



National Trust for Nature Conservation



SHIFTING PARADIGMS IN PROTECTED AREA MANAGEMENT

Edited by
Siddhartha B. Bajracharya, PhD
Ngamindra Dahal



BACKGROUND

The book is the outcome of deliberations made by over 125 participants from national and international institutions in the Regional Conference on *Managing Protected Areas: Shifting Paradigm*. The Regional Conference was organized by the National Trust for Nature Conservation (NTNC) in partnership with the Department of National Parks and Wildlife Conservation (DNPWC), International Center for Integrated Mountain Development (ICIMOD), World Wildlife Fund (WWF) and The World Conservation Union (IUCN). The conference was supported by the United Nations Environment Programme (UNEP), Bangkok Regional Office.

The objectives of the conference were (i) Sharing regional experience and knowledge in protected area (PA) management with prescriptions for effective management, (ii) Learning from best practices in PA management in the region, and (iii) Strengthening PA network in the region. The thematic areas of the conference were (i) Ecosystem Management, (ii) Governance in PA Management, and (iii) Economic Tools for Biodiversity Conservation. The outcomes of this conference is aimed at contributing to policy formulation, effective management of PAs in the region, good practices for replication of PA management models and enhancing better network and partnership in the region.



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FOREWORD

Biodiversity conservation is one of the primary goal of all the countries. Declaration of ecologically significant regions as protected areas (PAs) for biodiversity conservation and managing them under agreed international principles, norms, conventions and agreements is the road map for achieving the goal. In recent years, the tasks of achieving (PAs) have been more complex and challenging due to globalisation processes and further compounded by climate change. The current problems are the manifestations of interactions among these complex processes in diverse geophysical and climatic settings. Better understanding of these dynamics always helps to find better options and it is possible to address the problems appropriately.

The Regional Conference on “Managing Protected Areas: Shifting Paradigms” organised in Kathmandu, Nepal in April 2007 provided a unique opportunity to enhance the level of understanding among protected area managers, researchers, academicians, related communities and planners. The papers included in this book provide insightful information and knowledge that can be applied widely to address the emerging challenges of biodiversity conservation and protected area management. Although we still lack effective technology and the required funds to confront emerging challenges such as climate change and to prevent major set back for biological diversity, nevertheless the Conference provided an important platform to share these issues at international level. We believe that this book will be useful to protected area managers, biodiversity specialists, local people, students, NGOs and donor agencies working in the region.

I would like to extend my sincere thanks to UNEP for their valuable support. I would also like to extend my sincere appreciation to Ministry of Forest and Soil Conservation and Department of National Parks and Wildlife Conservation for successfully leading the Conference. I would also like to thank the NTNC staff members for successfully organising the Conference.

Finally, I would like to express my sincere thank to Dr. Siddhartha B. Bajracharya and Mr. Ngamindra Dahal from NTNC for bringing out this document in its present form.

Bimal Kumar Baniya
Member Secretary, NTNC Nepal

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NTNC would like to express their gratitude to Mr. Tirth Raj Gyawali, Secretary, Ministry of Forest and Soil Conservation, and Dr. Krishna Chandra Poudel, then Director General, DNPWC for their inspirational support to organise the conference. Our sincere thanks go to our conservation partners: DNPWC, WWF Nepal, ICIMOD, IUCN, UNDP for coordination and sponsoring participants which have helped enhance participation and quality of the conference. We would like to sincerely thank the Regional Environment Office of the U.S. Embassy for their support.

The conference would not have been organised without the continuing support and encouragement of the UNEP-ROAP team in Bangkok especially Mr. Surendra Shrestha, Dr. Aida Karazhanova, Dr. An Bollen, Dr. Dechen Tsering, Dr. Subrato Singh and Mr. Purna Chandra Lal Rajbhandari.

Thanks are also due to all the NTNC team for their dedicated and committed work during the conference. Without this wonderful team effort, the conference would not have been successful.

ABBREVIATIONS

ACA	Annapurna Conservation Area (Nepal)
ACAP	Annapurna Conservation Area Project (Nepal)
ACF	Assistant Conservator of Forests
BCF	Barandabhar Corridor Forest (Nepal)
BMC	Biodiversity Management Committee
CAMC	Conservation Area Management Committee
CBAPO	Community Based Anti-poaching Operation
CBD	Convention on Biological Diversity
CBO	Community Based Organization
CCA	Community Conserved Area
CDM	Clean Development Mechanism
CEPF	Critical Ecosystem Partnership Fund
CFUG	Community Forest Users Group
CS	Conservation Site
CSR	Corporate Social Responsibility
DNPWC	Department of National Parks and Wildlife Conservation
DoE	Department of Environment
DWC	Department of Wildlife Conservation
ECA	Ecologically Critical Area
FD	Forest Department
GEF	Global Environment Facility
GHG	Green House Gas
GIS	Geographic Information System
GLOF	Glacial Lake Outburst Flood
HKH	Hindu Kush Himalaya
ICDP	Integrated Conservation and Development Project
ICIMOD	International Centre for Integrated Mountain Development
INGO	International Non-government Organisation
IPCC	Intergovernmental Panel on Climate Change
IUCN	The World Conservation Union
KCA	Kangchenjunga Conservation Area (Nepal)
KCAP	Kangchenjunga Conservation Area Project (Nepal)

KL	Kangchenjunga Landscape
KMTNC	King Mahendra Trust for Nature Conservation (Nepal)
KP	Kyoto Protocol
MACP	Mountain Areas Conservancy Project
MCA	Manaslu Conservation Area (Nepal)
MCAP	Manaslu Conservation Area Project (Nepal)
MoFSC	Ministry of Forests and Soil Conservation (Nepal)
NaRMG	Natural Resources Management Group
NBR	Nokrek Biosphere Reserve (India)
NERCORMP	North Eastern Region Community Resource Management Project
NGO	Nongovernmental Organization
NNP	Nokrek National Park (India)
NPC	National Planning Commission (Nepal)
NPWC	National Parks and Wildlife Conservation
NSP	Nishorgo Support Programme (Bangladesh)
NTFP	Non-timber Forest Products
NTNC	National Trust for Nature Conservation
PA	Protected Area
PES	Payments for Environmental Services
POW	Programme of Work
PRA	Participatory Rural Appraisal
RAPPAM	Rapid Assessment and Prioritization of Protected Area Management
RRA	Rapid Rural Appraisal
SHG	Self Help Group
SHL	Sacred Himalayan Landscape
ShNp	Shivapuri National Park
TAL	Terai Arc Landscape
TAR	Tibet Autonomous Region
TBM	Trans-boundary Biodiversity Management
TEK	Traditional Ecological Knowledge
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNO	Upazila Nirbahi Officer (Bangladesh)
VCTP	Voluntary Carbon Trading Programme
VER	Verified Emission Reduction
WWF	World Wildlife Fund

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INTRODUCTION

Siddhartha B. Bajracharya¹ and Ngamindra Dahan²

Even though the formal protection of biological diversity started after 1950s, the ethos of nature conservation in Asian culture is evident in the region's perennial regard for nature as sacred and therefore the attempt to conserve nature in its pristine form. This view is further stressed by the abundance of folklores found in this region that narrate attempts, throughout history, to protect patches of forest adjacent to places of worship or important sources of water. In more recent times, various other models for managing protected areas (PAs) have developed. One such model that is gaining increasing success is based on the concept of integrated conservation and development and provides greater management responsibility to local communities. Hence, this approach emphasizes integrated management of PAs inclusive of local communities.

The Annapurna Conservation Area (ACA) in Nepal managed by National Trust for Nature Conservation (NTNC) contributed to pioneer this approach, thus resulting in a paradigm shift in PA management. The Kangchenjunga Conservation Area Project (KCAP) in Nepal added a new dimension to the same approach, thus clearly indicating evolutionary phases in Nepal's PA management paradigm and adoption of new

strategies to cope with the changing context. This process has brought about a realization that discussions on PA governance among stakeholders from the Asia region will help strengthen regional PA network and also engender new policy presentations for more effective PA management.

There is a growing need for the adoption of trans-boundary landscape approach that integrates critical ecosystems at the borderlands, addresses livelihoods and conservation issues through connectivity and cooperation. In the recent past, the Ecosystem Approach, as a new paradigm, has gained increasing success and there are some success stories to be shared and learnt. Similarly, there is wealth of local knowledge and best practices that could further the prospects of regional integrity. However, effective management would require harmonization of wider management objectives and commitment at the regional level to address a range of social, economic and environmental issues.

Until recently, PA management was exclusively under the public sector without any role for the private sector. However, recent cutbacks in public sector expenditure have severely undermined the public sector management approach and increased

¹Executive Officer, Projects & Programmes Development, NTNC; siddhartha@ntnc.org.np

²Energy & Climate Change Coordinator, NTNC; ngamindra@gmail.com

worldwide pressure to open up avenues for newer more innovative market driven ideas. In the new millennium the conservation sector is looking for and will be relying on emerging markets where environmental services can access payments linking biodiversity conservation directly with economic incentives.

With the objective of sharing regional experience and knowledge in PA management; learning from the region's best practices and strengthening networks in the region; the Regional Conference on Managing Protected Areas: Shifting Paradigm was organised in April 2007 in Kathmandu, Nepal. The conference was participated by over 125 managers, scientists and researchers from national and international institutions. The conference focused on three thematic areas (i) Ecosystem Management, (ii) Governance in PA Management, and (iii) Economic Tools for Biodiversity Conservation. This book is a result of several important papers presented in the conference. This book offers twenty seven papers on biodiversity and PA management including eco-regional planning, landscape level management, trans-boundary conservation, PA governance, implications of climate change, sustainable financing, mechanisms for payments for environmental services and tourism.

The issues presented in the different papers clearly reflect that the shift in the conservation paradigm has been gradual with the acceptance of the community as part and parcel of national level conservation initiatives. However, issues concerning to escalating conflict between human-wildlife and other upcoming issues in the region cannot be ignored without proper attention

by the PA managers. These issues become more complex at the trans-boundary level and there is a need for greater understanding of problems by all parties. Therefore, emphasis has been given in this book to formulate a "Regional Cooperation Framework" for the development of a regional strategy for biodiversity conservation and management in the process of scaling up conservation across larger landscapes.

Not only have we moved on from a narrow understanding of conservation towards a more inclusive approach that increasingly reflect ecological, socioeconomic and governance dimensions but policy processes are becoming increasingly complex as well. The success in addressing these challenges will to a large degree depend on a sound "enabling environment", which includes coherent and realistic policies. That means national conservation policies and programs in South Asia and elsewhere need to give much greater focus to two aspects of the new paradigm: Who governs, and How they govern. Many PAs in the region are responding to challenges concerning human well-being, and any form of PA governance system developed should respect traditional knowledge systems and also address tangible and intangible benefits to traditional societies living in and around a PA. The traditional knowledge system must be cautiously integrated with new technologies based on interdisciplinary research findings. It is evident that success of such a complex management system would also depend upon the availability of sustainable funding. Lessons from various countries such as Nepal give the impression that tourism development and sustainable management could provide financial

resources for effective PA management. Nevertheless, the PA manager must look for innovative conservation financing tools. Payments for Environmental Services (PES) could be a tool to address current management issues in PAs. The concept of creating voluntary carbon markets by linking forest conservation with economic incentives could substantially support to promote sustainable forest management within and outside a PA.

In recent times, there is increasing evidence of the impacts of climate change on ecosystems. Climate change is expected to induce significant modifications in biodiversity on a global scale, however estimating the impacts of climate change on the global abundance and distribution of biodiversity is challenging. PA managers might have to pioneer new management systems to address current global issues. They might need to ask whether the present designated boundary of the PAs will be able to meet the objectives of PAs in terms of species range and PA boundaries. Likewise, PAs are also facing different pressures and threats. For that reason, PA managers must carefully monitor management effectiveness through application of appropriate and scientific

tools. Among the tools, RAPPAM (Rapid Assessment and Prioritization of Protected Area Management), and application of Geographical Information System (GIS) and Remote Sensing in PA management are discussed in this book.

Finally, this book covers some major global, regional and national issues connected to PA management and biodiversity conservation. In the course of development of PA systems in Asia, it has been agreed that regional cooperation is required both for the effective management of PAs and to combat the global issues surrounding biodiversity conservation. The technical papers included in this book are divided into themes, namely ecosystem management, governance in protected area management and economics tools for biodiversity conservation. They address issues such as eco-regional planning for ecosystem conservation, landscape level management, trans-boundary conservation and conservation beyond boundaries. Finally, this book provides a definitive argument—and there is an increasing worldwide consensus—that effective conservation cannot be carried out in isolation with just a single spatial region or a species but rather it has to incorporate wider landscapes and ecology.





Theme 1 Ecosystem Management



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A NEW PARADIGM FOR MANAGING PROTECTED AREAS IN THE 21st CENTURY

Jeffrey A. McNeely¹

ABSTRACT

Protected areas need to be managed in new ways if we expect them to continue meeting the needs of people in the 21st Century. It is now well known that protected areas are an essential element of strategies used by modern societies to ensure that natural resources are managed sustainably, and that biodiversity is conserved for present and future generations. It is less appreciated that protected areas provide a wide range of economic, social, cultural, recreational, scientific, and spiritual values, generating considerable economic benefits, ranging from tourism development to carbon sequestration to watershed protection. Protected areas can be managed to provide substantial benefits to the people living in and around them, including as part of poverty alleviation strategies. Providing sustainable development to these communities sometimes may require more effective controls to ensure that populations of plants and animals are maintained at productive levels. This paper advocates using a wide range of protected area categories, managed as a system that involves national, provincial, and local governments; NGOs; local communities and indigenous peoples; the private sector; researchers; and other stakeholders. The protected areas also need to be seen as part of a larger regional landscape, which includes a surrounding buffer zone designed to provide benefits to local people, often through voluntary cooperative agreements established with local stakeholders. The larger landscape can help to link nearby protected areas, including across international boundaries.

¹Chief Scientist, IUCN-The World Conservation Union, Gland, Switzerland; email: jam@iucn.org

Introduction

Many areas of great natural wealth that are protected as national parks, game reserves, strict nature reserves, community conserved areas or other types of protected areas, are found in the most remote parts of a country, farthest removed from the mainstream developments that may be bringing a measure of prosperity to other parts of the country. Not surprisingly, these remote, but nature-rich areas also support some of the least economically-prosperous segments of the country's human population, making the linkage between nature conservation and poverty alleviation especially challenging. The challenge has gone unaddressed for far too long, and indeed, the rural populations have sometimes been encouraged, or even forced, to abandon the areas designated to achieve conservation objectives.

More recently, a very strong consensus has developed that protected areas need to make a concrete contribution to poverty alleviation, going far beyond simply doing no harm (Scherl, et al., 2004). This paper will highlight some of the most relevant issues, pointing out that many approaches to developing protected areas can also provide important economic benefits to rural populations. It is also important to recognize that poverty is not simply a lack of money, that human well-being (sometimes called "sustainable livelihoods") also involves living in a healthy relationship with the environment, and that areas important for their natural values can also lead to significant benefits for local people, in terms of watershed protection, non-timber forest products, and other such values.

Many of the rural poor well recognize the value of conserving certain features or landscapes, and have established their own protected areas (sometimes called "sacred sites") through their own cultural mechanisms (Putney, 2005). Thus the relationship among protected areas, poverty alleviation, and sustainable development has many complexities, which this paper will begin to identify.

The Convention on Biological Diversity (CBD) defines "protected area" as "a geographically defined area which is designated or regulated and managed to achieve specific conservation objectives" (Article 2). The 5th World Parks Congress, meeting in Durban, South Africa in September 2003, recognized that protecting such areas is no longer seen as a process of eliminating people from the land, but rather of integrating conservation objectives and human activities in an appropriate manner that assures the future of both. The modern approach to protected areas makes them essential parts of sustainable development (McNeely, 2005).

The CBD has marked a significant shift in the perception of protected areas by governments. It has linked protected areas to larger issues of public concern, such as sustainable development, poverty alleviation, traditional knowledge, access to genetic resources, national sovereignty, equitable sharing of benefits, and intellectual property rights. Protected area managers are now sharing a larger and more important political stage with development agencies, agricultural scientists, NGOs, anthropologists, ethnobiologists, lawyers, economists, pharmaceutical firms, farmers,

foresters, tourism agencies, the oil industry, indigenous peoples, and many others. These competing groups claim resources, powers, and privileges through a political decision-making process in which biologists, local communities, the private sector, and conservationists have become inextricably embroiled (McNeely and Guruswamy, 1998; McNeely, 2005). The challenge is to find ways for the various stakeholders to work together most effectively to achieve the conservation and development objectives of modern society. This paper will suggest means for doing so, with a special emphasis on the rural poor.

Contributions of Protected Areas to Sustainable Development

Protected areas carry out numerous functions that are beneficial to humans, and even essential to human welfare. Ten important ones are listed below:

- (i) Biodiversity: Conserve genetic resources and biological diversity more generally, enabling evolution to continue and providing raw materials for biotechnology.
- (ii) Watershed protection: Protect watersheds for downstream hydroelectric, irrigation, and water supply installations.
- (iii) Storm protection: Protect coastlines against damage from storms (especially coral reefs and mangroves), and absorb heavy rainfall (especially wetlands and forests).
- (iv) Tourism: Provide destinations for nature-based tourism and recreation.

(v) Local amenity: Ameliorate local climate conditions and provide amenity values to nearby communities.

(vi) Forest products: Provide a wide range of non-timber forest products, and limited amounts of timber.

(vii) Soil: Build soils, control soil erosion, and recycle nutrients.

(viii) Carbon: Sequester carbon, thereby contributing to global efforts to address anthropogenic climate change.

(ix) Research: Provide sites for scientific research on a wide range of ecological, social, and economic topics.

(x) Cultural values: Conserve culturally important sites and resources, and demonstrate the nation's interest in its natural heritage.

Some of these functions can also be provided by unprotected nature, agricultural lands, or even degraded wastelands; but properly selected and managed protected areas typically will deliver more of these functions per unit area at lower cost than will most other kinds of land use in the biologically important areas that require protective management (e.g., Tilman et al., 1997; Hooper and Vitousek, 1997). The way these functions are transformed into benefits for people, including the rural poor living around protected areas, will depend on the management objectives of the protected area and how effectively these objectives are converted into action (Hockings, 2000; Lockwood et al., 2006).

Material Benefits From Protected Areas

The people living in rural areas have long depended on the natural resources that are available there. Experience and logic indicate that local communities are likely to support protected areas to the extent that such areas continue to provide benefits to them, especially in the form of continued availability of resources. Commodities such as animal skins, bamboo, beeswax, construction materials, dyes, fibers, firewood, fish, fodder, fruits, game meat, honey, medicinal plants, mushrooms, ornamentals, resins, and timber have been harvested more or less sustainably for thousands of years. The local people have often developed mechanisms for managing these resources sustainably and allocating the benefits among the community (as recognized in Article 8j of the CBD). Many examples, including Sagarmatha National Park in Nepal, Doi Inthanon National Park in Thailand, and Xishuangbanna Nature Reserve in China, are presented by Beltran (2000).

Properly managed tourism in protected areas can also bring considerable income, without threatening the natural resource base. In Kenya, tourism is one of the largest export industries, earning over US\$400 million per year; thousands of jobs exist because of visitors to Kenya's magnificent coast and wildlife parks. Divers spend about \$30 million per year at the Bonaire Marine Park in the Netherlands Antilles, \$14 million in protected areas in the British Virgin Islands, over \$53 million per year in marine protected areas in the Cayman Islands, and \$23 million in Virgin Islands National Park in St. John's (OAS/NPS,

1988). See IUCN (2000) and Lockwood et al. (2006) for further examples.

Governments throughout the world have been able to capture considerable economic benefits from tourism, through visa fees, airport taxes, entrance fees for protected areas, bed taxes payable by tourist resorts, taxes on tour operators, and so forth. Tourists and tour operators can contribute at least part of the costs of the provision of large-scale tourism infrastructure and the costs of maintaining protected areas. Some countries are quite successful in generating such revenues; the South Africa Parks Board, for example, is able to earn about 80% of its running costs through various kinds of revenue-generating activities, as is the protected area system of Ontario, Canada (Moos, 2002).

Ecosystem Services from Protected Areas

Far more important than income from tourism or harvesting of renewable resources are the ecosystem services protected areas can provide to local communities, the nation, and the international community. Particularly important services at the community level include soil regeneration, nutrient cycling, pollination, recreation, provision of pure water, and maintenance of the functioning ecosystem which yields harvestable resources (see Millennium Ecosystem Assessment, 2005 for more details). Such benefits are often difficult to quantify, and even local people may take them for granted. Ecosystem services do not normally appear in corporate or national accounting systems, but they far outweigh direct values when they are computed; one

recent review estimated that coastal ecosystems provide services worth over US\$4,000 per ha per year, while tropical forests are valued at \$3,000, wetlands at nearly \$15,000, and lakes and rivers at \$8,500 (Costanza et al., 1997). The carbon sequestration service now generates a market worth billions of dollars annually, though protected areas are not yet able to take advantage of the carbon benefits of avoided deforestation, as these are not yet recognized under the Clean Development Mechanism of the Kyoto Protocol (under the UN Framework Convention on Climate Change).

One of the most important ecosystem services, especially in view of the major investments in water resource management being made in much of the world, is the stabilizing of hydrological functions. Experiences from various parts of the world demonstrate that protected areas are a cost-effective management option for maintaining healthy watersheds that produce a steady and reliable source of water. For example, 7,600 ha of cloud forest in the La Tigra National Park in Honduras provide the capital city of Tegucigalpa with 40% of its drinking water at a cost of about 5% of its second largest source; Guatopo National Park in Venezuela provides 20,000 liters per second of high-quality water to Caracas, justifying an expenditure of over US\$15 million to buy out timber and farming interests in the area; and the value of the hydroelectricity produced by Venezuela's Canaima National Park (3 million ha) is equivalent to 144 million barrels of oil per year, about \$2.5 billion at the current price (Garcia, 1984).

A Word of Caution

Economic assessment of the full range of goods and services provided by protected areas is part of the global move toward a market economy. This economic valuation is broadly endorsed by governments, but it can have negative impacts on the way that resources are managed. By transforming non-monetary values into monetary ones, land, labor, and nature become commodities rather than part of the cultural heritage that binds the members of the community to one another (Alcorn, 1997).

Further, assigning values to biological resources and ecosystem services inevitably makes value judgments about distributional and irreversible effects. While a complete discussion of the value of biodiversity should extend well beyond utilitarian values and market prices, even partial assessments of value can help to clarify the importance of biological resources to national development objectives and suggest ways of applying economic incentives and disincentives to ensure that the benefits of protected areas are delivered to the community, and that the community in turn is enabled to protect the resources upon which its continued prosperity depends.

Management Approaches to Deliver Greater Benefits from Protected Areas to Sustainable Development

Wild resources have been harvested sustainably by rural people for thousands of years, often as an important part of the culture (such as the Hema grazing management systems in many part of the Middle East). But the increasing

population, more sophisticated technology, and changing social, economic and political structures of today have removed most traditional controls on how resources are managed. If sustainable benefits are to be provided to local communities (a primary objective of development), more effective controls may be required to ensure that populations of plants and animals are maintained at productive levels. The means of doing this will vary from place to place, but management of protected areas for sustainable development should be based on four main principles:

Principle 1: The major functions of protected areas deliver different benefits at different scales. Protected areas are important at many levels, including local, national, and global. Drawing on the list of the functions of protected areas presented in section 2, Box 1 presents a model of

the various scales at which benefits are delivered by these functions, ranging from local to global. The range of possible benefits at each scale indicates the importance of defining objectives for individual protected areas; different management approaches will provide different mixes of benefits at different levels.

The first step in protected area management is to determine objectives at both the system and site levels; these objectives determine who gets what benefits, and pays what costs at what scale. This is a political process that should involve dialogue with the key stakeholders, including landowners, scientists, local communities, NGOs, and the private sector. Because different objectives involve trade-offs in terms of the distribution of costs and benefits, they need to be made explicit in management terms. Further, many of the public goods benefits of protected areas provide

BOX: 1
**THE SCALE AT WHICH BENEFITS ARE
DELIVERED BY PROTECTED AREA FUNCTIONS**

Protected areas provide benefits to people at all levels. Using the ten key functions listed above, this Box provides a model of the scale of which benefits can be derived, from 0 (=no benefit) to 4 (=maximum benefit). More precise determinations can be made for individual protected areas, based on management objectives.

