmer.

**Lack of income-generating capacity**
Sudan is internationally isolated and plagued by a record of civil war. Currently, it does not present much opportunity for tourism development or financial resources from tourism. Thus, the long-term financial sustainability of the park must rely almost exclusively on continued and sustained government funding complemented by donor funding.
Bibliography


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