Key Functions	Scale at which benefits are delivered		
	Local	National	Global
1. Biodiversity	0-4	2-4	4
2. Watershed protection	4	2-4	1-3
3. Storm protection	4	2-4	1-3
4. Tourism	0-4	4	2
5. Local amenity	2-4	1-2	0-1
6. Forest products	0-4	1-2	1-2
7. Soil	0-4	1-2	1-2
8. Carbon	0-1	1-2	2-3
9. Research	0-3	2-4	2-3
10. Cultural values	0-4	2-4	1-2

significant advantages for the global community, including conservation of biodiversity, sequestration of carbon, and the results of ecosystem research. Capturing appropriate rents at the national or local level from these global benefits remains a challenge that is only partially being met by intergovernmental conventions such as the CBD, Ramsar, and World Heritage. NGOs that capture willingness to pay among consumers in wealthy countries or sectors of society and deliver the results to protected areas in need can play an important role in this regard, and indeed have done so in many parts of Asia.

Principle 2: Many stakeholders have interests in protected areas and important roles to play in their management. Local communities, the private commercial sector, NGOs, and research institutions contain considerable variability as well as important potential to contribute to various

aspects of protected area management. However, these different categories of stakeholder tend to have very different major motivations, leading to different major roles that they can play in protected area management (Box 2). The way that the resources of a protected area are used in any particular place and time is the result of accommodation among conflicting interests between stakeholders having different objectives. Seldom does any single group dominate absolutely, and resources can be used in many different ways at the same place and time. Thus protected area management is part of an ongoing process in which an appropriate balance is sought among the different interests of the various stakeholders. A national protected area system plan can provide the basis for this process, but the Durban Congress highlighted the need to provide significantly greater attention to the rural poor living in and around protected areas.

BOX: 2 MAJOR MOTIVATIONS AND ROLES OF KEY STAKEHOLDERS

This chart presents a model of the motivations and roles of four major categories of stakeholders in protected areas in addition to government resource management agencies. These will vary considerably from place to place, but government resource management agencies should recognize the main motivations, harness the strengths of each stakeholder, and be aware of the limitations of each.

Stakeholder	Major Motivation	Major Roles
Local communities	Sustainable livelihoods	Resource management; buffer-zone management
Private commercial sector	Economic profit	Managing profitable operations; providing sponsorship
Nongovernmental organizations	Conserving public goods	Public information; technical advice; linkages among stakeholders; funding from public
Research institutions	Scientific curiosity	Research and monitoring; technical advice

Principle 3: The major problems facing protected areas need to be addressed by institutions at the appropriate scale, with appropriate roles. Just as different benefits of protected areas are delivered differently at different scales, so too must the different problems faced by protected areas be addressed by the right institutions operating at the appropriate scale. The first step in determining appropriate management responses is to clearly identify the problem being addressed. In general, local people possessing secure tenure can deal with most day-to-day threats better than governments can, while governments can resist major abuses better than local people can (providing they have the technical and institutional resources and political will to do so). When the main threat to a protected area arises from cumulative overuse by too many people making too many demands on ecosystems to meet their day-to-day subsistence needs, local regulation and social control may be required, along with investments in improved agricultural practices or alternative livelihoods (Caldecott, 1997). When poaching of endangered species is a major problem (for example, the recent problems of tiger and rhino poaching in India and Nepal), law enforcement will be a critical element. However, many of the factors leading to the loss of biodiversity and degradation of protected areas originate in national government policies far from protected area boundaries, such as national development priorities that may subsidize industrial agriculture in buffer zones, promote resettlement in remote areas, issue permits for mining within protected areas, build roads or dams in protected areas, and issue timber

concessions in protected areas or buffer zones. These require broader approaches such as improved national policies on development, trade, land tenure, and land-use planning.

A protected area system needs diversity in institutional approaches. Government conservation institutions in many countries claim an exclusive mandate to manage conservation areas and activities but lack the necessary human, financial, and technical resource capacities to carry out that mandate effectively. But protected areas support biological processes that often operate at small scales that vary dramatically in climate, elevation, structure, and importance from one site to the next. An over-emphasis on centralized protected area agencies can undermine institutional mechanisms at smaller scales, such as traditional approaches to conservation based on local knowledge about specific complex interactions and concerns about natural capital that can be applied in daily life. This clearly is not an either-or situation, but instead calls for creating new systems of governance for protected areas, with different institutions having different responsibilities at different scales. Simply stated, large-scale, centralized governance units do not, and cannot, have the variety of response capabilities—and the incentives to use them—that large numbers of local institutions can have (Ostrom, 1998).

Involving multiple stakeholders in protected area management has many advantages. The key challenge is to specify appropriate functional roles, as suggested in Box 3 (from McNeely, 1999). How these roles are distributed will

depend on the management objectives of each individual protected area and how these are implemented, but the Durban Congress underlined the importance of directing a greater share of the benefits to the rural poor:

Principle 4: Protected areas are best conceived as parts of a national system of land use. As called for under the Convention on Biological Diversity, each country needs to treat its protected areas as a system, with different parts of the system designed to provide different kinds of benefits to different groups of stakeholders, though of course with considerable redundancy built into the system to ensure sustainability. Box 1 implied that protected areas need to be conceived as a national system,

with some sites designed to provide primarily national benefits, others designed primarily to meet needs of local people for watershed protection, other sites to ensure sustainable use of non-timber forest products, and others designed primarily to conserve biological diversity.

A national protected area systems plan will ensure that all major ecosystems are well protected, the different components of the system are managed to the appropriate objectives, connections between protected areas are promoted where possible, developments in adjacent lands (buffer zones) are supportive of the protected area system, roles for different stakeholders are identified, and priorities for investment are specified.

BOX: 3 FUNCTIONAL ROLES IN THE MANAGEMENT OF PROTECTED AREAS

While each protected area has different challenges, the general distribution of responsibility among government, the private sector, NGOs, research institutions, and local communities can be assessed for each of the functional roles for protected areas. The table below assesses the importance of the role for each of the five groups, scoring from 0 (no role) to 4 (lead role). These scores are indicative only, and will vary with the site and its objectives.

Functional Role	Govt.	Private Sector	NGOs	Research Institutes	Local Communities
Site planning	4	1	2	2	3
Establishing norms	4	1	1	1	2
Maintenance of roads	4	1	0	0	1
Maintenance of trails		1-2	2	1	2
Running of hotels, lodges	0-4	0-4	0-2	0	0-4
Running of campsites	0-4	0-4	0-2	0	0-4
Habitat management	4	1-2	1-2	1-2	1-4
Wildlife management	2-4	1	1-2	1-2	1-4
Public information	2-4	1	1-4	1-2	1
Public relations	2-4	2	1-4	0-2	0
Extension	1-4	1	1-4	2-3	1
Research	0-4	1	1-4	2-4	1
Education	2-4	1	1-4	2-4	1
Monitoring	0-4	1	1-4	2-4	1-2
Bio-prospecting	0-1	4	1	2-4	2
Issuing permits	4	0	0	0	2
Funding	2-4	1-3	1-3	1	1

Conclusions: Providing Benefits to Rural Communities

Far more needs to be done to build support from local communities for protected areas in Asia. This will require a challenging combination of incentives and disincentives, economic benefits and law enforcement, education and awareness, employment in the protected area and employment opportunities outside, enhanced land tenure and control of new immigration (especially where the buffer zones around protected areas are targeted for special development assistance). The key is to find the balance among the competing demands, and this will usually require a site-specific solution.

A key factor is the stability of rural communities, implying that governments need to be particularly cautious when contemplating major efforts at relocating people from one part of the countryside to another. Those people who have developed long-term relationships with particular settings, and have developed knowledge on how to manage the resources contained within those ecosystems, are likely to have very different relationships with the land and its resources than are new immigrants who have no particular linkage to local resources and often receive considerable subsidies from outside; the new arrivals frequently are responsible for more destructive land-use practices than are the long-term residents, but of course new technologies and new markets can be expected to change behaviour of local villagers irrespective of their traditional conservation practices.

At a minimum, local communities should be consulted on any decisions that affect them. In many cases, giving the local people preferential treatment in terms of employment within the protected area (including seasonal or project-based employment), providing economic incentives to establish tourism or other income-generating activities in the buffer zone, and ensuring an appropriate flow of benefits from the protected areas to the surrounding lands can help to build a positive relationship between protected areas and local communities.

It is possible that some local communities have a limit on their perceived needs, and once their basic needs are met, then they will reduce their impact on protected area resources. But this rosy assumption is far from a generality and most communities contain at least some individuals who happily will try to exploit more from a system than can be supported in a sustainable way, even if the social costs far outweigh the private benefits. This means that protected area management needs to be based on a clear understanding of rules and regulations, and effective means of enforcing them through various kinds of incentives (such as employment, clean water, various kinds of linked development, and so forth), and disincentives (such as public ostracism, fines, and even jail terms).

Protected areas are created by people, so they are expressions of culture and serve as models of the relationship between people and the rest of nature. Thus the culture of each country is

reflected in its system of protected areas, so each will tend to have different characteristics.

The single overriding issue for those interested in using protected areas to alleviate poverty is how to find the right balance between the generalized desire to live harmoniously with nature and the need to exploit resources to sustain life and develop economically. The problems facing protected areas are thus intimately related to socioeconomic factors affecting communities in and around protected areas, including poverty, land tenure, and equity; they also involve national level concerns, such as land use, tourism, development, balance of payments, energy, and resource management; and global concerns such as biodiversity, climate change, and generation of new knowledge about the living world.

The sustainable development program for national protected area systems advocated here needs to include both firm governmental action and alliances with the other stakeholders at all levels. National governments cannot delegate their role as guarantors of the conservation of a country's cultural and natural heritage, so the appropriate authorities need to build the capacity to fulfill their regulatory and management duties

and responsibilities. But civil society can share certain rights and responsibilities regarding the management of protected areas after careful preparations and an adequate definition of roles and responsibilities. Given the interests of NGOs, businesses, scientists, indigenous peoples, and local communities who live within or close to protected areas, alliances can be created among stakeholders to enable each to play an appropriate role according to clear government policies and laws. Social and economic incentives can be used to reward land-holders that contribute effectively to protected area management.

If governments and the general public recognize the many economic, social, cultural, ecological, developmental, and political values of protected areas; if appropriate institutions are established to manage protected areas in close collaboration with other stakeholders; if sustainable economic benefits are enabled to flow to protected areas and their surrounding communities; and if information from both traditional knowledge and modern science can be mobilized to enable protected areas to adapt to changing conditions, then protected areas can be the engines for new forms of sustainable rural development that can ensure a better life for all.

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BIODIVERSITY CONSERVATION BEYOND BOUNDARIES: AN INITIATIVE ON REGIONAL COOPERATION IN THE HINDU KUSH-HIMALAYA

Nakul Chettri¹, Eklavya Sharma² and Bandana Shakya³

ABSTRACT

Realization of conservation goal requires implications at all levels of resource management. Protected area management in the Hindu Kush-Himalayan region has evolved from the strict species-based conservation to the livelihood-based landscape approach. The shift in the conservation paradigm has been gradual with the acceptance of the community as part and parcel of national level conservation initiative, together with the integration of many global conventions and directives. Scaling up conservation across larger landscape as facilitated by most global conventions involves cooperation at various levels. The paper briefs about a pilot initiative on the transboundary biodiversity management in the Kangchenjunga landscape, which brought forward the approach of regional cooperation for the implementation of the Convention on Biological Diversity. In the process, International Centre for Integrated Mountain Development developed integrated conservation corridor and landscape management plans and facilitated for its implementation through capacity building and partnership development processes. It set the stage for formulation of the “Regional Cooperation Framework” among the three nations—Bhutan, India and Nepal. The framework led further to the development of regional strategy for biodiversity conservation and management in corridors and transboundary landscape in Kangchenjunga with a focus on ensuring ecological, economic and socio-political integration.

¹International Centre for Integrated Mountain Development (ICIMOD), nchettri@icimod.org

²International Centre for Integrated Mountain Development (ICIMOD), esharma@icimod.org

³International Centre for Integrated Mountain Development (ICIMOD), bshakya@icimod.org

Introduction

Stretched over eight countries in Asia, the Hindu Kush Himalayan (HKH) region covers an area of 4.3 million square kilometers. The region is well known for its diverse social, cultural and biological richness and is home to millions of people who are economically poor and socially marginalized and heavily dependant on biological resources for their daily sustenance. The biological diversity is the essence of the region, enriched by the elements of four of the 34 global biodiversity hotspots (Mittermeier *et al.*, 2004) and several of the global 200 ecoregions (Olson *et al.*, 2001). Furthermore, glaciers, wetlands, rangelands and forests of the HKH sustain many rivers that are lifelines of downstream provinces and countries. The HKH is home to many historical ethnic communities of Bhutias, Kirats, Khas, Lepchas, Sherpas, Tibetans, Wakhis among others, whose role towards the maintenance of biodiversity over the years have been well known and significant. The environmental services based on its rich resources are the basis of livelihoods and physical security of 1.5 billion people living in the mountains and to the large number of people living downstream. There are unprecedented opportunities to convert this biological richness into enriching global environmental services whose impacts are evident beyond the regional boundaries.

The eight regional member countries of the HKH namely, Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal and Pakistan being signatories to many of the global conventions such as the Convention on Biological Diversity (CBD), Ramsar Convention on Wetlands, Convention on Migratory species

and the United Nations Framework on Convention of Climate Change, are committed towards safeguarding the rich biological diversity in the region. Protected Areas (PAs) such as national parks and nature reserves are universally recognized as a key tool in biodiversity conservation. In the HKH, the commitment of the member countries is reflected by establishment of 488 protected areas covering 39% of the total land area of the region. Additionally, there are about 28 Ramsar sites and numerous World Heritage Sites. At the national level, Bhutan ranks the highest (27%) followed by Nepal (16%) and China (15%) in setting aside their richer land terrain as PAs. Considering the given statistics on the number and coverage of PAs in the region, the global conservation target of assigning 11% of the nation's area for PAs seems to be achieved for the HKH region. However, it has been revealed that the extent of spatial coverage is inadequate for sustainable management of the diverse biological resources in the HKH region as there are substantial challenges on the ground hindering the implementation of global instruments at the local levels (Chettri *et al.*, 2006). Similarly, successes of many PAs have been questioned over the years (Brooks *et al.*, 2004; Chape *et al.*, 2005), that prompts us to view conservation management from a wider angle of social, environmental and economic security.

In the HKH, many of the conservation concerns are similar across the region such as problems related to land-use transformation, habitat fragmentation, unregulated tourism, unsustainable harvesting of biodiversity and access to the resources by poor and marginalized

communities. There are large numbers of wild animals disappearing due to biotic pressure and poaching. There are issues related to land tenure and encroachment and many forested paths linking the protected areas have been encroached upon and fragmented due to development works, intensive agriculture practices, extensive grazing and deforestation. Forests have been modified due to excessive felling of trees and subsequent planting of exotic species. There are prevalent transboundary issues on cross border grazing and illegal extraction of resources.

The CBD Program of work on PAs emphasizes on the “*establishment of national and regional system of PAs integrated into a global network as a contribution to globally agreed goals*”. The paper deals with the integration of PAs with the landscape approach to conservation at the Kangchenjunga landscape (KL) and discusses the strategic process of transboundary biodiversity management (TBM) based on multi-stakeholder and participatory approaches processed in conservation planning. It highlights the regional consensus among the three nations—Bhutan, India and Nepal—for implementation of the CBD targets for conservation. It also touches upon the significance of future regional strategies on transboundary biodiversity management in the KL.

Conservation Overview in the HKH

In the HKH, the conservation history with PAs as a cornerstone for conservation evolved gradually from the idea of preserving charismatic or important wildlife species and their habitat in a form of nature reserves and wilderness area,

preserved as they are, in their pristine form and without a speck of human intervention. Over the years, as environmental consciousness grew towards global concerns towards urbanization, population explosion, poverty, and pollution, people realized the necessity of viewing biodiversity conservation from the perspectives of social, cultural, economic and political concerns. Realizing the direct relevance of human sustenance and resource use, conservation practice in the HKH took a new dimension with the adoption of ecosystem or landscape approach that is based on the principle of (i) sustainability (wise use of its elements), (ii) equitability (fair and equitable sharing of benefits), (iii) participatory management (ensuring participation of local, indigenous, disadvantaged and marginalized communities), and (iv) partnership building (Secretariat to CBD, 2004; Chettri and Sharma, 2005a).

The landscape approach recognizes humans with their cultural diversity as an integral component of ecosystems and PAs as a part of a larger landscape that exists beyond the political boundary of a nation (Sherpa *et al.*, 2003; Sharma and Chettri, 2005). Conservation at the landscape level thus focused on establishing and maintaining continuous and contiguous habitats for the long-term protection and sustainability of biological diversity along with the wellbeing of the human population. As conservation biologists began to emphasize the importance of larger scale ecosystem-based management and regional approaches to biodiversity conservation (see Secretariat to CBD 2004; CEPF, 2005), the concept of TBM gained impetus. As a result, five potential transboundary landscapes, (i) Pamir

Landscape covering parts of Afghanistan, China, Pakistan and Tajikistan; (ii) Kailash Landscape covering parts of India, Nepal and China; (iii) Everest Landscape covering parts of Tibetan Autonomous Region of China and Nepal; (iv) Kangchenjunga Landscape covering parts of Bhutan, China, India and Nepal; and (v) Kawagebo-Namdapha-Hkakaborazi Landscape covering parts of China, India and Myanmar were identified within the HKH (Chettri and Sharma, 2005b). The TBM emphasizes on the use of

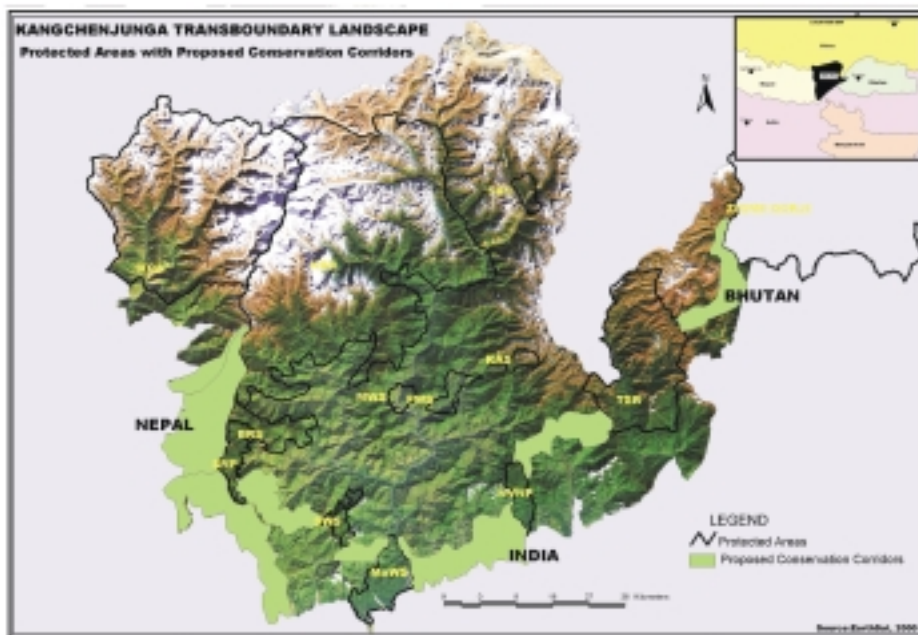
participatory and people-inclusive approaches to integrate and agree on the issues related to human communities divided across the border, to build partnerships and to enhance environmental protection through promotion of regional cooperation.

Kangchenjunga Landscape: A Pilot initiative for TBM

The KL (Figure 1) refers to the southern half of Kangchenjunga transboundary complex; one

FIGURE: 1

MAP OF KANGCHENJUNGA LANDSCAPE SHOWING
PROTECTED AREAS AND PROPOSED CONSERVATION CORRIDORS

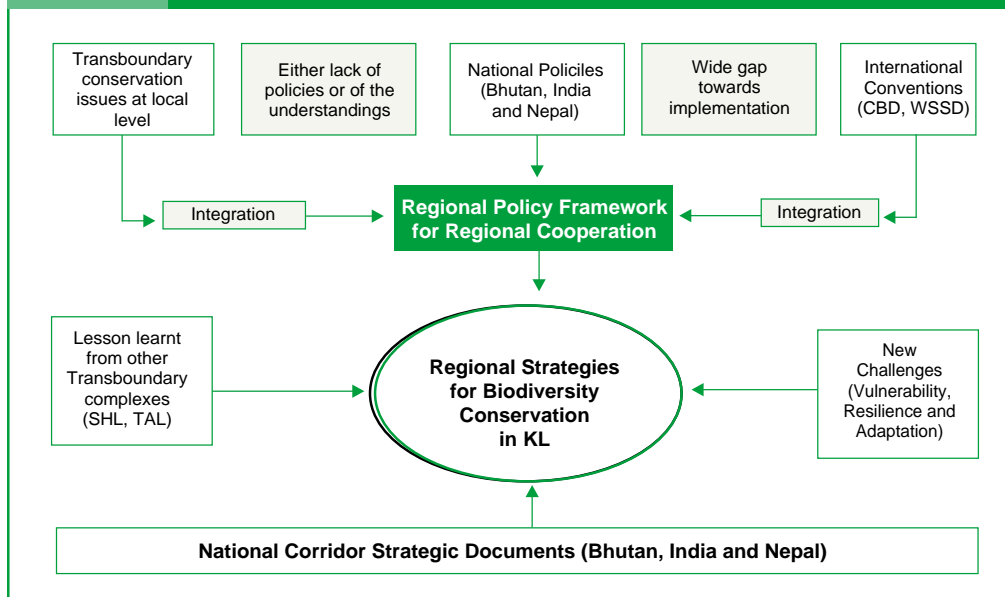


Notes: KCA- Kangchenjunga Conservation Area, Nepal; KBR- Kangchenjunga Biosphere Reserve, BRS- Barsey Rhododendron Sanctuary, Fambong Lho Wildlife Sanctuary, Singba Rhododendron Sanctuary, Mainam Wildlife Sanctuary, Kyongnosla Alpine Sanctuary, Sikkim, India; SNP- Singhalila National Park, Senchel Wildlife Sanctaury, Mahananda Wildlife Sanctuary, Neora Valley National Park, Darjeeling, India; and Toorsa Strict Nature Reserve, Jigme Dorzi National Park, Bhutan)

of the four most prioritized complexes identified in the Himalayan region. (WWF and ICIMOD 2001; CEPF, 2005). The landscape, spread across eastern Nepal, Darjeeling and Sikkim of India and western Bhutan enjoys a wealth of globally significant gene pool, high species endemism and biologically diverse ecosystems. The presence of 14 PAs covering 42% of the landscape makes it a significant repository of diverse biodiversity, rich in many endemic and globally threatened species such as the Snow leopard (*Uncia uncia*), Red panda (*Ailurus fulgens*), Musk deer (*Moschus moschiferous*), Tiger (*Panthera tigris*), Takin (*Budorcas taxicolor*), and Asian elephant (*Elephas maximus*), among others. For the past few years, the PAs in the KL have existed as isolated conservation 'islands' without any form of connectivity among them but have shared a conservation area of common interest across the boundaries. The concept that habitat connectivity through corridor development was indispensable for maintaining viable populations of species and for maintaining the ecological integrity was promoted. It was also realized that there are numerous national policies directed towards people-based conservation but a wide gap still existed between the national and more rapidly evolving global conservation instruments. The adoption of the TBM was to fill these policy gaps through participatory and integrated approach and partnership building between communities and government agencies of three countries. Major focus for conservation intervention in the KL was therefore to identify potential conservation corridors that would enhance the connectivity among the PAs, recognize and meet national

and global directives for biodiversity conservation, enhance livelihoods by adoption of conservation-linked development opportunities, and strengthen regional cooperation through policy innovations.

The strategic direction for TBM involved integration of local level conservation and development issues along with the national conservation policies of the three countries into a regional consensus for cooperation to implement global conventions such as CBD (Figure 2). The further intention was to formulate a regional strategic document that would support and expand upon the regional cooperation framework. In the process, the focus was made to integrate lessons learnt from the other landscape complexes such as Mount Everest complex (Sherpa *et al.*, 2003), Sacred Himalayan Landscape (SHL) Nepal (GoN/MFSC, 2006), assembling together the strategies from the national corridor plans developed during the process, and to incorporate strategies related to new environmental challenges such as climate change. The envisaged 'regional strategic document' for biodiversity conservation in the KL would facilitate the nations to prioritize and implement actions with regard to fulfilling the regional conservation goals under the directives of the CBD. The strategies would be based on the three explicit components of ecological, economical and socio-cultural sustainability; balancing conservation with sustainable use of community resources, harmonizing the ecological processes, maintaining the environmental services and thereby, improving the quality of human life.

FIGURE: 1**MAP OF KANGCHENJUNGA LANDSCAPE SHOWING
PROTECTED AREAS AND PROPOSED CONSERVATION CORRIDORS**

Realization of the need and Significance of Landscape/Ecosystem Approach

The necessity of landscape scale conservation in the KL was amplified by the fact that many PAs in the KL are of transboundary in nature and majority of globally significant species in the KL used extended habitats, beyond the political boundary of one nation. The landscape also had people who showed higher dependency on resources across the borders for various environmental goods and services that are culturally embedded in their lifestyle. In this regard, there were numerous conservation and developmental challenges; and that effective conservation could only be achieved through consideration of conservation measures at the

landscape level. This led to the consensus that biodiversity and livelihood management is more effective if a transboundary landscape approach is adopted across these mountain areas. Furthermore, the location of this trans-border landscape is an important asset for the region's geopolitics. The contiguous habitats and open border situation also made the KL an ideal place for both regional cooperation and transboundary biodiversity conservation.

Partnership Building and Expansion to SHL

ICIMOD, together with a number of organizations and institutions initiated strategic approach in conservation in the KL. The initiatives got momentum when ICIMOD and

WWF Nepal Program jointly organized a regional workshop on Kangchenjunga complex as a potential transboundary area in the region, in 1997. The workshop considered the geopolitical and ecological significance of the region and strongly revealed that effective conservation of this important transboundary landscape was possible only through regional cooperation. This opened up the pathway for further research, that identified the Kangchenjunga complex as one of the most critical biodiversity conservation areas in the eastern Himalaya (WWF and ICIMOD, 2001; CEPE, 2005). Since 2002, ICIMOD has been advocating for conservation corridor⁴ development through participatory processes and action research for regional cooperation in the KL. In 2004, further collaboration with WWF Nepal Program, the Mountain Institute (TMI) Himal Program, and the World Conservation Union (IUCN) Nepal, under the auspices of the Ministry of Forest and Soil Conservation, Government of Nepal conceptualized the Sacred Himalayan Landscape (SHL) for a more integrative and extended approach in biodiversity conservation (GoN/MFSC, 2006).

Community Acceptance and Participation

An enormous human dependency on the forests in the landscape was one of the most important drivers of habitat degradation that challenged conservation for restoring the ecosystem services. The only option for sustainable conservation was

to broaden the focus of conservation from strict protected area management to including the people in the larger landscape level protection of resources. With this realization, local communities were regarded as a central pillar in the landscape planning process. This was very critical in identifying the need-based and conservation-related development opportunities and it was also learnt that multi-stakeholder partnerships, local people's participation and acceptance and support from government agencies were crucial for such initiatives. It was also evident that communities do come forward for conservation provided there are some alternative economic options available to them. Community participation in the strategic development of KL was overwhelming when the community empowerment in decision-making was strengthened.

Integrative Corridor and Landscape Management Plans

The increasing economic and environmental interdependence among the three countries in the KL offered ample opportunities for cooperation, particularly in the wise and sustainable use of biodiversity and its management for environmental goods and services. Over the last few years, ICIMOD and its partners working in the KL have witnessed a positive paradigm shift from 'people exclusionary' to 'community based' approach through peoples' participation with adoption of landscape approach (GoN/MFSC, 2006; Chettri *et al.*, 2007). Through extensive participatory planning and consultations

⁴Conservation corridors interconnect protected areas and other relevant territories surrounding them. Human activities are promoted in these areas on sustainable development basis; activities are undertaken that do not endanger the rich natural resources contained therein and which benefits cooperating nations in general and communities in particular. Conservation corridors are thus a flexible planning tool that interconnects protected areas through combination of land use strategy.

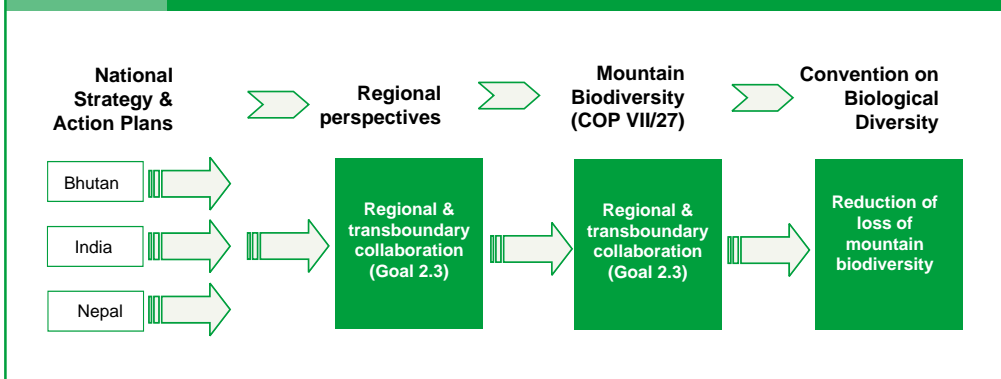
at the local, national and regional levels, the concepts of landscape approach and conservation corridors were promoted from the national to a global level. As a result, integrative corridor and landscape management plans and strategies were developed for the six potential conservation corridors linking nine protected areas in the KL.

At the policy front, it adopted local conservation initiatives with policy implications addressed at national and regional levels and identified the grey area (Figure 3). It was realized that regional cooperation in conservation is critically important to supplement specific country efforts to protect, conserve, use and revitalize and manage resources which are often thought of as a common heritage (UNDP, 1998). The research identified that International boundaries play an important role given their multifaceted functions as filter zones for illicit activities, gateway for people and goods, and also as zone of socioeconomic, cultural and environmental integration (Chettri and Sharma, 2005b). Moreover, KL provided an exceptional opportunity for regional cooperation (Sharma *et al.*, 2007). However, conservation across the boundaries showed challenges of extended nature, transcending the geographical boundaries of the countries sharing the landscape. As indicated in figure 3, the regional cooperation framework (Sharma *et al.*, 2007) brought forward the common element of national conservation policies with reference to the implementation goal 2.3 of Mountain Biodiversity (COP VII/27) along with the other goals as agreed by the CBD. It built upon the common prioritized issues such as over extraction of resources, haphazard land use practices, livelihood thrusts and weak

enforcement of conservation policies (Sharma *et al.*, 2007). Likewise the regional strategic document (ICIMOD's unpublished document) intends to provide directions that can be adapted and applied to the individual countries in the KL to achieve cooperation for better management of this critical landscape and the corridors. It presents numerous strategies, actions and indicators that can be applied to strengthen the conservation objectives. Based on the principles of participatory management, ecosystem approach, sustainability, equitability, transboundary approach and partnership building, it gives directives on four constitutive elements of biodiversity conservation, livelihood enhancement, environmental security, and regional cooperation.

Conclusion

The challenges of biodiversity conservation are most difficult especially in the regional context. Since conservation means wise use of biological resources, conservation efforts need to be effective and realistic in terms of sustainable use. Promotion of community-based conservation together with sustainable economic development is one of the fundamental challenges for biodiversity conservation. Former conservation measures, at the national level, mostly focused on providing complete protection of biodiversity from the people. Recently, with the adoption of ecosystem or landscape approach, there is an increasing recognition of the value that local communities bring to the process of conserving natural resources. This paradigm shift has seen the development and application of management models designed to integrate conservation and sustainable resource use. With

FIGURE: 3**POLICY FRAMEWORK FOR KL IN CONTEXT TO
POLICY LINKAGES FROM NATIONAL TO GLOBAL LEVELS**

sharing and learning from both mountain and global biodiversity convention processes, the KL initiative has enhanced regional and international cooperation in biodiversity conservation and management at the landscape level.

Long felt bilateral discussions have begun between the government of India and Nepal to control illegal trade across the borders. However at the regional level, the emerging second generation problems in participatory management such as the extent of communities' right on economic benefits, developing systems for conflict resolution, increasing women's participation, inclusion and full participation of traditional users and equitable distribution of benefits, social equity of unequal power relations between the rich and the poor, high and low castes, women and men and coping strategies of the vulnerable sections of society to climate change have emerged as new challenges. Recently developed Regional Cooperation Framework and the upcoming Regional Strategic Document for

transboundary biodiversity management in the southern half of Kangchenjunga complex would be very useful to showcase the significance of regional cooperation in addressing these issues and would provide technical and methodological guidelines for implementing the regional approach to conservation of mountain biodiversity at the transboundary level. It might also help build a strong trust among member countries for bringing lasting peace, prosperity and harmony in the HKH region.

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TRANS-BOUNDARY CONSERVATION INITIATIVES IN NEPAL

Krishna C. Paudel¹, Jhamak B.Karki² and Shiv R.Bhatta³

Introduction

Protected areas (PAs) in Nepal cover a total area of 28,998 km² which accounts for 19.7% of Nepal's geographical area within 9 national parks, 3 wildlife reserves, 1 hunting reserve, and 3 conservation areas (table 1). More than 80% of the area of PAs lies in the Himalayan physiographic region followed by 12% in the terai and only 1.5% in the mid-hills.

NP= National Park, WR= Wildlife Reserve, HR= Hunting Reserve, CA= Conservation Area

The common goal of PAs is biodiversity conservation in general and environmental protection, community development, cultural preservation and sustainable tourism in particular. In recent years its objective has been extended to landscape level conservation as well.

Table 1: Protected Area Coverage and Proportionate Physiographic Distribution

SN	PROTECTED AREAS	YEAR OF ESTABLISHMENT	AREA (KM ²)	PHYSIOGRAPHIC ZONE AND AREA (KM ²)
1.	Langtang NP	1976	1,710	High Himal20,565 km ² (86.4%)
2.	Sagarmatha NP	1976	1,148	
3.	Sheyphoksundo NP	1984	3,555	
4.	Dhorpatan HR	1987	1,325	
5.	Makalu Barun NP	1991	1,500	
6.	Rara NP	1976	106	
7.	Annapurna CA	1992	7,629	
8.	Kangchenjunga CA	1997	2,035	
9.	Manaslu CA	1998	1,663	
10.	Khaptad NP	1984	225	Mid-Hill 369 sq.km, (1.5%)
11.	Shivapuri NP	2002	144	
12.	Chitwan NP	1973	932	Terai2879 sq.km.(12.1%)
13.	Suklaphanta WR	1976	305	
14.	Koshi Tappu WR	1976	175	
15.	Parsa WR	1984	499	
16.	Bardia NP	1988	968	
Total		23,813		

Note: NP= National Park, WR= Wildlife Reserve, HR= Hunting Reserve, CA= Conservation Area

¹Department of National Parks and Wildlife Conservation, Ministry of Forests and Soil Conservation, Nepal.

²Department of National Parks and Wildlife Conservation, Ministry of Forests and Soil Conservation, Nepal; jbkarki@gmail.com

³Department of National Parks and Wildlife Conservation, Ministry of Forests and Soil Conservation, Nepal; shivbhatta@hotmail.com

One of the major aims of PA management in Nepal is species conservation focusing on flagship species having overall conservation importance. Illegal trade of flora and fauna is a major issue. The high demand of products in one country is affecting the conservation of the other countries, and this is where transboundary cooperation becomes crucial. Flagship species of common interest with India are the Asian Elephant (*Elephas maximus*), Great Indian One-horned Rhinoceros (*Rhinoceros unicornis*), and Royal Bengal Tiger (*Panthera tigris*); whereas with the Tibet Autonomous Region of China are the Snow Leopard (*Panthera uncia*), Himalayan Musk Deer (*Moschus moschiferus*), Red Panda (*Ailurus fulgens*), Brown Bear (*Ursus arctos*) and Himalayan Black Bear (*Selenarctos thibetanus*).

Issues in Trans-Boundary PA Management

Nepal having an open border with India in the south, east and west and long inaccessible terrain in the north, shares common problems with China and India with regards to trans-boundary PA management. Trade of wildlife parts has both domestic and trans-border implications. At the domestic level, issues include (i) lack of information networks and proper stakeholder engagement, (ii) lack of consumer awareness, (iii) weak enforcement within PAs, (iv) weak capacity for effective PA management, (v) lack of political commitments, (vi) weak inter-departmental cooperation, and (vii) policy gaps.

With the Tibet Autonomous Region of China, important issues are (i) Poaching of snow leopard, musk deer, and other wildlife across the borders, (ii) Unsustainable grazing and harvesting of non-timber forest products, (iii) Fire and disease

transfer risks, (iv) Imposition of fees to KCA residents for trade and grazing purpose has created problems for Nepalese inhabitants living in the border region, and (v) Tensions between the cross-border inhabitants.

Similarly, important issues between Nepal and India in the Kangchenjunga complex are (i) Grazing and exclusion of Livestock from Sikkim (KNP), (ii) Poaching of snow leopard, musk deer and other wildlife across the borders, (iii) Collection of red panda for western zoos from Indo/Nepal borders, and (iv) Unsustainable grazing and harvesting of non-timber forest products.

Some of the known wildlife trade routes along the northern border includes (i) Dharchula-Humla-Taklakot; (ii) Pokhara-Jomsom-Tibet; (iii) Dhading or Gorkha-Chhekampar-Tibet; (iv) Tatopani-Khasa; (v) Dolaka-Lamebagar-Kimathanka; and (v) Gola-Tibet. Similarly, important southern border entry points to Nepal are Mahendranagar, Bhairahawa, Birgunj, Biratnagar, and Kakarbhitta.

Box 1 shows the major seizures of wildlife parts between 2005 and 2006 in Nepal and India indicating the trans-boundary nature of the trade. To control illegal trade of wildlife parts, inter-governmental cooperation is crucial.

Initiatives in Transboundary Cooperation

Nepal has initiated in trans-boundary cooperation with India and China and participated in several meetings on trans-boundary cooperation regarding PA

BOX 1 SEIZURES OF ILLEGAL TRADE OF WILDLIFE PARTS IN NEPAL AND INDIA

DATE	SEIZURES	COUNTRY
Aug 4, 2006	2 tiger skins and some bones- Pilibhit Forest Division	India
Aug 1st week, 2006	1 tiger skin and some weapons - Coimbatore	India
July 3, 2006	1 leopard skin - Ramnagar	India
June 5, 2006	30 kgs of tiger bone- Khata, Kailali	Nepal
June 4, 2006	Wanted poacher Jagdish Lodha captured in Nepal, he had sold 7 tiger skins to Tibetan traders in Nepal in 2004.	
April 2006	1 tiger skin and 6 poachers apprehended - Chitwan National Park	Nepal
Dec 29, 2005	7 tiger skins - Dharchula	Nepal
Dec 10, 2005	4 leopard skins - Mahendranagar	Nepal
Sept 1, 2005	5 tiger skins, 36 leopard skins, 113 kgs of tiger bones - Syrubensi	Nepal
Aug 10, 2005	1 tiger skin, 103 pieces of tiger bone	Nepal

management. The protected areas bordering the Tibet Autonomous Region of China and Nepal are Quomolongma National Nature Preserve (in Tibet) and bordering it are Sagarmatha, Langtang and Makalu-Barun National Parks (in Nepal). Two important meetings have been held between the two countries. The first was held in March 1995 the outcomes of which were recommendations on (i) improving sharing of information, (ii) amending PA regulations, (iii) initiating opening new routes along the border, and (iv) forming a joint committee to collaborate trans-boundary conservations activities. In 1996 Nepalese park staff received training on ecotourism and visited the Tibet Autonomous Region of China to partake in consultative meetings with counterparts in Lhasa and

Shigatse. This was followed by park staff of the Quomolongma National Nature Preserve visiting PAs in Nepal.

Similarly, PAs in India which border Nepal are Dudhwa National Park, Katarniaghat Wildlife Sanctuary and Balmiki Tiger Reserve; while Suklaphanta Wildlife Reserve, KoshiTappu Wildlife Reserve, Parsa Wildlife Reserve, Bardia National Park and Chitwan National Park of Nepal border India. Two meetings have been held between India and Nepal on trans-boundary PA management issues. The first was held in Kathmandu in January 1997 which called for exchange of information and regular field level meetings and cross visits. The second meeting held in New Delhi in 1999 further reiterated the

need to hold field level meetings every three months and annual central level meetings between park staff of the two countries. A meeting between the two countries in Kathmandu in 2002 led to the following recommendations:

- (i) Form a Joint trans-boarder consultative committee
- (ii) Hold quarterly field level meeting
- (iii) Establish central level database
- (iv) Setup joint monitoring committee for poaching and illegal activities
- (v) Make efforts for capacity building of frontline staffs on both sides of the border
- (vi) Conduct training and workshop for field level staff
- (vii) Identify and implement effective programs for biodiversity conservation
- (viii) Identify migratory routes of wild animals
- (ix) Establish in-country mechanisms to involve relevant department agencies for mitigating problems of people living in the border areas
- (x) Monitor international border areas regularly to check poaching, illegal felling, sawing, encroachment and illegal trade
- (xi) Use departmental channels to resolve problems and issues
- (xii) Hold national level consultative meeting in 2 years to review progress and develop future strategies

Moreover, the Kangchenunga Conservation Area in Nepal, Quomolongma National Nature Preserve in the Tibet Autonomous Region of China and Kangchendzonga National Park in Sikkim, India has been proposed for the tri-national peace park.

Achievements to Date

Field Level Achievements between Nepal and India:

Regular interactions between field level staff of the government, communities, and local NGOs of are taking place in both countries. Community based anti-poaching operations (CBAPO) are also taking place. The CBAPOs are helping to control poaching, smuggling of timber, illegal grazing and to help rescue wildlife and create conservation awareness in the communities around the PAs. CBAPO have to date confiscated 163 nets and traps used to capture wildlife and 5,463 cubic feet of timber; captured 64 persons involved in illegal activities and generated a fund of NRs 219,770 through fines; and helped remove encroachers from 163 ha of forest land. A field level action plan to strengthen trans-boarder cooperation has also been prepared by Nepal.

The 10-year strategic plan of the Tarai Arc Landscape (TAL), Nepal has stressed to include strengthened trans-boundary cooperation with India. This includes efforts to strengthen cooperation in multiples areas—information sharing and research, wildlife conservation, meta-population management, law enforcement, anti-poaching and curbing illegal trade.

Similarly, a tripartite meeting between Nepal, India and China was held in Beijing in 2006 where discussions were held on the need for joint efforts to control of illegal trade of wildlife parts within the territories of three neighboring countries.

Recommendations for Future Cooperation

As trans-boundary issues are complex, greater understanding of the problems by all parties is essential. Realizing this complexity at various levels of trans-boundary cooperation, improvements in the following areas are suggested:

- (i) Information sharing and capacity building at all levels of PA management in the trans-borders is urgently required
- (ii) Strengthen cooperation among neighboring countries for control of illegal trade of wildlife, their parts and derivatives
- (iii) Strengthen interdepartmental cooperation within each of the countries
- (iv) Strengthen cooperation and coordination among government, NGOs, CBOs and civil society organizations at the trans-border areas
- (v) Establish exemplary joint initiatives to protect and manage trans-border biodiversity
- (vi) Continue community mobilization for protection, management and use of resources
- (vii) Protect and manage remaining degraded habitats in the trans-border areas
- (viii) Minimize livestock pressures in the trans-border forests
- (ix) Promote alternate energy resources in the trans-border areas, and create and promote site specific alternative livelihood options
- (x) Minimize people-wildlife conflicts
- (xi) Establish sustainable relief mechanisms for wildlife victims
- (xii) Ensure benefits of trans-border biodiversity conservation initiatives to local communities



ROLE OF BARANDABHAR CORRIDOR FOREST IN LANDSCAPE LEVEL CONSERVATION

Ganga Jang Thapa¹ and Binod Basnet²

Introduction

Protected area (PA) management has been evolving over the years. In the beginning, protection could not be achieved without removing the local communities from the area that needed protection. From this strict protected area system we have slowly, but surely, moved away from the '70s model where local people residing within the PAs were relocated to new locations so that pristine protection could be achieved. In the '80s, realization dawned on the protected area managers that protection cannot be achieved without the active support of the local communities. In the '90s, they realized that protection should be looked from a more holistic view as isolated areas cannot survive on their own as wild animals and vegetation do not abide by man-made boundaries.

The Terai Arc Landscape (TAL) program initiated from 2001 is jointly implemented by the Department of Forests (DoF) and Department of National Parks and Wildlife Conservation (DNPWC) of Ministry of Forests and Soil Conservation (MoFSC) and WWF Nepal Program in collaboration with the local communities and nongovernmental organizations (NGOs).

The TAL was initiated covering around 43,000 km² of surface area in both Nepal and India encompassing 11 protected areas of Nepal and India as well as large non-protected areas between them. In Nepal, TAL encompasses 23,129 km² of 14 districts including 75% of the remaining forests of lowland Nepal including Churia hills and four PAs. It represents the Terai Duar Savannas and Grasslands ecoregion, one among the Global 200 ecoregions.

The TAL landscape has the second largest population of rhinos (*Rhinoceros unicornis*) and one of the highest density of tiger (*Panthera tigris*) populations in the world and is home to other flagship species like the Asiatic wild elephant (*Elephas maximus*). One of the important corridors in the TAL is the Barandabhar Corridor Forest (BCF).

A forest corridor is defined as forested area connecting to a larger area, serving as passageways and as alternative habitat. The BCF is adjacent to the Chitwan National Park and its buffer zone was identified as an important forest corridor. The BCF was important in terms of

¹Executive Officer, National Trust for Nature Conservation, Nepal; gthapa@ntnc.org.np

²Program Officer, National Trust for Nature Conservation, Nepal; binod@ntnc.org.np

trans-boundary level conservation and serves as wildlife corridor for the movement of wild animals from Chitwan National Park and adjacent Valmiki Tiger Reserve of India in the lowland to the ecologically significant upland forest of the Mahabharat range.

United Nations Development Programme was convinced on the significance of the corridor and embarked on the Project—The landscape scale conservation of endangered tiger and rhinoceros populations in and around Chitwan National Park project (The Tiger-Rhino Corridor Project) together with Global Environment Facility (GEF) and United Nations Foundation (UNF) in 2001. The project was executed by National Trust for Nature Conservation (NTNC) and implemented in the area of the Chitwan National Park and its buffer zone in south central Nepal. The project started from 2001 and was successfully closed in April 2006.

The project was launched with the aim of promoting landscape level biodiversity conservation with strong community-based management links to conserve endangered species in and around the Chitwan National Park, a world heritage site. This project aimed to conserve the only existing corridor forest where a whole Village Development Committee of Padampur was relocated. Previously, Padampur village was located inside the Chitwan National Park which used to be annually flooded by the Rapti River. To ease the suffering of the local communities of Padampur and relieve the pressure on the park, the communities were relocated next to the BCF. Furthermore, communities in and around the BCF rely heavily

on natural resources for their daily livelihood needs; therefore, as a part of the project design, the project had incorporated a socioeconomic development component aiming to reduce the human dependency on the declining natural resources while addressing the ecological problems facing the degradation in the corridor forest.

The project was supported by the Global Environment Facility (GEF), the United Nations Foundation (UNF) and the United Nations Development Programme (UNDP). The financial support from GEF was assigned to support biodiversity conservation, particularly biodiversity management and monitoring, while the support from UNF was allocated to increase awareness on biodiversity issues among local people and enhancing the capacity of local communities, especially women and other target groups, for undertaking income generating activities, socioeconomic and cultural development and promotion of indigenous knowledge. The support from UNDP was primarily targeted for activities in the areas of the indigenous knowledge, conservation of cultural heritage and environmental health. The UNDP country office acted as an implementing agent for the UNF and GEF funds. The project execution was carried out by NTNC in collaboration with DNPWC through Chitwan National Park, Buffer Zone Council of Chitwan National Park and Department of Forests through Chitwan District Forest Office. These institutions played a key role in operationalization of anti-poaching revolving fund to support anti-poaching activities and formulation of management plan for BCF.

The Project Area

The Chitwan National Park, which covers an area of 932 km² was founded in 1973 and was declared as a UNESCO World Heritage Site in 1984. The park spans the four administrative districts of Chitwan, Nawalparasi, Parsa and Makwanpur. The park starts from the northern riverbank of Rapti near Ghatgai area and expands north, up to the foothills of the Mahabharat. The Chitwan National Park has the last Nepalese population of Asian rhinoceros and it is also the last stronghold of the Bengal tiger. Other threatened animals in the park include leopard, wild dog and wild Asian elephant as well as mugger crocodile and Indian python. Altogether 50 mammal species are found within the park. The park is rich in bird species and more than 500 species are found in the park. These include rare species such as the Bengal Florican (*Houbaropsis bengalensis*), Lesser Florican (*Sypheotides indica*), White-necked Stork (*Ciconia ciconia*), Black-necked Stork (*Ephippiorhynchus asiaticus*), and the Sarus Crane (*Gus anigone*).

The conservation of wildlife corridors, especially ones maintaining elevation gradients, is identified as a major gap in the regional conservation area network in the Himalayan ecoregions. To meet the goal of improving the landscape for conservation of endangered species in the Chitwan Valley, it was clear that extensions of Protection Forest were needed to link Chitwan National Park to its surrounding habitats outside the park. While the habitat connectivity already exists between the Chitwan National Park and the Valmiki Tiger Reserve (area of 336 km²) in India, the only remaining forest patch connecting the park to the Siwalik forests and the Mahabharat Range in the north is the BCF

(Tikauli forest) (70.1 km²). This forest serves as an essential migration corridor for flagship species like the tiger and rhinoceros, so that these species have access to upland habitats. The BCF also contains the Bish Hazar Tal, one of the important wetlands in Nepal, and a critical habitat for many species of migratory and aquatic birds and the mugger crocodile (*Crocodylus palustris*).

Ecosystems of Barandabhar Forest Corridor

The Project area encompasses 213 km², 45% of which is forest. It includes adjacent villages and agricultural land within five Village Development Committees and two Municipalities on either side of the Corridor to the east and west and supports a total population of 109,316 (17,795 households), of which 50% are female and 41% are classified as belonging to Disadvantaged Groups. The Corridor covers 96 km² and is bisected by the Mahendra Highway, the main east-west highway running the length of the country. The area to the south of the Highway is designated a Buffer Zone (61 km²) and managed by the Buffer Zone Development Council, that to the north is National Forest (35 km²) under the jurisdiction of the Forest Department. Classification of LANDSAT images from 2002 indicates that 80% of the Corridor is forest; riverine, sal (*Shorea robusta*) in various stages of succession, and open *Bombax ceiba*; 10% short grassland; 3% open scrub; and 2% water bodies. The last category includes Bish Hajari, the second largest natural lake within Nepal's inner Terai and designated a wetland of international importance under the Ramsar Convention.

Previously the BCF (*Tikauli*) forest has been an important source of natural products such as

fodder, fuelwood and timber for the people of the surrounding villages. These actions put pressure on critical ecosystem and encroachment through expansion of agricultural land has reduced the total area of habitat available to wildlife. Due to previous resettlement actions and social situation, including poverty and population growth, the pressure on the BCF had increased so that the minimum width of the forest is approximately 2.1 km.

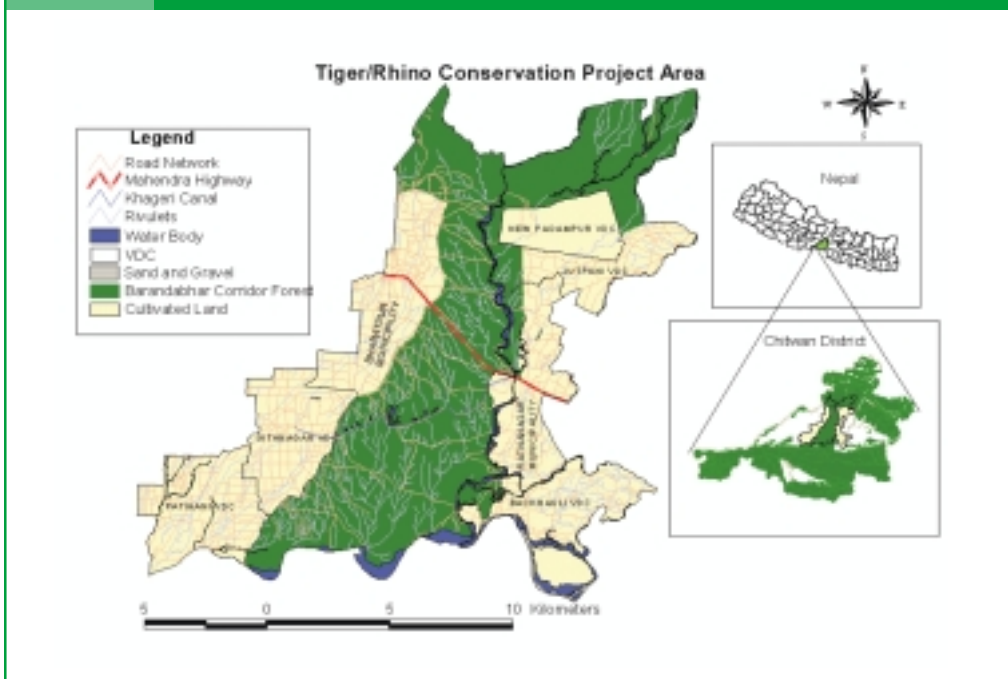
Barandabhar Forest: Multitude Ecological Functions

The Project was conceived as part of a landscape-scale initiative to improve the

conservation status of endangered species (notably tiger and rhinoceros) in Chitwan Valley by linking the Chitwan National Park, a World Heritage site, to its surrounding natural or semi-natural habitats by means of extensions and corridors. One such opportunity was Barandabhar, reputedly the only remaining patch of forest that links forests in the National Park and, more widely, in the Siwaliks with those in the Mahabharat Range to the north. Restoration and conservation of the BCF also provided a migration corridor for flagship species, such as tiger and rhino, to gain access to upland and mountain habitats, particularly during the monsoon when the lowlands would be flooded.

FIGURE: 1

MAP SHOWING THE PROJECT AREA AND CORRIDOR
FUNCTION OF BARANDABHAR FOREST



NTNC assessed the ecological significance of BCF and concluded that it supports small numbers of up to 10 tiger and approximately 30 rhinoceros, as well as a diverse avifauna (over 300 species, of which 182 species are resident) that includes migratory species which use the Corridor as a stop-over point. Direct observation of one litter of 4 tiger cubs and 5 rhinoceros calves indicates that these populations are breeding; and repeated sightings of some individuals over a three-year period (2001–2003) suggests that some reside in the BCF. Encounters with tiger (camera traps and pug marks) and rhinoceros (direct observations and tracks) were notably fewer north of the East-West Highway than to its south but both species were recorded as far north as the foothills of the Mahabharat. The assessment drew attention to the potential bottleneck to animal movements at the northern end of the Corridor. Here the width of the Corridor and cover provided by forest has been reduced as a direct result of the relocation of Padampur Village from inside the national park.

Further, the Project's assessment was subjected to an independent review, while critical of this assessment; the review concluded that BCF serves a multitude of ecological functions, including provision of the following:

- ▶▶ Potential north-south altitudinal connectivity across the Himalayan landscape, specifically in the case of the Chitwan-Annapurna linkage within the Narayani Basin Ecosystem
- ▶▶ Existing connectivity between northern and southern sectors of the Terai Arc Landscape within Chitwan Valley, complimenting similar linkages provided by Nawal Parasi Forest to the west of the National Park and Parsa-Bara Forest to the east of Parsa Wildlife Refuge
- ▶▶ Existing forest connectivity, either as a forest corridor or forest fragment (stepping-stone), for movement of migratory bird species
- ▶▶ Potential opportunity, as a corridor, for movement of other large terrestrial species, such as leopard and clouded leopard, into and out of the Chitwan-Parsa-Valmiki ecosystem
- ▶▶ Breeding habitat for tigers and a potential dispersal corridor for tigers to move east and west along the southern slopes of the Mahabharat Range
- ▶▶ Conservation of the Bish Hajari Tal, a Ramsar-designated wetland of global importance
- ▶▶ Watershed protection

Key Project Achievements

- ▶▶ Much improved levels of biodiversity within the Corridor, most noticeable with respect to the vegetation, which is regenerating well, and to a lesser extent, based on available data, with respect to abundance of ungulates, including rhinoceros (*Rhinoceros unicornis*) and tiger (*Panthera tigris*)
- ▶▶ Wide range of research undertaken to inform implementation of the Project and future management of the Corridor. Much of the research commissioned by the Trust is reasonably sound and well focused
- ▶▶ Greater environmental awareness and the establishment of Green Force Clubs in all 47 government schools
- ▶▶ Strengthening and establishment of a wide range of community-based initiatives and institutions, with focus on engaging with women and other socially disadvantaged

groups. Livelihoods have improved for a significant proportion of the 3,500 households identified as belonging to marginalized/disadvantaged groups through a range of initiatives including income-generating activities, alternative or improved energy technologies, improved livestock and institution of savings/credit cooperatives. These improvements are underpinned by provision of health and veterinary care facilities

- ▶▶ Huge reduction in pressures from livestock grazing, firewood collection and probably timber extraction and fodder collection from the core of the Corridor (i.e. excluding the 300 m peripheral fringes which are being managed formally (south of the Highway) or informally (north of the Highway) by Community Forest User Groups
- ▶▶ A living museum, with its associated clinic in traditional medicine, to conserve Tharu culture and indigenous knowledge

Conclusion

The role of BCF in landscape level management was to maintain ecological and evolutionary processes that create and sustain biodiversity, maintain viable populations of species and conserve blocks of natural habitat large enough to be resilient to large-scale disturbances and long-term changes together with empowering local communities technically and financially for its management in perpetuity.

Biodiversity conservation and alleviation of poverty can be achieved by empowering local communities by means of appropriate systems of governance and providing them with relevant skills. Ultimately, the long-term ecological integrity of protected areas and the landscapes in which they are the core component of biodiversity will be most effectively sustained by the engagement of the local communities in their responsible management.

Partnership is the key to success for organizations sharing common goals. The synergic partnership brings multi-skills approach to providing alternative means of livelihood which increases sustainability.

The future management of the Corridor is to consolidate what has been achieved by the Project by replicating income-generating activities, promoting the acquisition of multiple skills within households to provide families with year-round options for generating income, and addressing sustainability issues. Efforts will be focus initially on the 3,500 households originally targeted by the Project and subsequently extend to other householders with the Project area. The future interventions will also include:

- ▶▶ Establishment of the Barandabhar Forest Conservation Committee
- ▶▶ Representation of this Committee on the Terai Landscape Arc Steering Group
- ▶▶ Policy formulation for the management of the National Forest in the north of the Corridor



BRIDGING SUSTAINABILITY AND PRODUCTIVITY

Devaka K. Weerakoon¹

Sri Lanka is an island covering an area of 65,610 km² and is considered as one of the global biodiversity hotspots along with the Western Ghats of India (Myers *et al.*, 2000; Mittermeier *et al.*, 2005). The flagship species of Sri Lanka's biodiversity is none other than the largest terrestrial animal in the Asian subcontinent, the Asian Elephant (*Elephas maximus maximus*). At present, Sri Lanka supports around 4,000 wild elephants which is the third largest Asian Elephant population in the world (DWLC, 2007). This is indeed a large population for a small island like Sri Lanka, with a density of approximately 1 animal per 16 km². One must turn to history in order to understand the reasons that have contributed to such a high elephant density in Sri Lanka.

Sri Lanka's written history dates back to the 5th century B.C. The chronicles indicate that Sri Lanka's civilization is molded by two major factors, Buddhism and agriculture. One of the main agricultural practices seen in Sri Lanka is *chena* cultivation also known as shifting cultivation or slash and burn cultivation, especially in the drier parts of the island. Here the farmer clears a plot of land burns it and cultivates crops for a single cropping season. The

following year the farmer shifts to a different plot of land, eventually returning to the original plot after several years. This type of land use practice converts climax vegetation to a secondary vegetation and sustains it in that state by preventing natural succession.

The Asian Elephant is an edge species (Fernando *et al.*, 2004) and prefers such secondary vegetation (Table 1) which is rich in food plants such as grass and scrub species (Ishwaran, 1993; Samansiri and Weerakoon, 2000a; Samansiri and Weerakoon 2000b; Weerakoon *et al.*, 2004). This is possibly due to the fact that they have poor digestive and detoxification capabilities that prevent them from feeding on tree species that contain complex toxins to discourage herbivores. As such there is reason to believe that the *chena*

Table 1: Elephants Densities Observed in Different Habitat Types

HABITAT TYPE	DENSITY OF ELEPHANTS/ SQ.KM.
Dry Grassland	2.0 – 4.0
Marsh grassland	3.6 – 4.0
Scrub patches	3.0 – 3.2
Forest	0.2 – 1.5

Source: Ishwaran 1993

¹Department of Zoology, University of Colombo, Colombo 3, Sri Lanka

farmers in Sri Lanka have created elephant habitat for thousands of years as a consequence of their farming practice contributing to a high density of elephants.

However, with time the human population has increased by many folds in Sri Lanka leading to the current level of 20 million people—one of the highest population densities in South Asia. Thus the demand for land has also increased while at the same time shifting cultivation has changed to permanent cultivation due to limited availability of land as well as more water being made available for farmers through new irrigation schemes. This has created a conflict between man and elephant with respect to land use.

In order to resolve the escalating conflict between man and elephant the National Government has set aside nearly 11% of the land area of Sri Lanka as protected areas (PA's) with the Asian Elephant as the main conservation target (Table 2, Figure 1). However, a census carried out by the Department of Wildlife Conservation (DWC) shows that between 35–50% of the elephants use areas outside the protected area network on a permanent or temporary basis (DWC, 2007; Hendavitharana, 1994). These are the areas where high human-elephant conflicts persist at present. Therefore, the extensive protected area network established for conservation of elephants has failed to retain them effectively. The reason for this failure lies

Table 2: Protected Areas of Sri Lanka where the Primary Conservation Target is the Asian Elephant

NO.	NAME	CATEGORY*	AREA (HA)
1	Giants tank	Sa	4,330
2	Madhu road	Sa	26,677
3	Wilpattuwa	NP	132,299
4	Kahalla-pallekelle	Sa	21,690
5	Seegeriya	Sa	5,099
6	Minneriya-girithale complex	NP/ Sa/ NR	25,034
7	Kaudulla	NP	8,335
8	Tricomalee	Sa	18,130
9	Somawatie chaithiya	NP	37,645
10	Thrikonamadhu	NR	25,019
11	Flood plains	NP	18,171
12	Wasgomuwa	NP	37,062
13	Madhuru oya	NP	58,849
14	Victoria-Randenigala-Rantembe	Sa	42,087
15	Bogahapattiya	Sa	32,000
16	Udawalawe	NP	30,821
17	Galoya complex	NP/ Sa	57,137
18	Lahugala-kithulana	NP	1,554
19	Ruhuna complex	NP/ Sa/ SNR	123,339
20	Lunugamvehera	NP	23,498
21	Bundala	NP	6,216

Sa = Sanctuary; NP = National Park; NR = Nature Reserve; SNR = Strict Nature Reserve

Note: The number indicates the number used to identify the protected area in the map shown in figure 1

Source: Department of Wildlife Conservation

in the erroneous management strategy pursued by the DWC in these protected areas.

Most of these areas that were designated as protected areas were traditionally managed by humans under a shifting cultivation regime which creates optimal conditions for elephants. Once such an area is designated as a protected area, humans are excluded from the habitat. The ensuing 'hands off' management regime results in replacement of the slash and burn cycle by another, the natural succession cycle leading to a secondary climax of mature scrub habitat where elephants can find little fodder. Thus the carrying capacity of protected areas tends to diminish gradually with time (table 1). However, slash and burn cultivation is still being practiced in the buffer areas of these protected areas where there is still plenty of food available for elephants. As a result, elephants are attracted to the buffer areas, especially during the dry season to meet their nutritional requirements which eventually leads to conflicts with humans.

As a result, more than 150 elephants are killed by farmers and on an average, 60 or more people are killed by elephants annually. Further, damage caused by elephants to crops and property amounts to several million rupees each year. The current strategy adopted by DWC to mitigate human-elephant conflict is to drive these elephants into the PAs and fence them or translocate problem animals into PAs. However, most PAs are already operating near their carrying capacity for elephants and therefore cannot support further numbers. Further, the DWC also provide elephant deterrents to farmers and also pay compensation through an insurance scheme

FIGURE: 2

MAP SHOWING THE PROTECTED AREAS OF SRI LANKA WHERE THE PRIMARY CONSERVATION TARGET IS THE ASIAN ELEPHANT



Source: Department of Wildlife Conservation

for loss of life or injuries caused by elephants. Even though the National Government has invested a great deal of money and set aside a substantial area of land for elephant conservation in Sri Lanka, the level of conflict continues to escalate raising serious questions regarding the future of the Asian Elephant in Sri Lanka.

Therefore time has come to explore other management options, especially for the elephants that range outside PAs as they are the ones that cause conflict. One of the management options

that can be undertaken is to eliminate elephants that are in areas developed for human use by culling or capture for domestication. Even though the continued killing of elephants by farmers can be interpreted as a form of culling, it has not resulted in the alleviation of the conflict. Further, culling elephants as a management policy is unacceptable in Sri Lanka for socio-cultural and political reasons. Similarly, given the environmental attitudes and the endangered status of the Asian Elephant, capture for domestication is also ethically unacceptable.

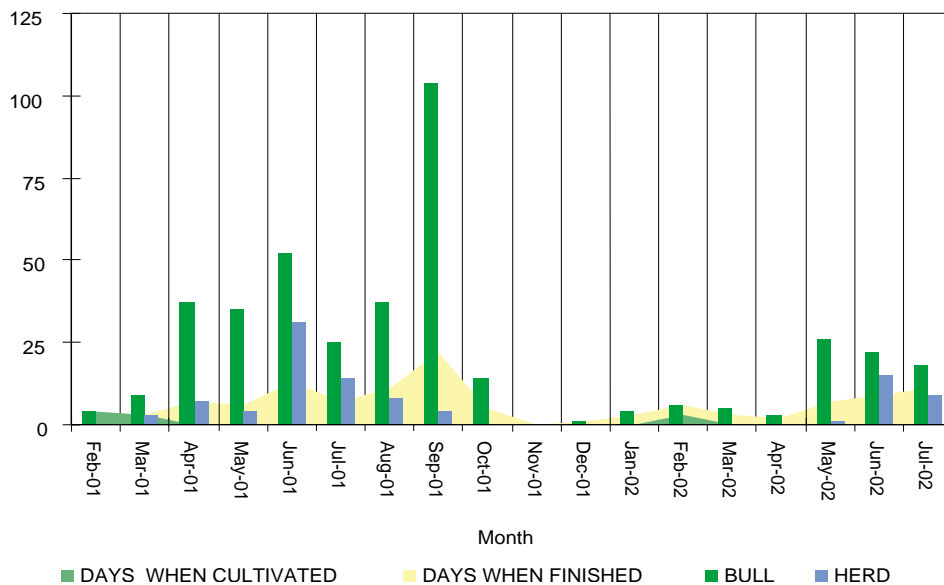
Another alternative to prevent elephants from leaving the protected areas would be to increase the carrying capacity of these PAs through intensive habitat management. However, the scale of habitat enrichment required to sustain elephants are not economically viable. Furthermore, all PAs cannot be converted to elephant habitats as this would seriously affect other biodiversity within the park.

A third option is to manage buffer areas of selected PAs to increase the carrying capacity of these areas for elephants through promotion of land-use practices that are compatible with human uses and elephant conservation. The aim of this paper is to describe a novel project that will be initiated by Centre for Conservation and Research in Sri Lanka to explore a cohabitation model for humans and elephants.

This model is based on the hypothesis that *chena* cultivation in the buffer zone of PAs can be managed with minimal conflict, which will create a landscape mosaic that elephants

prefer. This hypothesis was formulated based on long term studies conducted by our research group which shows that elephants generally stay away from *chena* areas during the cropping season as there is sufficient food available within the PA and uses the *chena* area mainly during the fallow season when food becomes scarce inside the PAs (figure 2). It has also been observed that there is very little crop raiding taking place with most of the crop raids being from single males or male groups while herds rarely raid crops. Further, an interview survey of the *chena* farmers indicates that they do not consider elephants as a significant threat to their crops.

The human elephant cohabitation model will be tested in a site called Welihara located in the buffer zone of the Ruhunu National Park complex. At present the PA is separated from the buffer zone by an electric fence which prevents elephants from using the buffer zone during the fallow season. We propose that the electric fence be moved to the ecological boundary rather than the administrative boundary to include the buffer zone and allow farmers to practice *chena* within the buffer zone. This will allow both farmers and elephants to use the buffer zone with little conflict. Further, as a part of the project the farmers will be provided protection through electric fences as well as compensation for crop depredation. At the same time we will facilitate a mechanism for the farmers to get a higher market price for their produce by introducing an accreditation system to show that purchasing their produce helps elephant conservation.

FIGURE 2**USAGE PATTERNS OF THE BUFFER AREA OF RUHUNU NATIONAL PARK COMPLEX BY ASIAN ELEPHANTS**

Note: The area is managed by local communities under a slash and burn regime. The farming season starts in December immediately after the rains and continues till March. The main crops cultivated are vegetables and cereals. The long fallow period between April to October allows *chena* plots to be colonized by short grass and scrub species such as *Dichrostachys cinerea*, *Acacia* sp., and *Memecylon* sp. Succession during the 5–10 year period between cultivation cycles creates a vegetation mosaic across the landscape, from scrub in early colonization stages to mature scrub forest. About 100 to 150 elephants utilize this area on a permanent or temporary basis.

We expect that this management strategy will allow elephants to access critical food resources in the buffer zone during the dry season while allowing people to cultivate the land using traditional farming methods. Thereby it will create a ‘win-win’ situation for both elephants and man. If this model produces promising results, it could be used on a wider scale to conserve elephants in buffer areas.

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LINKING TANGIBLE BENEFITS WITH THE INTANGIBLES EXPERIENCES IN PA MANAGEMENT

P.S. Ramakrishnan¹

Introduction

There are many examples in the region which could form the basis for sustainable management of natural resources, which can be achieved only when conservation concerns are linked with sustainable livelihood/development of traditional societies (those who are close to nature and natural resources) living within the protected areas (PAs) and outside too. What I have tried to do in the following few pages is to highlight the issues and using appropriate illustrative case studies, how solutions to the problems could be appropriately addressed. At the outset itself, I would like to emphasize that the problems involved in PA management are not merely ecological or economic in the traditional sense of the term, but also touch upon the social, cultural and spiritual dimensions of integrated socio-ecological systems that one is concerned with (Ramakrishnan, 2007a). Further, the available experiences may or may not lie within the boundaries of the PAs themselves; often it may be outside of them where traditional societies also live. In any case, an integrative view of knowledge systems (Ramakrishnan, 2001; Ramakrishnan *et al.*, 2005) is crucial for designing strategies to address sustainability

concerns—such an approach has implications for local, national and regional human security concerns too (Ramakrishnan, 2007a,b). What I have also tried to bring out during the following discussion is the value of traditional ecological knowledge (TEK) that enables one to have a whole range of flexible possibilities to develop what I call as ‘hybrid technologies’ developed with appropriate inputs from the formal knowledge base, and in this process not only contributing towards addressing sustainability concerns in a broader framework.

The Issue

So far, conservation management efforts have largely been centered around protection of natural resources within the PAs from outside impacts; at the same time restricting the use of these resources by local communities within. In a major UNESCO-sponsored research initiative on biosphere reserve management in the South and Central Asian regions (Ramakrishnan *et al.*, 2002), one visible outcome was the realization of the big divide that exists between socio-ecological theories and their practice in the field. This was seen as the major hurdle in dealing with traditional societies living close to nature and

¹ School of Environmental Sciences, Jawaharlal Nehru University, New Delhi, India; psr@mail.jnu.ac.in

natural resources, as is the case within PAs. This divide was seen as a major impediment for community participatory approaches.

The concept of sustainable use of natural resources has yet to take roots, due to lack of location-specific understanding on how the resources should be managed. Whilst the concept of using knowledge systems as the basis for protected area management is something that is emphasized upon in more recent times, PA management often has been limited to base it on the basis of text-book knowledge exclusively, with little knowledge on the traditional knowledge available with local communities. Where it is taken on board, often it is based on the more obvious component of the traditional knowledge, namely, the timber and the non-timber forest products on which the local communities are directly dependant.

What is often not realized is that there is much more to traditional knowledge, particularly knowledge which impinges upon ecological and social processes, and which enables one to connect bridges between ecological and social systems (Ramakrishnan, 2001; Ramakrishnan *et al.*, 2005). Such an approach to PA management addresses sustainable management of both natural and human-managed ecological systems in which local communities have an interest for meeting with the broader livelihood concerns in a sustainable manner.

Thus, for example, restriction of grazing within the 'Valley of Flowers' in the Nanda Devi Biosphere Reserve has been suggested to increase the undesirable spread of *Polygonum* sp. Do we

have adequate population ecology based information to allow or restrict grazing to whatever extent that may be required? Ad hoc decisions taken by PA managers may more often prove to be harmful, even causing difficulties in reversing a wrong step already taken. In fact, there seems to be increasing evidences emerging now to suggest that perturbation is an essential element to ensure sustainability of the right kind of herbaceous ground cover to develop a system which is known for its aesthetic value. Also, we have enough evidences in this PA to indicate that stricter control over grazing within the area may end up with undesirable species coming in which adversely impact the aesthetic value of the valley that one is concerned with. In this context, much of what one is looking for in terms of controlled perturbations for ensuring ecosystem level integrity comes from researches done outside the PAs, rather than within. Now it is part of the textbook knowledge that perturbations are an essential element of ensuring ecosystem integrity; therefore, one is not looking for the elusive 'pristine ecosystem'; rather one is concerned with how to integrate perturbations at an appropriate level to lead to sustainable management of biodiversity in all its dimensions (Ramakrishnan, 2001). Yet, this basic biophysical principle of the ecological paradigm has yet to be effectively integrated into PA management approaches.

Sharing Knowledge on Best Practices

Much of what has been done in the name of eco-development within PAs, though valuable from the point of reducing dependence on biomass for energy²; issues of eco-development

of local communities directly linked with natural resource management are yet to receive adequate attention. However, there are many experiences from the region, some of which may be within a given PA itself, or even outside of it, which are of considerable value for designing management strategies with community participation.

The Issues of NTFPs

The case of ‘Kani’ tribe, where the cultivation and value addition to ethno-biologically important medicinal plant species could improve the quality of life of these people is an interesting example (Box 1). The extraction of the active principle from medicinal plant species like *Trichopus zeylanicus* and three other medicinal plants as ingredients used in the formulation of ‘Jeevani’, was shown to remove fatigue and energize the body, due to the presence of certain glycolipids and non-steroidal compounds with profound adaptogenic and immuno-enhancing properties. Even more interesting are: (i) enabling the local people in cultivation of the medicinal plant species, and (ii) empowering the community for equal sharing of the economic benefits arising from the value added pharmaceutical products sold in the market. These approaches to promoting traditional medicine still remain isolated examples, which need to be replicated in a major effort.

Linking the Tangibles with the Intangibles

The initial impetus amongst traditional societies (societies living close to nature and natural resources) for conservation of biodiversity seems

to have arisen out of their animistic religious belief system (Box 2). Such belief systems are fundamental aspects of a people’s culture which strongly conditions their use of natural resources. The concept of the ‘sacred grove’, a small patch of the natural ecosystem that traditionally served as an area for religious rituals to propitiate their nature-linked deities—the wind, water, fire, sun, etc—as well as a site for the worship of their ancestral spirits, could be viewed as symbolic of ‘nature-human’ interconnections. From a socio-ecological perspective, these interconnections are significant for ensuring that basic needs are met on a sustainable basis (Ramakrishnan, 1996, 2001). Expansion of the concept of sacred grove would eventually lead to the concept of sacred landscape. In any case, many ‘sacred landscape’ units are often distinct mega- or micro-watersheds, that directly affect the livelihoods of the societies living within them. Water is often a key element driving natural resource management because it is critical to the livelihood of these societies, as was shown by this author working across the Indian Himalayan region. A reductionist perspective will lead to the concept of sacred species. Our studies indicate that such socially selected species invariably have ‘ecological keystone values’ in the ecosystem, performing key functions for ecosystem integrity.

What do these protective impulses, which often cannot be articulated by the traditional societies living in PAs suggest in the contemporary context? Such impulses, ingrained in the psyche of these traditional societies, are often linked with TEK, refined and enriched over a long

²For example by providing energy efficient cooking stoves, provision of non-conventional energy sources for household use, or other facilities for village level activities.

**BOX : 1 THE CASE STUDY OF THE KANIS OF KERALA
WESTERN GHATS AND NTFP MANAGEMENT ISSUES**

The plant they called '*Arogyapacha*' (meaning health-giving green plant, in Malayalam language), *Trichapas Zaylanicers* sub spp *travancoricas*, has immuno-enhancing properties embedded in their fruits and leaves, and was used traditionally by the *Kani* tribe of Kerala for their anti-fatigue properties. In the commercial manufacture of 'Jeevani', the active principles were extracted by the Tropical Botanical Garden and Research Institute (TBGRI) and based on scientific validation and standardization, herbal formulation of '*Jeevani*' was prepared using this species along with three other medicinal plants from the area. This technology was then transferred to Arya Vaidya Pharmacy (AVP), a traditional medicine manufacturer in the region of Coimbatore for a period of seven years against a license fee of IRs 100,000 (approximately US\$ 2,500), and a royalty of 2.5% on ex-factory sale of the product. Further, it was also decided by TBGRI that the license fee and the royalty accruing from the sale of this drug would be shared with the *Kani* tribe equitably. The prime concern that the tribals had in the beginning was to evolve a viable mechanism for receiving such funds. With support from TBGRI, local government officials and NGOs, the tribals formed a registered trust with about 60% of the *Kani* families of Kerala becoming members of this trust. In February 1999, the amount due to them at that time (IRs 535,000) was transferred to this trust with the understanding that the interest accruing from this amount alone will be used for the welfare activities of the *Kani* tribe.

'*Jeevani*' was able to capture markets in India as well as abroad, including the USA and Japan. This necessitated a regular supply of fresh leaves of *Trichopus zeylanicus*. Since the wild collection could not be dependable, TBGRI scientists developed a protocol for cultivating this plant. Cultivation studies revealed that the plant is habitat-specific and that the therapeutically active principles are produced only when it is cultivated in and around its natural habitat. Therefore, TBGRI trained 25 tribal families to cultivate this plant around their dwellings in the forest. In the first year itself each family earned about IRs 8,000 from the sale of leaves from the cultivation of *Trichopus zeylanicus* from a half-acre plot maintained by each family. Unfortunately, the Forest Department objected to the cultivation of *Trichopus zeylanicus*, arguing that the tribals might remove the plants from the natural population of the species in the forest and make it endangered. The argument against this was that even if the tribals collect it from the forest, it will possibly be a sustainable one as only leaves are required and the plant is perennial. But the Forest Department came up with another objection that this plant is not in the official list of the plant materials permitted to be collected by the *Kani* tribe, in the first

place. These issues were finally resolved after a long period of uncertainty when the Kerala Government decided to permit the tribals to cultivate this plant. TBGRI-Kani benefit sharing experience was evolved much before the signing of the CBD. Although there was no legal binding on the part of the TBGRI to share the commercial benefits with the *Kani* tribe, this whole effort was based on a mutual trust and considerations of each other.

The author and his team thus demonstrated that indigenous knowledge systems merit support, recognition and fair and adequate compensation. This benefit sharing model, recognized as the '*Kani model*', is now acclaimed as the first of its kind; and can be implemented anywhere, as per the letter and spirit of Article 8(j) & 10(c) of the Convention on Biological Diversity (CBD). What this model suggests is that there is immense scope for community participatory research analysis, with a view to understand all the sustainable NTFP management issues that are often location and community specific.

Source: Pushpaangadan, 2002

BOX : 2

CONSERVING THE SACRED: THE PROTECTIVE IMPULSE AND THE ORIGINS OF MODERN PROTECTED AREAS

- Pre-Columbian societies in the Americas held the widespread view that the Earth and all her creatures are sacred, and therefore permission had to be sought before the resources could be used, or else the spirits of those resources would seek revenge (Hughes, 1998 a, b). For small-scale subsistence societies, which met a variety of their needs through the use of local resources, impermanence, transience and renewal would have been viewed, as forming central themes of life for symbolic, spiritual and even functional reasons (Hay-Edie and Hadley, 1998).
- For the enlightened sages of the eastern tradition, the forest is a world of wisdom, peace and spirituality. The term '*Aaranya*', in the antiquated Sanskrit language, means "*Aa*" for no, and "*Ranya*" for war; meaning a place of non-violence (Saraswati, 1998).
- Even today, the highest and most rugged features of the mountain landscape, relatively inaccessible and rich in nature's endowments, evoke a sense of overwhelming sanctity amongst many societies around the world (Berbaum, 1997; Berbaum, 1997; Ramakrishnan *et al.*, 1998)—for example, the Himalayas, for a large section of the people of the Indian subcontinent; Koyasan in Japan, the meditation center for Shingon Buddhism; Mount Kailas in the Tibet Autonomous Region of China for Hindus and the Buddhists; Xishuangbanna in Yunnan province of China for the Buddhist Dai (T'ai) tribe; the sacred mountains of the Maoris of New Zealand; Kilimanjaro and Mount Kenya for the East African tribes, etc.
- All these traditional beliefs and identities of the people are seen in the light of shared territory, common rights and similar lifestyles, as is the case for the *Gaddi* tribe occupying the Dholadhar range of the Western Himalayas who see their identity as an act of divine intervention—through a complex belief system that provides a spiritual anchor for relating specific lifestyles with traditionally managed natural landscapes (Kaushal, 2001).
- "Sacred groves" as protected ecosystems (recently categorized as "community conserved areas" by IUCN) are found in abundance in the context of a country like India—there are over a few thousand groves widely distributed both in the hills and the plains. Indeed, they are widely distributed around the globe. The level of protection may vary, many of them variously impacted by human interference. In any case, these community conserved patches can be seen as relicts as land conversions and degradations are rampant in many parts of the world. They can be seen as an experimental ground to understand the local ecosystem properties and functions, and as a source of germplasm for any meaningful restoration/rehabilitation efforts in the region (Ramakrishnan *et al.*, 1998).
- A whole range of spatially well-defined sacred landscapes are spread all across the globe where traditional societies live. To take an example, the 'Demajong' landscape of the Tibetan Buddhists of the Sikkim Himalayas (Ramakrishnan, 1996) have traditional societies living as an integral part of it; being involved in a variety of agricultural and animal husbandry practices, and extraction of resources such as fuel wood, fodder, food and medicinal species from the natural ecosystems. Natural ecosystems are closely linked to the village ecosystem functions, in a sustainable manner.
- With few codified norms and practices but covering a large zone of human influence, is the notional sacred landscape traced by the Ganga river system. Starting from the higher reaches of the origin of this river in the north, at Gaumukh in the central Himalayan region, passing through the alpine, temperate and sub-tropical mountain ranges, and then tracing its way through the large geographical region of the Indo-Gangetic alluvial plains, the river system eventually ends up in the Bay of Bengal. Elsewhere, In the east Asian Japanese Kii mountain region of Koyasan, Kumano Sanzan, Yoshino and Omine are other 'spatially diffused' sacred landscapes (UNESCO, 2001), rich in biologically diverse temperate forests, Buddhist temples and monasteries. Being a hub for cultural and religious interactions since ancient times, the region represents a blend of the indigenous Shinto religion, based on nature worship, and Buddhism that came in subsequently.



BOX : 2**CONSERVING THE SACRED: THE PROTECTIVE IMPULSE AND THE ORIGINS OF MODERN PROTECTED AREAS**

- Socially selected species are valued for cultural, religious or spiritual reasons (Ramakrishnan *et al.*, 1998). For example, basil (*Ocimum sanctum*), neem (*Azadirachta indica*) became sacred as part of a conscious decision by Hindu society that was linked to its tangible values for its multipurpose use and medicinal properties. *Ficus* spp. are valued by Hindus and Buddhists in the Asian region, and the traditional animistic societies of Asia and Africa. Other examples of socially valued species include *Alnus nepalensis* in north-east India, *Prosopis cineraria* in the desert region of Rajasthan, *Prosopis africana* in Cameroon, and oak species in the Central Himalayan region of India. In Iran, some 158 trees like walnut, willow, cypress, sprucefir, etc. are considered sacred. What we recognize now is that socially valued species invariably have an ecological keystone value (Ramakrishnan, 1992a; Ramakrishnan *et al.*, 1998).

Source: Ramakrishnan, 2003a

period of time. This TEK, which can only be deciphered through intense participatory research, operates at a process level, linking ecological and social variables. The challenge before all of us who are concerned with conservation lies in deciphering this knowledge, and validating and integrating it into the modern scientific paradigm. It is a means for integrating these societies into modern day processes of PA management. Those values that operate at a psychological level have to be accepted for what they are, as humans, as we have always tried to relate ourselves with nature through the concept of cultural landscapes (Ramakrishnan, 2003b, 2005, 2006); even urban societies have the urge to construct an urban cultural landscape around them, as is evident even in the context of the most developed countries (Shutkin, 2000). Unless PA management is firmly rooted in the cultural and spiritual ethos, it will not only adversely impact natural resource conservation, but also the livelihoods of marginalized sections of society. In order to achieve a broader perspective on conservation ecology, we need to reconcile the scientific approaches of ecology

and economics with the ethics and spiritual perspective of traditional societies lest we fall prey to the kind of anthropocentric thinking that has been the bane of the traditional ecological paradigm which dominated the past millennium. Local communities should be enabled to relate to a value system that they understand and appreciate, and thereby participate in the process of PA management.

Conclusions

What does all this lead to in terms of community participation in PA management? Tangible and intangible benefits that the traditional societies living in the area seek from the cultural landscape around them, has to be adequately addressed. As indicated here the connecting link between the “tangibles” and the “intangibles” is the knowledge systems—TEK and the textbook based “formal” knowledge, and an appropriate integration between the two, based on a dialogue between the manager and community representatives (Ramakrishnan *et al.*, 2005). In order to facilitate this, it is critical that appropriate institutional arrangements have to be conceived

where the traditional ways of local institution building have to be taken on board along with modern ways of doing it through an elective process. In the ultimate analysis, what one is seeking is to connect cultural diversity with biological diversity (Ramakrishnan, 2007a), which alone can be the basis for conservation

linked sustainable development with concerns for human security (Ramakrishnan, 2007b). What one is aiming for is to link conservation with sustainable livelihood/development of traditional societies (Ramakrishnan, 2001), and in the process bring ecology with economics and ethics, as closely as possible.

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RESPONDING TO CHALLENGES OF HUMAN WELL-BEING THROUGH PARADIGM SHIFT IN PROTECTED AREA MANAGEMENT: EXPERIENCES AND LESSONS FROM BUFFER ZONE INTERVENTIONS OF NOKREK BIOSPHERE RESERVE IN MEGHALAYA THROUGH NERCOMP-IFAD PROJECT IN NORTHEAST INDIA

Vincent Darlong

Introduction

Rapid growth of human and livestock populations, coupled with urbanization, industrialization and agricultural expansion, and resultant pressures on land for development have taken an increasingly heavy toll on India's remaining wilderness. The Northeast India, which is part of the Eastern Himalayas, constitutes one of the ten most important biogeographic zones of the country (WII, 2000). With about 8% of the country's total geographical area, Northeast India has only about 4% of the country's total population. About 75% of the total geographical area of the region is forest, rich in wildlife and biodiversity. India's current protected area (PA) network is about 4.70% of the country's geographical area, which is targeted to be increased to 5.74%. Within Northeast India, 3.17% of the total geographical area is under PA network, which is targeted to reach up to 6.19% (GOI, 2006). These statistics, however, do not

include the network of considerable areas of community-conserved areas and sacred groves spread across the upland communities of the region.

On the other hand, conservation measures and management practices to mitigate the impacts of various anthropogenic and other development pressures remain slow, inadequate and at times challenging. Most existing PAs in India follow typical management plans, which are generally government-driven, top-down approach. In spite of the fact that many of these have been implemented with the best of intentions and integrity, the results and impacts remain inadequate and limited as compared to the investments made in such programs and projects.

The North Eastern Region Community Resource Management Project for Upland Areas

¹ NRM Coordinator, NERCORMP-IFAD, Shillong, India, Email: drvtdarlong2002@yahoo.co.in

(NERCORMP) is a joint livelihoods project of the International Fund for Agricultural Development (IFAD) and the Government of India. One of its mandates is to undertake eco-development activities among and with the communities living in close proximity to the protected areas in the project locations of Northeast India. Such activities or interventions have been undertaken in the buffer zone areas of Nokrek Biosphere Reserve (NBR) in West Garo Hills District of Meghalaya, India. The core area of NBR is known as Nokrek National Park (NNP). The NERCORMP-IFAD follows the principles and practices of participatory 'bottom-up' approaches of planning and implementation in all its project interventions and deliveries.

The objective of the present paper is to share the experiences of NERCORMP-IFAD project in the buffer zone interventions of NBR involving 45 villages out of 132 villages located within the buffer zone of the biosphere reserve. It is argued that the project's innovative approaches and strategies of interventions in the buffer zone areas of NBR may be considered as a successful demonstration of paradigm shift in protected area management in responding to challenges of human-well being. It is indeed considered as a developmental model, particularly in areas where the land and forest is community-controlled, as most upland areas of Northeast India. Our experience is that such models can only strengthen the cause of conservation as well as peoples' aspirations for livelihoods improvement through conservation initiatives.

NERCORMP-IFAD Project

A Brief Project Profile

The North Eastern Region Community Resource Management Project for Upland Areas (NERCORMP) is a joint livelihoods initiative of the Government of India (GOI) and the International Fund for Agricultural Development (IFAD), a specialized agency of the United Nations. The North Eastern Council (NEC), the regional planning body under the administrative regime of the Ministry of Development of North Eastern Region (DoNER) of the Government of India. Thus, the project is popularly acronymed as NERCORMP-IFAD. The United Nations Office for Project Support (UNOPS) based in Bangkok supervises the project as cooperating agency. NERCORMP also has collaborative programs with a number of agencies under the Technical Grants Assistance of IFAD. These organizations are the ICIMOD, Kathmandu, Nepal; ENRAP-IDRC, New Delhi and CIFOR, Bogor, Indonesia. It also collaborates with the North Eastern Hill University, Shillong, India as one of its resource institutions.

NERCORMP was declared effective from February 1999 and closes in March 2008. The overall objective of NERCORMP-IFAD is "*to improve the livelihood of vulnerable groups in a sustainable manner through improved management of their resource base in a way that contributes to protecting and restoring the environment*". NERCORMP operates in six districts of three states in Northeast India, viz. Karbi Anglong and North Cachar Hills Districts in Assam; Senapati and Ukhrul Districts in Manipur; and West Khasi

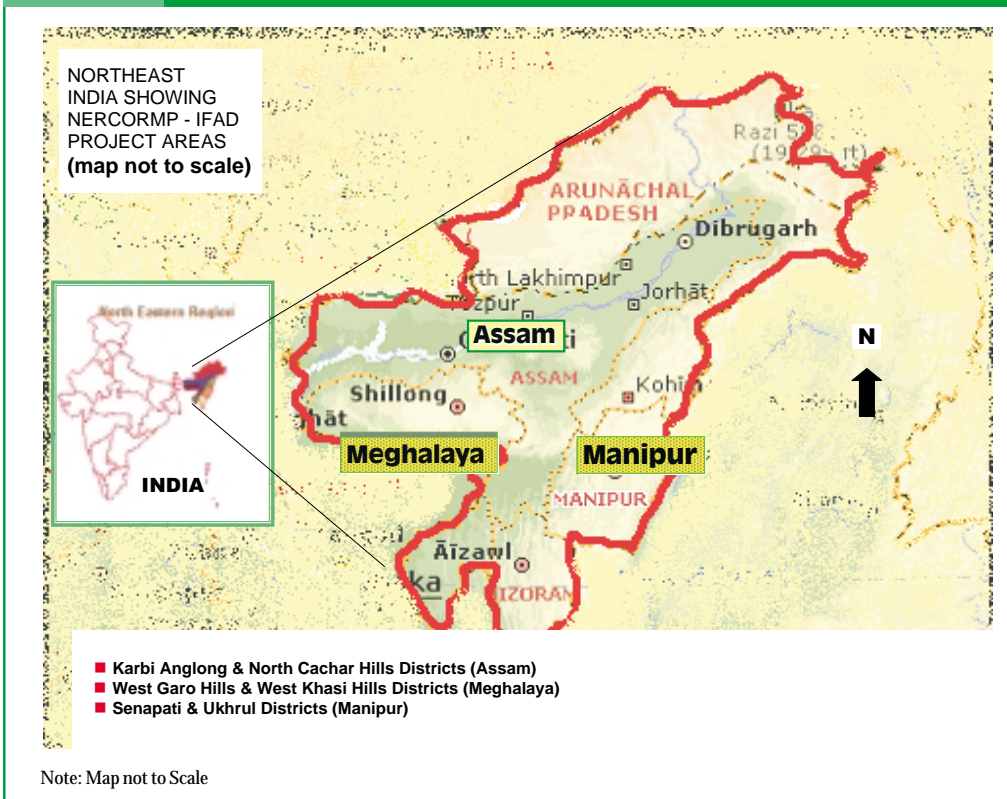
Hills and West Garo Hills Districts in Meghalaya (Fig. 1). The Project works in 860 villages comprising 39,196 households spread over all the six districts and 3 states. Most of the project beneficiaries (termed as clients) are the shifting cultivators (Table 1).

The project principally attempts to synergize and converge the strengths of the Government (Central and State Governments), International Organizations (IFAD and UNOPS), local

partner NGOs, the inherent potential and strengths of the local communities, Project Management Team with professionals of diverse fields located in the Project HQ in Shillong termed as Project Support Unit (PSU) and in the project districts termed as Development Support Team (DST). While doing so, NERCORMP adopted two broad strategies to achieve holistic development focusing in the following areas (NERCORMP, 2006): (i) Social mobilization, motivation, organization and

FIGURE: 1

MAP SHOWING THE PROJECT AREAS OF NERCORMP-IFAD IN NORTHEAST INDIA



capacity building to tap and realize the latent potentials of communities employing time-tested traditional value systems of the diverse tribes to ground the project objectives and strategies; and (ii) Interventions with social, economic and rural infrastructure focusing in the facilitation of income generating activities (IGAs) to achieve economic transformation through regeneration and restoration of local environment and the natural resource capital.

Contours of Project Interventions

NERCORMP-IFAD is designed to address various components of development sectors. The major sectors are community institution building, social sector development, village infrastructure development, natural resource management, economic livelihoods activities; besides cross-cutting issues such as gender mainstreaming, linkage with financial institutions, micro-credits, monitoring & evaluation, etc. The contours of NERCORMP-IFAD interventions are briefly represented in Table 1 below.

Nokrek Biosphere Reserve

The Nokrek Biosphere Reserve (NBR) lies in the heart of Garo Hills, touching all its three districts, viz. East, West and South Garo Hills Districts in Meghalaya State of India (Fig 2). The biosphere reserve was declared and notified on 1st September 1988. The NBR is situated on mountainous terrain of the Tura Ranges with altitudes ranging from 149 meters to 1,415 meters above sea level. The highest point of the ridge is Nokrek Peak (1,415 masl). The biosphere reserve is spread over an area of approximately 820 km², of which only 47.48 km² is the core area that has

been acquired from the local communities and declared as the Nokrek National Park (NNP) in 1997.

The Nokrek biosphere area forms an important upper catchment source of the vital life giving river systems of Garo Hills, such as Simsang, Daderi, Dareng and Ganol, besides numerous streams and rivulets of local significance. Most of the core area of the reserve designated as NNP consists of evergreen primary forest, which is inaccessible except on foot. This area is also the reservoir of a large variety of wild relatives of *Citrus* species, for which the area is also popularly designated as Citrus Gene Sanctuary. Recently, Barik *et al.* (2007) reported as many as 710 vascular plant species belonging to 465 genera and 140 families from NBR. The important animals of the buffer zone or biosphere reserve are the clouded leopard (*Neofelis nebulosa*), binturong (*Artictis Binturang*), tiger (*Panthera tigris*), bison (*Bos gaurus*), python (*Python reticulates*), hoolock gibbon (*Hylobates hoolock*) and the Asian Elephant (*Elephas maximus*); most of which are highly endangered species, and Schedule I animals under the Wildlife (Protection) Act, 1972. Together with the adjoining Balphakram National Park in South Garo Hills, the area is home to the largest concentration of elephants in N.E. India.

The NBR has a buffer zone area of 772.52 km². Its ecological characteristics, floristic profiles and management strategies have been studied by Barik *et al.* (2007). There are 132 villages with a population of about 40,000 (GoM, 2002) within the buffer zone of the NBR. The people living in the area are known as the *Garo*, one of the

Table 1: Contours of NERCORMP-IFAD Interventions

SECTOR / COMPONENT	ACTIVITIES / INTERVENTIONS
Community Institution Development	<ul style="list-style-type: none"> [a] Formation of CBOs <ul style="list-style-type: none"> ■ Natural Resource Management Group [NaRMG], husband & wife from every household [NaRMGs are responsible for village level community resource management planning, implementation & monitoring]
	<ul style="list-style-type: none"> ■ Self Help Group [SHG], 15-20 women per group [Each groups are trained in Management of revolving fund, IGA, micro-credit, savings, etc.]
	<ul style="list-style-type: none"> ■ Formation of NaRMGs Associations & SHGs Federations along with capacity building for larger development networking among the communities
	[b] Training / capacity building: Trainings on institution/ organization management, PRA, revolving fund & micro-credit management, livelihoods activities, IGAs, Monitoring & Evaluation, etc. in which all sectors are involved
	Drinking water supply, community health & nutrition, village & household sanitation, special focus on women and child health care, etc.
Social Development	Inter-village roads, culverts, causeways & foot-path bridges, schools and community halls, collection centers, etc.
Village Infrastructure	<ul style="list-style-type: none"> [a] Land & water management <ul style="list-style-type: none"> ■ Terrace development ■ Minor irrigation and water harvesting ■ Soil & water conservation ■ Jhum modifications
NRM & Income Generating Activities	<ul style="list-style-type: none"> [b] Land / farm-based Economic livelihoods <ul style="list-style-type: none"> ■ Promotion of agriculture & horticulture, NTFPs, MAPs, Home gardens, etc. ■ Livestock, fishery, sericulture & apiculture development
NRM & Income Generating Activities	<ul style="list-style-type: none"> [c] Non-farm based Economic livelihoods <ul style="list-style-type: none"> ■ Various micro-enterprises such as mini rice mills, grocery shops, carpentry, tailoring & weaving units, etc. ■ Processing Units for Aloe vera, Patchouli, Geranium, etc. (to be managed by the communities)
	<ul style="list-style-type: none"> [d] Biodiversity / Forest conservation <ul style="list-style-type: none"> ■ Community biodiversity conservation ■ Community forestry management
	[a] Micro-credit, Marketing, Gender, Communication, Technical Coordination, Monitoring & Evaluation, Finance & Accounts and Project Management.
Cross-cutting / Miscellaneous activities	<ul style="list-style-type: none"> [b] Building linkages with Research & Knowledge Centers (coordinated by NRM Sector). Key partner organizations are: <ul style="list-style-type: none"> ■ International Centre for Integrated Mountain Development (ICIMOD), Kathmandu ■ Centre for International Forestry Research (CIFOR), Bogor, Indonesia ■ Food and Agriculture Organization of UN (FAO), New Delhi ■ Knowledge Networking in Asia & Pacific Region (ENRAP-IDRC), New Delhi ■ North Eastern Hill University (NEHU), Shillong

predominant scheduled tribe communities of Meghalaya. All of the buffer zone lands and forests are controlled and owned by the communities as per traditional customary laws and practices. The land tenure system is divided into *Akhing* land, each village being under the traditional leadership of a *Nokma*, who practically controls all the allotment of land for cultivation or otherwise as per the customary laws and practices of land tenure system.

Shifting cultivation (locally known as *jhum*) is the most predominant form of land use in the buffer zone. Ninety percent of the population depends on shifting cultivation. Other livelihood activities include permanent agriculture in the form of terrace or wet rice cultivation in the valleys with permanent sources of water, horticulture plantations or orchards (most common being cashew nuts, oranges, pineapple, banana and areca nut), and sporadic tea plantation. Only 3% of the area is covered with orchard and other forms of permanent cultivation. About 32 villages do not have any orchard but entirely depend on *jhum*. In recent years, there has also been increased activity of coal and limestone mining from many parts of the buffer zone of the NBR. Non-timber forest product (NTFP) collection, predominantly broom grass (*Thysanolaena maxima*) from many of the secondary forests and thatch grass (*Imperata cylindrica*) from fallow re-growths are common in many villages of the NBR. Many parts of the buffer zone continue to be dominated by '*jhumscapes*', distinguished by its poor vegetation growth or secondary forests dominated by shrubs.

The overall economic condition of the people of NBR buffer zone remains poor with insignificant domestic wealth. Common livestock are cattle, goat and pigs. Domestic fowls are also common. Piggery is the most popular livestock in the buffer zone. Cattle and goats are not as common as piggery. However, income from livestock rearing is negligible. Education outreach remains poor, though almost every village has a primary school. About 50% of schools are made of bamboo structures. School dropout after primary education is high due to non-availability of further facilities. The villages within the NBR have a very poor healthcare network. The nearest available healthcare center for more than 60% population is at an average distance of 20 km or more. Malaria is a very common disease in the NBR area. About 60% villages now have motorable road though not black-topped. Approach to 40% of the villages is by means of footpaths through rough terrain, most of which are maintained by the communities. The entire area is devoid of any organized market. Most villages depend on the natural streams and streamlets for drinking water; only a negligible number of villages have managed drinking water supply built in recent years. Thus, the overall development index of the communities living within the buffer zone of NBR remains extremely low. Even the government's interventions through the NBR Management Plan appear to have had very little development impacts in the area.

Process Interventions by NERCORMP-IFAD: Paradigm

The paradigm shift in responding to challenges of human well-being in NERCORMP-IFAD is primarily in its 'process interventions' rather than

just the 'menu or packages of interventions'. The processes or stages and principles followed are simple but participatory in all stages, which may be outlined as follows:

Principles of Interventions

- ▶▶ Project facilitates the communities, through the participation of local partner NGOs to determine their own 'development menu', identifying and selecting those activities or interventions that will improve their wellbeing; these activities are to create both 'group' / common and 'individual household' assets through bottom-up approach of planning
- ▶▶ Community empowerment, equally focusing in creating space for the most vulnerable groups (women and the poorest) as key stakeholders in decision-making and implementation processes
- ▶▶ Transferring the 'ownership' of the project activities to the communities (planning, implementation and management of assets by the communities)
- ▶▶ Strengthening the building processes of the major livelihood assets of the communities: human, social, physical, natural and financial capitals or assets; very strong component of community contribution in all assets and village infrastructures
- ▶▶ "Wealth Ranking" of individual households a must; criteria for wealth ranking developed by the communities themselves; the poorest households get proportionate higher grants on priority basis
- ▶▶ More than 50% investment is 'grant' to the communities for economic livelihoods development or income generating activities;

this 'grant' is given to the communities as 'revolving funds' managed by the communities themselves for micro-credits

Key Goals of the Project

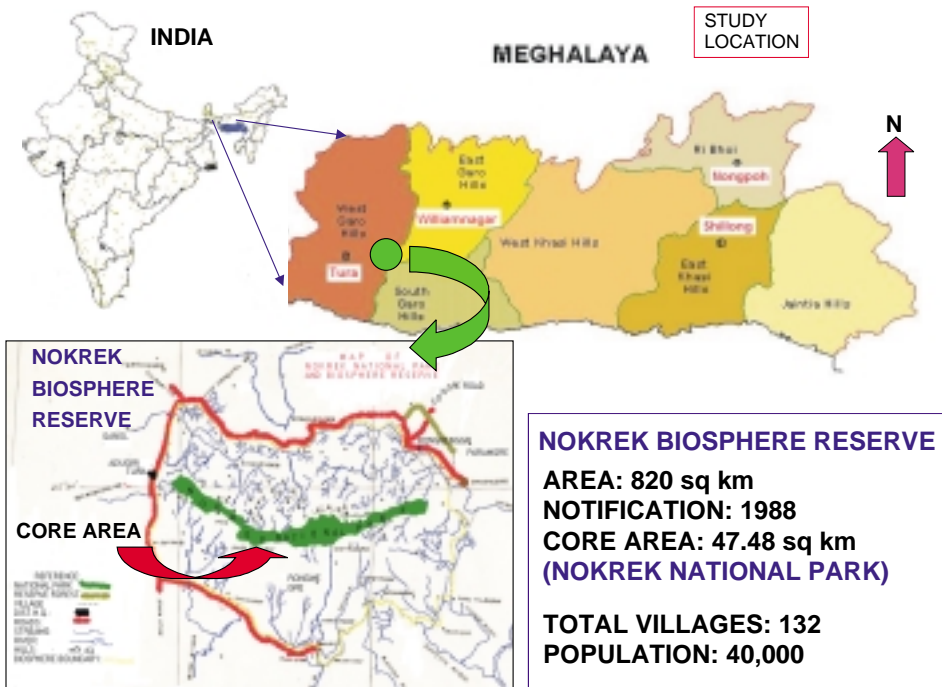
- ▶▶ Building and capacitating Community Based Organizations, i.e. enabling the communities to chart and address their own development pathways
- ▶▶ Food sovereignty and food security (to eradicate hunger and poverty)
- ▶▶ Improved income and savings
- ▶▶ Conservation of natural resources
- ▶▶ To achieve overall rural 'human wellbeing' along with environmental restoration

Village Selection & Clustering

- ▶▶ Villages with at least 60% shifting cultivators, grouped into clusters with 8-12 villages in each cluster
- ▶▶ Cluster formation based on 'social groupings' rather than watershed principles. [Criteria of village selection did not always meet on watershed basis]
- ▶▶ Other considerations: geographical connectivity to enable upscaling of focused crops to produce commercial volume or critical mass in the 'cluster area'

Community Sensitization and Mobilization

- ▶▶ Sensitizing the traditional village institution through series of dialogue and confidence building measures
- ▶▶ Organizing the communities into Natural Resource Management Groups (NaRMGs) with equal number of men and women from every household of the village

FIGURE: 2**MAP SHOWING THE LOCATION OF THE PRESENT STUDY AREA IN
NOKREK BIOSPHERE RESERVE IN MEGHALAYA, INDIA**

- ▶▶ Focusing women issues and development through women-exclusive Self Help Groups (SHGs)
- ▶▶ Capacity building of the communities: trainings (on organizational management, micro-credit management, book keeping and accounts, NRM, livelihood activities, non-farm enterprises, etc.), exposure visits, exchange visits, etc
- ▶▶ NaRMGs become the planning and implementation body for the communities,

preparing its own 'Community Resource Management Plan'

- ▶▶ Vision building & Perspective Plan preparation
- ▶▶ Formation of the NaRMGs into Cluster Associations and the SHGs into Federations, generally after 2-3 years of formation of NaRMGs and SHGs

Preparation of AWPB

- ▶▶ Preparation of the Annual Work Plan Budget (AWPB) by the communities [NaRMG] with

the facilitation of partner NGO and DST, which includes both group activities and individual household activities

- » AWPB based on fund allotment for each year

Fund: Allotment, Flow Mechanism and Management

Fund allotment:

The percentage of fund allotment under each sector is as follows. The AWPB are based on these percentages spread over 3–5 years period for each project village (calculated @ IRs 20,000 per household; IRs 45 = 1 US\$ at the time of Project Appraisal).

Fund flow:

- » Both NaRMGs and SHGs must have separate bank accounts
- » All funds transfer through bank from Project to communities as per sanctions
- » SHGs receive fund allotments as Revolving Funds, which is loaned to individual members of the group with mutually agreed rate of interest; respective SHGs make their own rules and regulations for loans/ advances, interest rates, repayment periods, etc. [Revolving Funds are capital assets of the groups, which is grant from the project/ government, but individuals access the funds as loan for any consumptive or non-consumptive purpose such as income generating activity or for creating assets]

Fund Management & Administration:

- » NaRMGs & SHGs trained to handle their own accounts and financial matters

- » Internal Auditors of the project audit the fund management systems of the communities regularly
- » All NaRMG & SHG funds audited once in a year by independent External Auditors sourced as per government financial procedures or norms
- » All funds received by the groups from the project are to be declared in the group meetings; displayed in writing; or all cash books and transaction records can be inspected by any member of the groups anytime

Implementation and Monitoring by the Communities

- » Review of the group and individual household activities done periodically but regularly through the monthly meetings of the NaRMGs and SHGs; all meeting proceedings are recorded
- » Community Coordinator / NaRMG President or Secretary submits a quarterly monitoring report of the village activities in a prescribed format to the project office (DST); the area-coordinating partner NGOs often assist in filling up of the format
- » Project staff and partner NGOs make village visits as often as possible to motivate and encourage the communities as much as to supervise the progress of their chosen activities and also to provide technical support
- » Government line departments are key stakeholders in project processes

Exit/Sustainability Strategy

- » Continuous efforts in linking the project activities with the central and state

government programs and projects such as horticulture mission, national agriculture innovation program, organic farming, ecotourism, bamboo mission, medicinal plants board, biodiversity board, Joint Forest Management, district rural development agencies, market organization, training institutions, etc

- ▶▶ Developing cadres of grassroots specialists in agriculture, horticulture, fishery / aquaculture, livestock management, bee keeping, Self-Employed Business Agents, etc. that are critical to continuity, replication and scaling-up of rural development activities
- ▶▶ Strengthening and organizing the CBOs into larger groups of associations and federations, and building linkages between these groups for market, training and credit support, etc. The federated groups formed are the NaRMG or Cluster Associations and SHG Federations
- ▶▶ Building and strengthening linkages with financial institutions including the credit-worthiness of the CBOs; initiation of non-banking financial institution within the project under the name and style of *NERCORMP Institute of Micro-finance (NIM)* as many project villages do not have ready access to existing banking facilities

Additional Activities to Strengthen Process Interventions of NERCORMP-IFAD

Participatory 3 Dimensional Model (P3DM): Tool for NRM learning, planning and applying action

P3DM is a relatively new communicative facilitation method conceived to support

collaborative processes related mainly to natural resource use and tenure and aimed at facilitating grassroots participation in problem analysis and decision making. P3DM is a community-based tool, which merges geographical information system (GIS)-generated data and people's knowledge of their local geography to produce a stand-alone relief model (Rambaldi and Callosa-Tarr, 2002; ICIMOD, 2003). P3DM was constructed at Sasatgre (one of the important villages within the buffer zone of NBR) with the facilitation from ICIMOD. The model has brought to these communities a deeper understanding and appreciation of their village geography and natural resources, improved village communication and planning capacity, improved land use management particularly for selection of areas for shifting cultivation (*jhum*) and stronger community cohesion.

Other Key Features Contributing to Project Success

- ▶▶ Involvement of partner NGOs who are from the local communities, speaking the same dialects/language, who were mobilized and motivated. Their participation is crucial even during the post project scenario
- ▶▶ Community's confidence on the project team and partner NGOs together with the availability of the project team and partner NGOs at all times
- ▶▶ Wide publicity at the local level. This has motivated the project villages take up activities as challenges and opportunities as neighboring non-project villages often do visit them for consultation. Social pressures motivate them to do their best. Even many of

Table 2: Percentage Fund Allotment for Different Sector of the Project

S.N.	SECTORAL DIVISION	% FUND ALLOTMENT	REMARKS
1	Community Institution Building	7.40	Major investment on training / capacity building / human resource development
2	Village Development		
	a. Economic Livelihoods / Income Generating Activities	51.80	Most of the funds to NaRMGs & SHGs as Revolving Fund for IGAs
	b. Social Sector	5.40	Drinking water; health and sanitation.
	c. Village Infrastructure	20.40	Rural connectivity (roads and bridges); community halls; collection centers; etc.
3	NRM Development	4.10	Community forests and biodiversity conservation (Functionally merged with Livelihoods/IGAs)
4	Project Management	10.90	Fairly high due to scattered project villages, difficult hilly terrains, etc.
	Total	100.00	

- the district authorities frequently visit the project villages which encourage them further
- ▶ Knowledge about the project amongst the local government and non-government officials, including public leaders and peoples' representatives
 - ▶ Strong involvement of district administration and local line departments in the project administration and delivery system, and also ensuring additional fund from government particularly under the District Rural Development Agency (DRDA)
 - ▶ Digital video documentation of village activities, which are shown to the villages, which in turn encourages them to perform better

- ▶ Small but fairly secured and predictable system of fund flow to the project, partner NGOs and the communities. This gives them a kind of financial security, facilitating better planning and implementation of the project interventions by the communities

Citrus Rejuvenation Project

Many of the villages within the buffer zone of NBR are economically dependent on citrus (orange) plantations. The Garo Hills mandarin orange is considered to be one of the best varieties in the region. Its high demand had prompted many of the households to take large scale orange plantation as livelihoods activity. However, many of the plantations being old, had the experiences

of attacks by diseases resulting in severe decline in orange production thereby directly affecting the local communities. Several families have even abandoned their orange orchards and returned to shifting cultivation. The honey yield from these orchards also declined drastically.

It may also be mentioned that the NBR is known for its rich wild citrus germplasm. In fact, part of the NBR closer or within the core area of Nokrek National Park is also considered as Citrus Germplasm Sanctuary.

The NERCORMP-IFAD took up a citrus rejuvenation project from the Government of India in order to address the problems of decline in orange production in the area. With technical assistance from the Indian Council of Agricultural Research and State Horticulture Department of Meghalaya Government, the project resulted in the rejuvenation of orange plantations in the area with renewed interest in orange cultivation. The Project in collaboration with the District Administration also organizes Orange Festival each year to facilitate market linkages and to provide opportunities for sellers and buyers interaction.

Linking Culture with Conservation

The Nokrek National Park is culturally and mythologically connected with the local Garo tribe. Mythologically the locals believe that the deity *Durama* resides in the Nokrek Peak / Nokrek Range. The ancestors of the *Garos* worshiped this deity as the 'giver of life' as all the important rivers of Garo Hills originate from

Nokrek Range. Traditionally, the deity is also connected with the one who loves thick forests and various types of animals and plants within such forests. And therefore, irrespective of the ownership of the NNP, the locals would like to see that the Nokrek Range remaining covered with forests. They know that conservation of Nokrek Ranges can still bring benefits to them such as ensuring sufficient water flow into its numerous rivers that originate from the Range. There are also serious attempts to transmit these cultural values to the younger generation of the communities.

Special Focus on Shifting Cultivation

NERCORMP-IFAD generally neither encourages nor discourages shifting cultivation or *jhum*. It believes in strengthening the empowerment and education processes of the communities to make their own conscious choices and decisions with respect to *jhum*. Communities were well informed the possible trade off with *jhum* or without *jhum*. They were educated on what they might lose and gain if they continue *jhum* or discontinue *jhum* by replacing *jhum* with other crops or land-use systems. Along with the communities, the issues of *jhum* were addressed as follows:

Rationalization and optimization of *jhum* clearings based on availability of household labor and crop seeds

Prior to *jhum* clearings, social mobilizations (through NaRMG meetings) are carried out for prior auditing of individual household on the availability of crop seeds for planting and also

probable availability of household labor/man-power for weeding during the ensuing year. (Weeding is the most labor-intensive part of *jhum* cultivation, which often could determine the success or failure of crop harvest if timely weeding is not done). The outcome of these exercises has been:

- ▶ Communities reported reduction of *jhum* (area) by 40-60% in the project villages within the NBR
- ▶ The practice has ensured optimum and rational use of land for *jhum*
- ▶ Increase in *jhum* cycle from 3-5 years to 7-9 years
- ▶ More practical and judicious selection of sites for *jhum* (avoidance of critical water sources for *jhum* or avoidance of haphazard and random selection)
- ▶ Marked reduction in forest fires often associated with the burning of shifting cultivation/*jhum* burning. Stronger community based fire management strategies.
- ▶ Improved biodiversity/forest cover in the area

Promoting 'green boundaries' cum traditional integrated pest management system

The project encourages protection or maintenance of patches of vegetation on hill tops of *jhum* fields and maintenance of fairly-wide 'green boundaries' between *jhum* fields. The results of these interventions can be summarized as follows.

- ▶ Vegetations protected on hill tops or as boundaries between two *jhum* plots are the seed sources of local plant species for re-colonization of *jhum* fields

- ▶ Such green patches act as habitat for local insects, many of which are pollinators
- ▶ Maintenance of sufficiently large green boundaries ensure in maintaining healthy pest-predator relationship as part of traditional integrated pest management systems
- ▶ Mosaics of 'green boundaries' also act as barriers for soil, moisture and nutrient conservation

Reinforcement of Traditional Indigenous Knowledge / Practices in Shifting Cultivation for soil, water, nutrient and biodiversity conservation

Shifting cultivators traditionally practice a number of activities that were useful in conservation of soil, moisture, nutrient and biodiversity. Some of these activities include placing of unburned logs across the *jhum* fields, avoidance of weeding of sprouting or germinating seeds of local trees and useful shrubs, sowing seeds of local tree species and useful shrubs along with sowing of crop seeds in *jhum*, seed exchange among farmers prior to sowing to ensure cross fertilization of crops and so on. The communities were encouraged to take up many of these activities that can benefit them as follows:

- ▶ Placing of unburned logs across the *jhum* fields can be used
- ▶ for piling of plant biomass during weeding
- ▶ Nutrients from plant biomass will recycle in the system
- ▶ Act as support / barrier for soil and water conservation on sloppy *jhum* fields
- ▶ Fields can be re-used in the second year for tuber crops (e.g. Ginger) as soil fertility can be

maintained through appropriate management or mulching of weeded weeds

- ▶ Maintenance of germinating or sprouting tree species can ensure better conservation of local biodiversity/plant species; also ensures quicker recovery of the system
- ▶ Exchange of seeds among the farmers ensure genetic purity of the local crops while at the same time facilitating cross fertilization of local crops

Intensification of cropping phase and commodification of crops

- ▶ Cropping intensification from traditional one year to two or more years by crop rotations and manipulations. Cereals and pulses and other vegetables [dominated by paddy] in the first year and tuber crops (Ginger) in the second year are most popular.
- ▶ Crop commodification/diversification: Replacement of traditional *jhum* crops with perennial horticulture crops having market demands. Some of the preferred crops are pineapple, banana, areca nut, cashew nuts, orange, medicinal and aromatic plants, tea, etc.

Intensification of fallow management

- ▶ Conversion of *jhum* land into multi-layered agroforest with predominant local fruit crops or introduced species.
- ▶ Plantation of fallow areas with NTFPs, timber species, fuelwood, multipurpose nitrogen fixing species, etc.
- ▶ Conversion of fallow forests into community forest / community conserved areas with community-initiated rules and regulations for NTFP extractions, prohibition of *jhum* in such areas.

System integration

By “system integration”, we mean promotion of various types of upland farming integrations along with *jhum* cultivation. These include sericulture, aquaculture, apiculture, livestock management, home gardens, etc. Also credit access through provisions of revolving funds to the communities (NaRMGs and SHGs). NERCORMP-IFAD attempted to provide all these interventions at household level with the ultimate objective of enabling the shifting cultivator households to decide their best course of livelihoods. These processes had in deed allowed many of the families to give up shifting cultivation or drastically reduce the areas for shifting cultivation.

Educating the communities with formal laws and regulations

Whenever feasible, NERCORMP-IFAD takes the opportunity of educating the communities in the existing formal laws and regulation particularly those relating to natural resources. The NBR falls within the Garo Hills Autonomous District Council (GHADC) constituted under the Sixth Schedule of the Constitution of India. The Autonomous District Council has both the executive and legislative power over the natural resources, except those notified as reserved forest and protected areas. Two important acts legislated by the GHADC are the Garo Hills District (*Jhum*) Regulation, 1954 and the Garo Hills (Forest) Act, 1958.

The communities are encouraged to understand such legislations and explore how best they can benefit from such laws and regulations. For example, the Garo Hills District (*Jhum*) Regulation is to provide for the regulation and

control of the practice of *jhum* or other forms of shifting cultivation, which gives power to the District Council through the *Nokma* (head of traditional institution) for the Selection and allotment of land for *Jhum*, Prohibition of *jhum* in certain areas and by certain persons, Fixation of cycle of *jhumming*, Precaution against fire, Recuperation of soil in the *jhum* area, Introduction of wet and other form of permanent cultivation in the *Akhing* (land traditionally under the custodianship or ownership of the *Nokma*), Introduction of terraced form of cultivation and horticulture, Restriction on shifting of village, Penalty, etc. The other important legislation is the Garo Hills (Forest) Act, 1958 which encourages and recognizes the communities to have village and community forests and register under the act to have both customary and legal rights.

It may be mentioned that both the laws are applicable within the NBR. Particularly in the Indian context, the biosphere reserves being more of management strategies rather than having legal entity, it is important for the communities to understand the formal laws to enable them deliberate how their traditional customary practices and the formal laws of the government can converge to give them maximum protection. After all, many such laws have been enacted to protect the interest of the communities and their customary practices. All the land and resources within the buffer zone of NBR continue to be governed under such customary practices over which the communities continue to enjoy sovereignty of governance and ownership.

Strengthening the Cause of Conservation through Promotion of Community Conserved Areas

In 33 of the 45 project villages within the buffer zone of NBR, NERCORMP-IFAD has been able to promote creation of 'community conserved areas' (CCA) over 5567.28 ha forest. The largest of these CCAs is 1400.00 ha at Mandalgre village. Although collectively known as CCA, the various categories of CCAs in different villages are known by different nomenclature such as Village Forest Reserves, Water Catchments Reserves, Village Bamboo Reserves, Village Broom Grass Reserves, Village Thatch Grass Reserves, Wildlife and Elephant Corridor Reserves and Stream bank cum Riverine Fish Pool Reserves. The communities (NaRMGs) with community-initiated rules and regulations that are preventive, prohibitive, punitive and facilitating in characters manage many of these CCAs. The communities have also started experiencing the benefits of these conservation efforts in various ways. A network of CCAs has now transformed the local degraded '*jhumscapes*' into well-preserved protected areas. The communities are also reporting reduction in elephant depredation in the area. Thus, promotion of CCA within the NBR has strengthened the overall cause of PA management in the NBR. The communities today seemed to be much appreciative of the government's efforts of sustainable management of NBR for the good of present and future generations of the people living in the area. The project too has facilitated in the registration of many of these CCAs as per the Garo Hills District

(Forest) Act 1958 to enable the communities enjoy both the legal rights and customary rights.

Concluding Remarks

NERCORMP-IFAD project can be said to have successfully demonstrated that community-oriented innovative interventions can very well work in upland areas like NE India where majority of the forest is owned or controlled by the communities. The encouraging results and achievements in livelihood interventions in the buffer zone areas of Nokrek Biosphere Reserve in Meghalaya is a demonstration of paradigm shift in protected area management addressing the challenges of well-being. It is expected that similar model would work well in any upland areas or communities, particularly in the Eastern Himalayas, irrespective of the ownership of the forests. The distinguishing characteristic features and elements that make a project like NERCORMP-IFAD as a model responding to challenges of human well-being in protected area management should include:

- ▶▶ Promotion and empowerment of community based organizations that take up the ownership of the project
- ▶▶ Building and strengthening the absorbing capacity of the communities
- ▶▶ Bottom-up approach of planning and implementation where men and women play equal roles and responsibilities
- ▶▶ Active participation of local community-based partner NGOs in project processes and deliveries
- ▶▶ Transparency and accountability in all aspects of project fund management and implementation

- ▶▶ Availability of community-managed revolving funds for micro-credits

How many of our typical PA management strategies have similar project approaches? Most typical program-components in PA management tend to consider the communities living in the PA as the 'undesirable components' of the project. In the process, the people are often treated as 'outsiders' or mere beneficiaries, but never as part of the components that could determine the best effective PA management interventions. Most often, the eco-development agencies in PA management failed to share space and responsibilities with the local communities, thereby limiting the scope and effectiveness of such traditional top-down PA management strategies. The other serious limitation often seen is that PA authorities tend to perform multiple tasks, particularly managing protected areas and also implementing livelihoods interventions projects. It is best that both the types of work should be executed or implemented through separate agencies for best results, though both agencies would be expected to work in close coordination, collaboration and partnership.

Of course, we must appreciate the fact that protected areas are under the legal jurisdiction of the government and hence it is the prerogative of the authorities to design and implement any kind of management strategies deemed appropriate. It is also true that many of the buffer zone areas of protected areas, as in Northeast India, continue to be under the ownership and control of the communities. In other cases, indigenous communities continue to live in and

around protected areas that are traditionally dependent on resources of forests that have now been brought as protected area. Conflicts with communities living in and around protected areas with the authorities of PA managers are widespread. Prolong existence of such situations could actually severely impact in the fulfillment of conservation goals, purposes and objectives. Therefore, there has to be a paradigm shift in protected area management strategies so that the aspirations and well-being of the people living in and around protected areas could also be appropriately responded.

In deed responding to challenges of human well-being is demanding particularly in protected areas management where there could be so many legal and other issues of priorities. Single factor that often makes eco-development project challenging in PA is the fact that beneficiaries often tend consider the support received from the eco-development project as part of normal rural development activities. At the same time, the project officials (notably the officials in the concerned department) also fail to convey and advocate the fact that any eco-development projects in PA demand community's cooperation and reciprocation towards supporting the conservation initiatives of the government. Often

as there is no sense of project ownership by the communities in most PA management programs, the people tend to take the benefits but in turn take very little pro-active role towards promoting conservation. The above brief discourse on the experiences of NERCORMP-IFAD and lessons learned in the interventions of the buffer zone of NBR could be a successful example of paradigm shift in responding to challenges of human well-being in PA management that could achieve the twin goals of improved livelihoods and enhanced conservation objectives. Hopefully concerned authorities in protected area management can draw lessons from these experiences for the cause of improved protected areas management in the Eastern Himalayas.

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LINKING TOURISM TO BIODIVERSITY CONSERVATION: A PARADIGM SHIFT IN PROTECTED AREA MANAGEMENT

Siddhartha B. Bajracharya¹ and Anu Kumari Lama²

ABSTRACT

Nepal is gifted with nature's bounties and is a nation that covers a significant area of natural wilderness, abundant biological and cultural resources with tremendous significance and value that extends to the global level. Hence, the necessity arises to systematically protect and conserve biodiversity. Protected areas (PA) of different categories have been established by the government of Nepal to protect the unique natural features of Nepal's diverse landscapes, rich biological and cultural resources, and also to provide opportunities for visitors to experience outdoor recreational opportunities. Establishment of the PA system has substantially affected the lives of many mountain communities through biodiversity conservation and increase in tourism activities. More than 30% of the Nepalese Himalayas are now protected and its effect on increase in tourism in this region has brought development opportunities and enhanced appreciation amongst local communities for nature and culture conservation. Within this background, tourism's contribution to the Himalayan communities is not just in terms of poverty alleviation and enhancing the socioeconomic status of these communities but also contributes to biodiversity conservation. The fact that there has been an impressive growth in annual tourist arrivals in PAs suggests that the demand for nature based tourism is on the rise and hence supports our argument that a symbiotic relationship between tourism and biodiversity conservation exists.

PAs are specially designated areas for the protection and maintenance of biodiversity and the cultural heritage associated with that area. It would not be an understatement to say that heavy financing is a necessary condition for the successful management of PAs. Nepal is a developing country and currently, the government's priority lies in poverty alleviation rather than investing in PAs. On the other hand, PAs are continuously threatened by ever increasing human activities and the pressing need for sustainable management of PAs is also on the rise. This too requires sustainable funding. This paper examines how Nepal's PAs are being set aside and discusses their importance from a conservation and socioeconomic perspective. It highlights local initiatives and demonstrates its impact in managing Nepal's largest PA, the Annapurna Conservation Area (ACA).

¹Executive Officer, Projects & Programmes Development, NTNC; siddhartha@ntnc.org.np

²Tourism Officer, ACAP - National Trust for Nature Conservation

Introduction

Tourism is the fastest-growing global industry and is at the forefront of global economic growth (Campbell, 1999; Sharma, 2000). National parks and other PAs have a well-established connection with tourism (Boyd, 2000) in terms of the recreational opportunities they provide to tourists (Eagles and McCool, 2002). Tourism in PAs can provide significant opportunities for economic advancement, contributing to increasing incomes, poverty alleviation and opportunities for vertical advancement in the tourism industry (Eagles and McCool, 2002). Besides, tourism can also assist to protect and generate resources for PAs (Eagles and McCool, 2002). Hence, tourism provides the link that provides an economic justification for biodiversity conservation (McNeely, 1988). However, tourism often results in negative environmental impacts (Nepal, 2000; Buckley, 2001); even ecotourism, which generally aims to achieve compatibility with biodiversity conservation, if unregulated can cause natural degradation (Davenport, *et al.*, 2002). The impacts of tourism on the natural environment depend on the characteristics of the ecosystems and human activities concerned (Buckley, 2001), as well as the availability of tourist facilities, and policies and regulations of the PAs (Davenport, *et al.*, 2002).

In Nepal, PAs have been a long time tourist attraction. The pristine mountain environment and the enthralling beauty of the Himalayas are undoubtedly world famous. These environments are rewarded with unique biodiversity, exquisite landscapes and myriads of wildlife many of which are unique only to Nepal. Towards the latter part of the twentieth century, tourism in Nepal

grew to become a major economic sector. Tourism's growth is also associated with an increase in demand for nature-related tourism, including ecotourism, and an increase in tourist visits to PAs. Development of ecotourism has thus been an integral part of the PAs system in Nepal. The prime objective of ecotourism in Nepal has been to promote a symbiotic relationship between tourism and the environment, with a particular focus on poverty alleviation.

As elsewhere in the world, PAs have played a significant role in driving Nepal's tourism industry (Nepal, 2000). Chitwan National Park, Sagarmatha National Park and ACA are major tourist destinations (Nepal, 2000). A balanced interaction between tourism, parks, local communities and the natural environment is expected to provide mutual benefits for all (Nepal, 2000). Local communities in and around the mountain parks of Nepal have received substantial income and employment benefits from tourism, which has positively influenced local attitudes towards conservation (Nepal, Kohler *et al.*, 2002; Mehta and Heinen, 2001; Bajracharya, 2006).

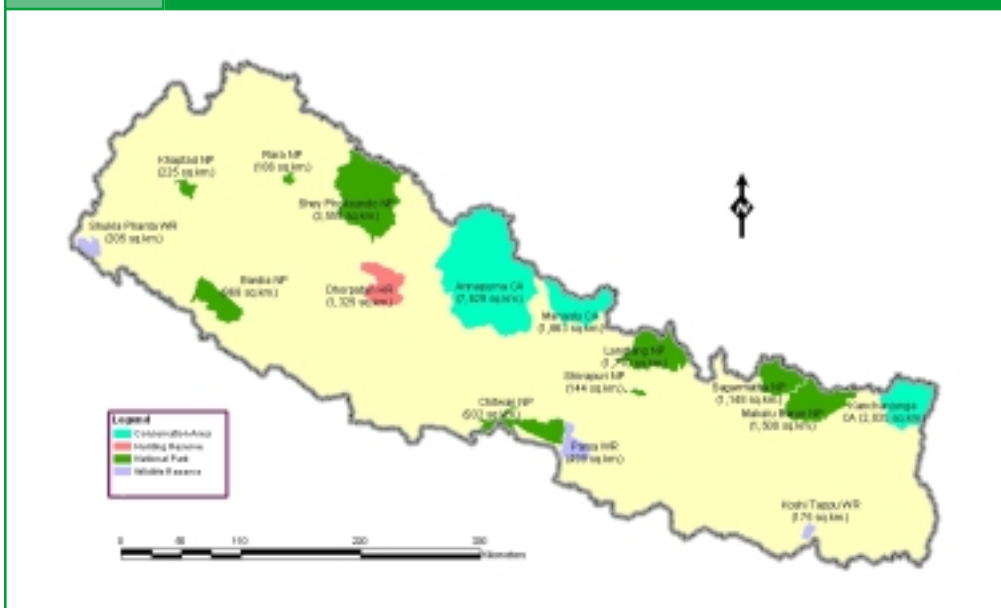
Protected Areas in Nepal

Since 1973, the Government of Nepal prioritized biodiversity conservation by adopting the PA system. The National Parks and Wildlife Conservation Act of 1973 assigned major responsibility for establishment of PAs with the objective of conserving the unique natural and cultural heritage and protection of valuable wildlife. There are altogether 16 PAs in Nepal, which accounts for more than 19% of the country's total land mass.

economies, most obviously from tourism. Although PAs provide tremendous benefits, as elsewhere in the world, there is a significant funding gap for effective management of PAs in Nepal. Nevertheless, revenue from tourist income from PAs is slowly becoming a good source of funding for certain PAs of Nepal.

Tourism is the biggest industry in Nepal, a major contributor to its economy generating more than US\$ 180 million annually, attracting over 360,350 tourists in 2007 (NTB, 2008). The industry also accounts for 3.5% of GDP and contributes about 25% of the total foreign exchange earning. Besides, it provides direct and indirect employment for over 300,000 people. Tourism industry is intimately connected to the protection

FIGURE: 1



of natural and cultural resources of PAs. There is an increasing demand for travel to natural areas indicating the intimate connection between tourism and the PAs. This is evident from Figure 4, which shows that in Nepal the number of tourists visiting PAs increased from 25% in 1995 to between 50% to 60% at present. The growth potential and the trends observed in tourist arrivals in PAs put tourism in a strategic position to make a positive contribution to its sustainability and the development potential of surrounding areas and their communities. On the other hand, it can also help the sustainable management of PAs—the warehouse of globally important ecosystems and resources. The demand for nature based tourism especially trekking tourism

is concentrated in three major PAs of Nepal (Figure 5), which accounts for 95% of the total trekking activities carried out in Nepal. The growth in the number of PAs in such short span of time shows Nepal's commitment to conservation of natural resources and the development of remote areas of the country. Ecotourism development has been an essential part of this whole process thus highlighting the strong linkage between tourism and the PA system. ACA's combination of spectacular tourism resources, its image of being the 10 most popular trekking destinations in the world in association with the effective PA management system has attracted an average of 60% of the trekking tourists visiting Nepal.

FIGURE: 2 NUMBER OF VISITORS TO ACA

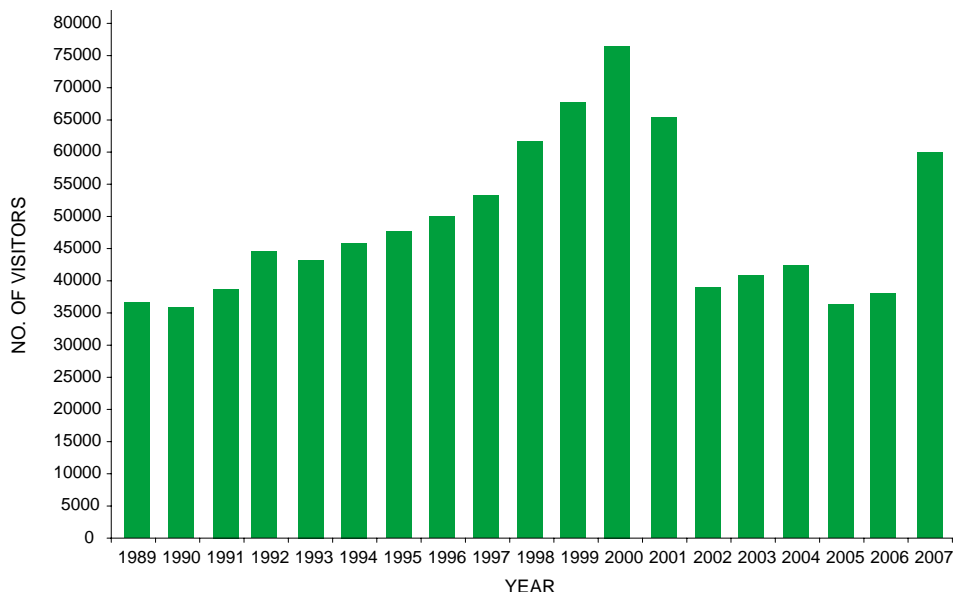
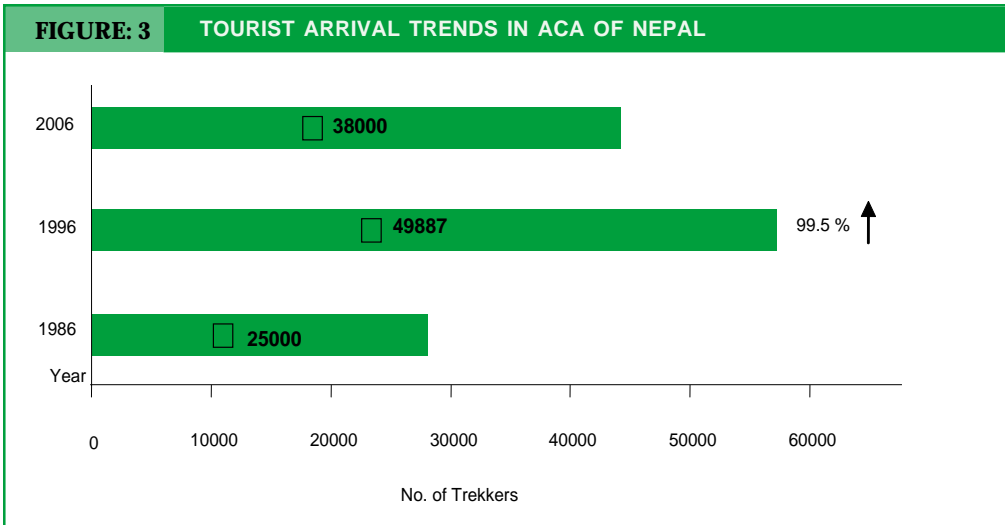


FIGURE: 3 TOURIST ARRIVAL TRENDS IN ACA OF NEPAL

Annapurna Conservation Area (ACA)

ACA is the first conservation area and the largest PA of Nepal (7,629 km²). It spreads over five districts with 57 Village Development Committees. It is exceptionally rich in natural heritage and biodiversity, stretching from the lowland sub-tropics of the middle hills to the permanent snow cover of the Himalayas, and beyond the alpine grasslands in the Trans-Himalayan region to the parts of the Tibetan plateau. Within a short span of 120 km, the altitude rises from less than 1,000m to over 8,000m. Such abrupt altitudinal variation with a diverse climate and geo-morphological conditions have created diverse ecological complexes and niches in ACA, which harbours 1,226 species of plants, 102 mammals, 485 birds, 41 reptiles and 23 amphibian species. This rich biodiversity has generated complex symbiotic relationships between plants, animals and humans.

The fundamental driving forces shaping the environmental resource base within ACA are population growth, tourism and poverty. Owing to this reality the National Trust for Nature Conservation's Annapurna Conservation Area Project (NTNC-ACAP) has initiated an approach towards matching protection priorities more closely with human needs and aspirations. This has become increasingly accepted as an important element in PA management strategies of Nepal (Bajracharya, 2004). The objectives of meeting protection priorities and human needs have been achieved through the generation of financial resources from tourism and channelling the revenue back to manage ACA through conservation measures, sustainable development initiatives, appropriate information, interpretation and education programmes for visitors and residents. Additionally, tourism operations within ACA have been carefully planned, managed and monitored in order to ensure their long-term

sustainability. ACA is the most popular trekking destination in the Nepalese Himalayas. The number of tourists visiting the area has increased steadily since the late 1980's, until the onset of a political conflict in the country, which has led to a sharp fluctuation in tourism since 2001. ACA was created partly in order to alleviate environmental degradation linked to trekking tourism (Sherpa, *et al.*, 1986; KMTNC, 1997; Pobocik and Butalla, 1998), and sustainable development of tourism is one of the principal goals of ACA management (KMTNC, 1997). Tourism management in ACA is considered globally to be a good example of community involvement (Cater, 1994). Moreover, the tourism revenues have helped to restore

degraded features of the natural and cultural environment in ACA (Gurung and DeCoursey, 1994).

In this regard, NTNC has made a unique contribution by designing and managing ACA, a new and innovative PA management system. Establishment of ACA was a paradigm shift in PA management and sustainable tourism development and management in Nepal. The management approach is based on a careful integration of conservation and development priorities, and incorporates all the key elements of the Category V protected landscape approach. For many years, ACA has been adopting

FIGURE: 4 MAIN THREATS TO BIODIVERSITY

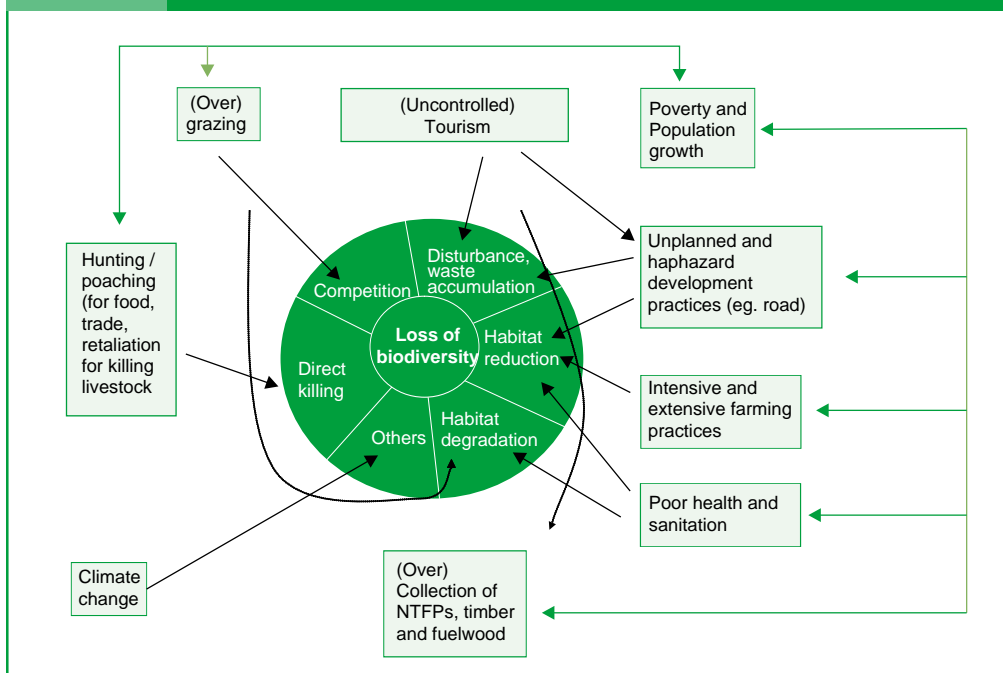
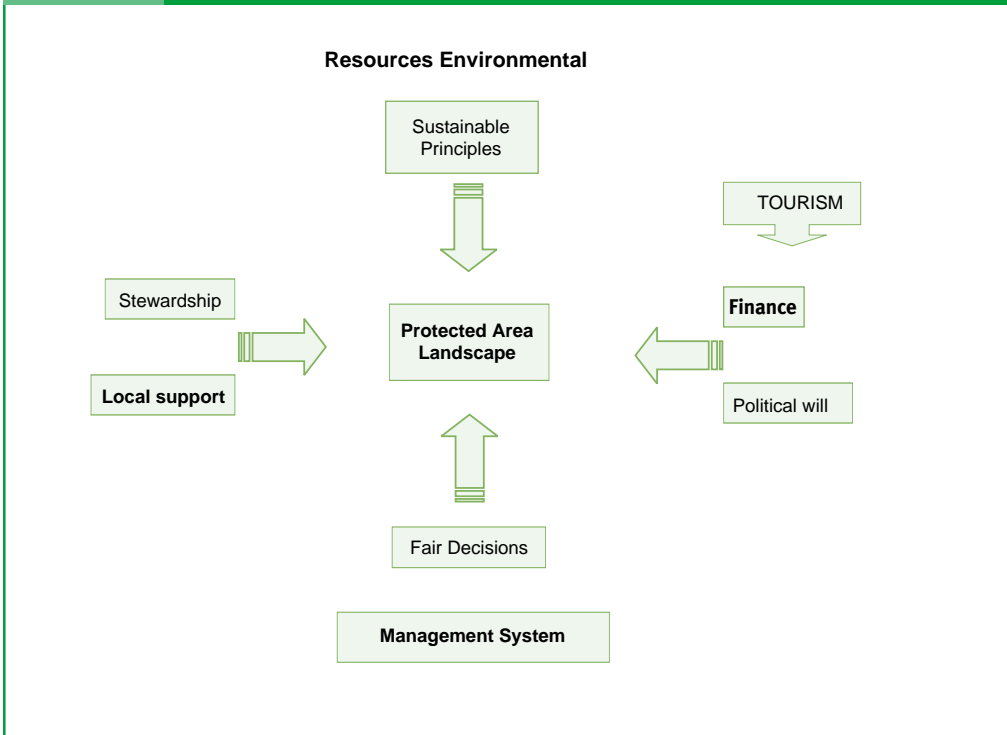


FIGURE 6 PROTECTED AREA LANDSCAPE MANAGEMENT



integrated conservation concepts and is one of the best examples of protected landscape management in the developing world.

The unique conglomeration of diverse flora and fauna, and the complimentary geological and socio-cultural web of life have attracted hundred thousands of people, making ACA the 10 most popular trekking destinations in the world. Tourism in ACA has become the most important source of foreign exchange, a lucrative sector for generating income and employment opportunities for the people of ACA. More importantly, revenue from tourist income in

ACA has significantly reduced the funding gap to effectively manage the largest PA of Nepal. The recent analysis of average percentage ratio of the income from tourism revenue against annual budget of ACA by Bajracharya (2004) indicated that the revenue covers 85% of the annual budget. In an average, the annual budget of ACA is US \$1.4 million. Therefore, this revenue has become a major driving force in the overall conservation and development policy in ACA. This is a unique example of such a large PA being effectively managed through tourism revenue. More importantly, as a result of availability of resources from increased tourism

revenue, management of ACA does not require the already scarce resources of the Government. By contrast, many park authorities and institutions both in Nepal and in other developing countries are still seeking a mechanism for durable funding of parks (Wilkie & Carpenter, 1999). Tourism development in ACA is considered a benchmark for the development of tourism in other areas of Nepal (Doggart and Doggart, 1996).

The experience of ACAP shows that if sustainable management of PA is to succeed, certain management characteristics must coexist. These include:

- ▶▶ A “Stewardship ethics” amongst all stakeholders
- ▶▶ Local support and their involvement in all stages of management
- ▶▶ Management system that promotes PA landscape approach based on fair decisions
- ▶▶ Tourism that facilitates long term revenue generation opportunities
- ▶▶ Government Policies and Acts aimed towards the promotion of sustainable tourism products/facilities within PA landscape
- ▶▶ Judicious utilization of the environmental resources for sustainable management of PA landscape

Pioneering a New Approach for the Tourism Industry

NTNC is a pioneer conservation organization in Nepal that realized the early potential of tourism as a tool for conservation and development. The establishment of ACAP was an initiative to

introduce an innovative approach to long-term environmental conservation and short-term economic development thereby securing financial sustainability of the region. The basic principal behind ACAP is to collect entry fees from tourists and revenues from the users of the area’s resources and to utilize these resources for the management of ACA. Two important approaches have been adopted in maximizing the economic impacts in ACA.

- ▶▶ **Minimize the cost** – ACAP approach focuses on community-based conservation. This provided an opportunity to reduce huge costs associated with conventional PA management.
- ▶▶ **Maximize the benefit** – Through ACAP, NTNC has been the pioneer NGO to initiate the idea of reinvesting all tourist entry fees into the Integrated Conservation and Development Projects (ICDP) in the area. In addition, local institutions such as CAMC have been authorized to collect and utilize certain fees and revenues, which is utilized as matching funds to ACAP’s support, which comes from entry permit fees or sometimes from donor funding for specific projects.

In light of the present scenario of declining global and national spending on biodiversity conservation and PA system, sustainable financing of PAs is a crucial issue. The justification to protect PAs in developing countries like Nepal can be based on an economic rationale rather than primarily a social or environmental one. On the one hand, enhancing the revenue earning potential of PAs from tourism secures financial sustainability for

long term management of the PAs, and on the other hand provides benefits to appropriate set of stakeholders, thereby ensuring a balanced approach to long-term environmental conservation and short-term economic development.

The experience of NTNC in ACAP is evidence that tourism can be developed as a vehicle to transform local communities and nature conservation positively, and provide a more sustainable alternative. One of the most widely accepted principles in achieving this is through local community involvement in tourism planning and management. Community based sustainable tourism provides a realistic means of building strong and interdependent links between resource management, economic development, social welfare and environmental conservation. Economic impacts of tourism on local communities are generally considered to be positive. Income generation and employment from tourism enterprises such as running a lodge or a grocery shop, porters, cooks and guides are major economic benefits from tourism to local communities in ACA. Community involvement and control of tourism development will also ensure that maximum tourism revenue stays in the host communities. This will enhance livelihoods and generate a profitable source of income, empower and motivate local groups to adopt practices, which conserve, protect and preserve the natural environment.

Challenges

Nepal's tourism has seen a varied growth and fall pattern. The fall in tourist arrivals is primarily

attributed to the political instability in the country resulting in damaging consequences for both the economy and tourism. Political instability within the past 10-11 years has also affected Nepal's PAs that have witnessed a fall in their resource base and revenue earning capacity. Besides the negative impact arising from a fall in total tourist arrival, the decline of the environment, along with the loss of species has hampered conservation initiatives, sustainable financing of PAs and disrupted the livelihood opportunities of local communities. Figure 7 indicates an outcome of the tourist arrival and revenue collection status of ACA before and after the conflict period in Nepal. As the ebb and flow of tourism arrivals in Nepal still very much depend on the status of the world economy and political/social stability in Nepal, the greatest challenges in this circumstance include:

- ▶▶ Build confidence amongst tourist community to visit Nepal
- ▶▶ Translate the attractiveness of Nepal as a premier tourist destination into increased tourist arrivals
- ▶▶ Develop new approaches for sustainable tourism development, which not only seek to minimize local environmental impact, increase tourist numbers but also give greater priority to development of quality tourism infrastructures (road connectivity, air connectivity, communication, IT enabled services, healthcare and human resource development) community participation and poverty alleviation by diversifying tourism product and increasing accessibility

Areas for Further Improvement

Participatory Management

One of the aggravating causes of environmental degradation in PAs is the poverty of local communities living in and around the PAs. In order to diminish destructive activities in PAs, management should make effort to involve all groups within the community in conservation and development projects. Priority needs to be given to providing access and benefit sharing with resource dependent communities. As a process of community-based conservation, devolving authority to plan, implementing and managing conservation activities to local communities are some ways to achieve the desired results. The results of the management will then be sound PA management with good relationships among multi-stakeholders and good governance with transparency, accountability and participation.

Legal System

Community involvement and their traditional practices need to be given a greater legal recognition. Efficiency of such management would generally depend on a legal system to back it up with a strong commitment and cooperation from all stakeholders and management resources. The success of ACA management is primarily due to the participatory conservation approach backed up by certain degree of legal authority in deciding on the management of the resources. Once the community realizes that the protection of PA resources is beneficial to their livelihood, they will invest their resources back into its management, thereby securing the revenue earning potentiality of the PA for its long term management.

Product Diversification

Tourism can become a diversifying and value-adding element for agricultural, forestry, horticulture and other sectors by adopting new models for collaboration approach between the private and public sector and between tourism, hospitality and travel sector, I/NGO's and local communities. Ways and means to diversify products and services should be sought to tap these opportunities.

Funding Diversification

Financing PA is a thorny question the world over. Even countries that boast a long history of PA management is currently facing difficulties financing them adequately. Hence, innovative strategies to secure financial capacity through diversification of funding opportunities must be sought. Means of capturing ecosystem service values, public investment and donations, private sector initiatives (corporate social responsibility) etc. are some key initiatives to start with.

Conclusion

Tourism can provide significant opportunities for long term conservation of biodiversity, community development and socioeconomic upliftment. Since its establishment, ACAP has emerged a leader in ecotourism promoting community based nature tourism, owned and managed locally. All of these have brought in much-needed jobs and income to the local communities while helping to conserve thousands of hectares of varied landscape, culture and biodiversity. None of this was easy. It is often a slow and cumbersome process to achieve successful ecotourism in practice, involving capacity building with local communities and

creating effective partnerships with the private sector, NGOs, local authorities and funding organizations.

Recently, tourism in Nepal has gone through a series of hardships and is still facing a crisis situation due to the absence of proper crisis handling mechanisms. While it is evident that tourism can thrive only in a situation of peace and stability, like other industries, enhancement of tourism depends on constructive vision, a strong

political will, trained manpower, effective and well planned marketing and promotional activities. Ensuring that tourism follows a truly sustainable path and that it contributes to the sustainable management of PAs, whether public or private, will require enhanced cooperation and concrete partnerships among the tourism industry, governments at all levels, local communities, PA managers and planners, and the tourists themselves.

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GOVERNANCE IN PROTECTED AREAS MANAGEMENT OF NEPAL

Shiv Raj Bhatta¹ and Jhamak B. Karki²

The Evolution of PA Governance in Nepal

This paper has tried to examine how governance in protected areas (PAs) changed over time in Nepal. Major shift in policy and management paradigm has been presented along with their objectives. Change in the paradigm within last three decades along with some of their social and biodiversity consequences have been presented. Buffer zone management has been presented with its short term consequences.

The legal basis for the conservation of wildlife in Nepal is:

- 1958: Wildlife Conservation Act 1958: There was no provision for the establishment of PAs but a Rhino Patrol (*Gaida Gasti*) was established for the protection of rhinos (*Rhinoceros unicornis*) of Chitwan valley.
- 1973: National Parks and Wildlife Conservation (NPWC) Act (1973): Provided legal base for the establishment of PAs in Nepal. A wildlife Section in Department of forest was established.

- 1989: Department of National Parks and Wildlife Conservation established as overall responsible organization for the conservation of biodiversity of the country.
- 1995: National parks & wildlife conservation regulation placed restriction on use of resources in Terai PAs.
- 1996: Mountain national parks regulation provided right to local communities on use of forest resources.

Based on above mentioned Acts and regulations the following additional guiding principles exist to conserve biodiversity in Nepal:

- ▶▶ Regulations of each PAs
- ▶▶ Forestry Sector Master Plan (1988)—25 year
- ▶▶ Nepal Biodiversity Strategy (2002)
- ▶▶ Nepal Biodiversity Sector Implementation Plan (2006)
- ▶▶ Management plans of PAs and Buffer Zones
- ▶▶ Action plan of species (tiger, rhino, snow leopard)
- ▶▶ Work-plans of Community Based Organizations (CBOs)—User Groups, User Committees—of the buffer zones and conservation areas

¹Department of National Parks and Wildlife Conservation, Nepal; shivbhatta@hotmail.com

²Department of National Parks and Wildlife Conservation, Nepal; jbkarki@gmail.com

Some of the remarkable shifts in policies considering people at the front are:

1989: Amendment in the Act with the provision of Conservation Area. This is primarily to:

- ▶▶ Involve local communities in wildlife management and integrate conservation and development efforts
- ▶▶ Give management responsibility to nongovernmental organizations—National Trust for Nature Conservation (then King Mahendra Trust for Nature Conservation) received management responsibility of the Annapurna Conservation Area (ACA)
- ▶▶ Ensure public participation in conservation and management of biodiversity of the area

1992: The 4th Amendment of the NPWC Act (1992) marked a landmark decision with provision of buffer zones in all PAs. This aims extensive management of buffer zone to meet daily need of the community and uplift their socioeconomic status and minimize pressures in core zones. Therefore the twin goal approach of biodiversity conservation and socioeconomic upliftment is expected to be achieved through:

- ▶▶ Peoples participation in conservation of core area based on a three-tiered legal organization (Fig 1)
- ▶▶ Sharing of 30–50% PA revenue
- ▶▶ 100% of the revenue of the forests of the buffer zone goes to the local community
- ▶▶ Management of the financial and natural resources by the community
- ▶▶ Initiation to address risks taken by the community for biodiversity conservation

- ▶▶ Social mobilization for biodiversity conservation and community development;
- ▶▶ Self-governing community based institution
- ▶▶ Community capital generation to promote self-reliance (so far total community capital generated is NRs. 140 million)
- ▶▶ Involvement of women and Disadvantaged Groups in decision making

There is a clear-cut legal provision for:

- ▶▶ Declaration of area: in coordination with local users
- ▶▶ Duties, responsibility and rights of CBOs
- ▶▶ The planning process of CBOs
- ▶▶ Users have full authority to take decision regarding the community forests of the area
- ▶▶ Planning, decision making, implementation, monitoring and evaluation and public audit by local users
- ▶▶ Buffer zone management regulation and detail Buffer zone management guideline approved by democratic Government
- ▶▶ Users group at the settlement level to encourage high level of participation and reduce conflict (transparency)
- ▶▶ PA staffs as technical back up and buffer zone institutions as main management authority of the resources of the buffer zone
- ▶▶ Provision of relief for wildlife and flood victims
- ▶▶ Committees allocate budget for User Groups, monitor and evaluate activities
- ▶▶ Planning and resource use decisions by general assembly of users
- ▶▶ Process are detail in the guideline
- ▶▶ Activities and budget distributed in assembly of users

- » Public audit conducted
- » Local contribution and park revenue are spelled while budgeting
- » The organizations are either elected or based on consensus
- » The improved conditions of forest of the buffer zone indicates effectiveness of the model
- » Participation in animal rescue, habitat management activities in the buffer zone

The actors playing different roles in the area are:

- » PAs: Coordinate and monitor;

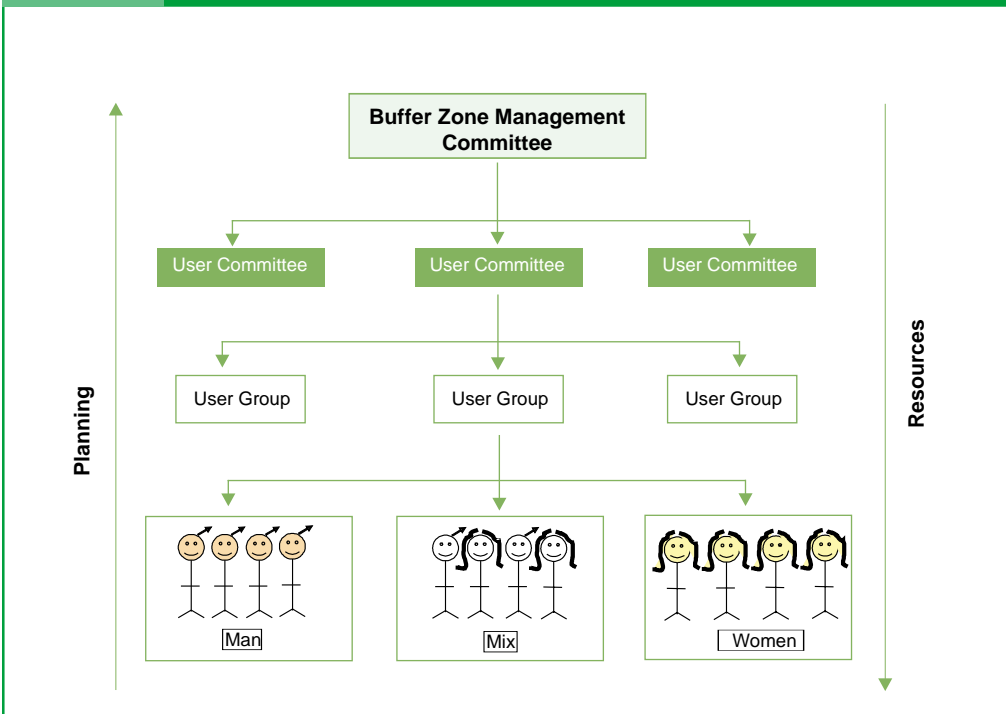
- » NGO/INGO: Tri-partite agreements and substantial support in capacity building to implement buffer zone programs; and
- » Tourism entrepreneurship: Promote non-consumptive benefits of PAs.

Some Issue

Despite, positive aspects of the changing governance, there are some emerging challenges that need to be addressed:

- » Buffer Zone Management Plans are prepared by PA managers rather than by the community

FIGURE: 1 BUFFER ZONE INSTITUTION



- ▶▶ PA managers have right to dissolve CBOs (though only in exceptional cases)
- ▶▶ PA managers acting as member secretary of the apex body of Buffer zone institution might influence decision making
- ▶▶ Human casualties have increased due to better conservation efforts
- ▶▶ Needs and aspiration of marginalized groups not adequately addressed
- ▶▶ Expectation are whole livelihood but PA can only contribute to few requirements
- ▶▶ The Act, regulation and guideline needs to be revised

Conclusion

Changes in governance of PA management have helped to generate people's participation in conservation and thus minimized park-people conflict to some extent. Change in governance has helped to build capacity of local communities and improved conditions of biodiversity as well. The participatory approach over the traditional strict conservation approach has several advantages. The concept is new and would take time to demonstrate the overall impact of the changing governance system in conservation of the country.



CULTURAL LANDSCAPE AND SUSTAINABLE LIVELIHOOD IN RESPONSE TO GLOBAL CHANGES: LESSONS FROM MANANG, TRANS-HIMALAYAS, NEPAL

Ram P. Chaudhary¹

Introduction

A landscape is a heterogeneous land area composed of a cluster of interacting ecosystems that is repeated throughout in a similar form (Forman and Gordon, 1986). Most natural landscapes in Nepal have been influenced by natural and anthropogenic disturbances (Chaudhary, 1998); on the other hand, human activities such as farming, burning, hunting, livestock grazing can play a role in management of landscapes. Cultural landscape management approach is the most effective way of supporting peoples' livelihood and economic development whilst sustaining long-term local and global environmental values. This paper will reflect different processes that interact at the local, regional and global levels to effectively manage cultural landscapes—natural habitat and diverse ecosystems *viz.* agricultural, forest and grassland ecosystems managed by human activities—of Manang and cultural integrity of *Manang*², the inhabitants of Upper Manang.

Upper Manang's landscape is complex and is closely linked to a variety of bio-physical, socioeconomic and political-economic processes.

Manangis are involved in a wide range of economic activities and live in harmony with the natural environment. Nevertheless, glacier retreat caused by global warming and migration resulting from tourism are the two most pressing phenomena that affect the livelihood of the people of Manang.

Notwithstanding the negative effects resulting from global changes in weather and market relations that the Manangis have had to endure, they have nevertheless evolved coping strategies and processes to not just survive in an increasingly integrated and changing world, but have actually proved themselves a victor in this changing process. During the last two hundred years, the people of Manang have evolved from a community plagued by extreme poverty and surviving in a brutal mountain environment to transforming into one of the wealthiest, sophisticated and internationally oriented communities in Nepal. Their success was not achieved by avoiding the process of globalization, but precisely by linking up to such processes and exploiting them to their own advantage (Aase 2007). This paper attempts to briefly explain the

¹Central Department of Botany, Tribhuvan University, Kirtipur, Nepal. Email: ram@cdbtu.wlink.com.np

²Manangi refers to the community who live in Nyeshang, and Nar & Phoo of Upper Manang.

processes, coping strategies and activities adopted by the *Manangis* to sustain their livelihood and achieve economic development.

Processes and Livelihood Activities

Manang district is a part of the Annapurna Conservation Area and is characterized by climatic gradient that lead to rapid altitudinal changes over comparatively short distances. Like most other traditional mountain societies, *Manangis* share a holistic view of the eco and societal system and their relationship with nature is based on coexistence rather than competition (Ramakrishnan, 2005). The livelihood of the inhabitants of upper Manang is dependent upon existing processes and activities, namely (i) bio-physical processes such as glacier retreat, water

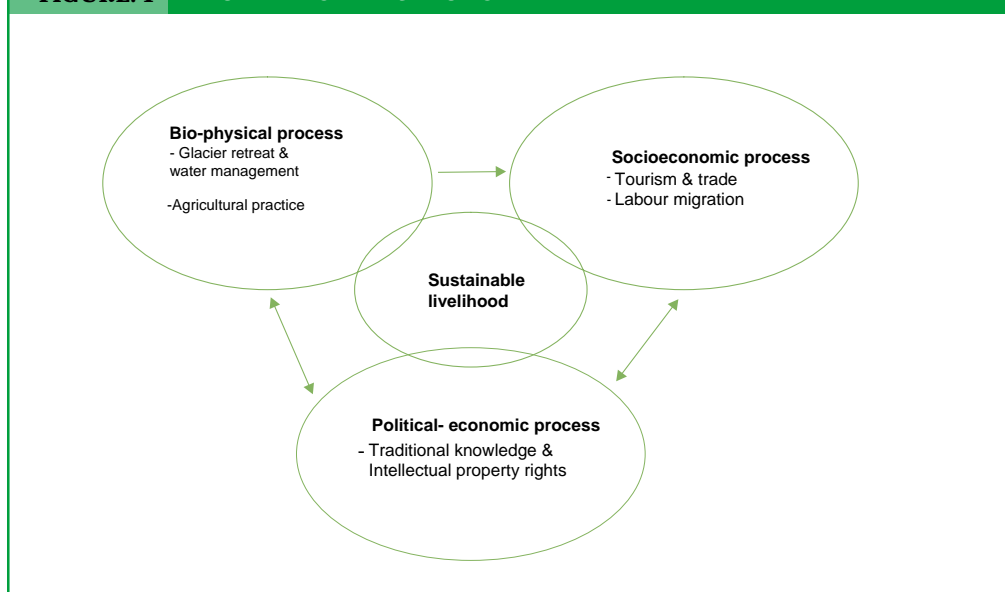
management and agricultural practices; (ii) socioeconomic processes such as tourism, trade and labor migration; and (iii) political-economic process concerning traditional knowledge and intellectual property rights. The above processes interact with each other besides having strong linkages with processes operating at the regional and global levels. The communities have adopted different activities that have a strong impact on processes that shape people's livelihoods at the local level (Figure 1).

Glacier Retreat and Water Management

The Himalayas constitute a large reservoir of fresh water and is a source for many perennial rivers such as the Indus, the Ganges and the Brahmaputra. These rivers are the lifeline for

FIGURE: 1

BUFFER ZONE INSTITUTION



millions of people (Hoelze and Haeberli, 1999). The retreat of glaciers in the central Himalayas that started around the Little Ice Age—maximum ca. 1850—has been accelerating at a greater pace since c.1970, primarily as a result of the ongoing global warming phenomena. The retreating glaciers will cause changes in land use that may affect agricultural production at large and hence adversely affect the lifeline of millions of people in the region. The Gangapurna North glacier shows that the glacial lake was formed after 1952. This was confirmed by the age of the pine trees growing on the till between the river and north of the glacial lake. All the trees are younger than 50 years. These stages clearly indicate that the recent retreat has been taking place at an accelerating rate. The average rate of retreat between 1960 and 2002 is approximately 50 m/yr (Vetaas, 2007).

Under the changing conditions arising from glacier retreat it is important to research the ways the people of Manang have adopted to manage their water resources for irrigation. In this regard, Dannevig (2007) compared water management

in Ngawal and Manang, two villages of Upper Manang. His comparison is elaborated in Box 1.

Agricultural Productivity

Traditionally managed agriculture contributes to local consumption, both as food and livestock feed. The glacier-melt water not only plays a significant role in agricultural productivity at the regional level, but is also closely linked with management of natural resources at the local level, namely agricultural practice and crop diversification, forest resources such as timber and non-timber forest products, and animal husbandry and pasture management.

Agricultural practice and crop diversification. Compared to agricultural practices in other ecological zones of the country, practices in trans-Himalaya is different. To begin with, agriculture land in Manang is scarce comprising only about 1% (1958 ha) of the total area—2,246 sq.km.—of the district (ADO-Manang, 2003). While crop growing along the ‘U’ valley in the Marsyangdi river valley is limited to 3,600 m in the north aspect, the absolute limit in the south

BOX 1 WATER MANAGEMENT FOR IRRIGATION IN MANANG DISTRICT

The glaciers above both the villages are found shrinking. The type of irrigation found in Upper Manang is by surface canals³ that supply water from nearby streams. In Manang village, people changed the water management system as a response to more pipes (a technological change); no such changes had taken place in Ngawal village. Manang had a well functioning water supply, where plastic pipe to a large extent had replaced the traditional canals. In Ngawal on the other hand, lack of water was a predominant issue for the users, with a lot of fighting and poor agricultural yields. Hence, the processes mentioned are all affecting the water supply in the two villages of Upper Manang, and this can be considered as an important lesson for management of water in other parts of the Himalayas at the crossroads of global warming.

Source: Dannevig (2007)

³Water canals mostly consist of an open ditch in the soil.

aspect goes as high as 4,100 m (Phoo village) and 4,200 m (Nar village) and is probably one of the highest in the world. Even though the fields are manured around the first week of November, crops in Manang are grown only during the summer season. Farmers in upper Manang do not apply fertilizer for growing buckwheat. Furthermore, one-two weeding are carried out by hand with the help of a small spade and each weeding, wherever possible, is followed by irrigation.

Like other mountain communities, *Manangis* highly value diversification of crops that are apt for isolated settlements and uncertain biophysical environment. Wheat, barley and buckwheat comprise the most important staple food in upper Manang, of which the latter crop is grown in rotation of wheat or barley. Potatoes are also grown extensively and as in other parts of Nepal and the Indian sub-continent, they are considered vegetables. In recent years, cabbage, cauliflower, carrot, onion, garlic and spinach are commonly seen grown in the kitchen gardens.

Harvesting of wheat and barley is done by uprooting the plant during the last week of September; whereas buckwheat is razed by using a sickle. Threshing of wheat is done by beating the ears into a rake which is a comb like iron blades fixed on the wooden frame; for barley and buckwheat, the long stick is popularly used. Apart from local consumption as staple food, wheat grains are also fed to their horses/mules in Manang (Aase and Chaudhary, 2007).

Climate change, such as unpredicted seasonal rainfall, global warming and temperature

fluctuation is one of the key factors affecting agricultural productivity. Similarly, low temperature (spring frost) and rainfall and unpredictable patterns in rainfall are major limiting factors for crop productivity (Vetaas, 2007). In addition, Manang has a greater chance of losing genetic stock of indigenous wheat and barley as a result of replacement of these crops by crops of non-indigenous variety.

Forest utilization

Manangi people primarily use forest resources as (i) timber trees—pine and fir—for construction as well as for fuel wood—junipers, birch and pine; (ii) fertilizer—particularly blue pine needles and juniper branches—that are mixed with animal dung to maintain fertility by lowering the salt rich soil to normal pH; and (iii) incense—*Juniperus indica*, traditional medicine (Pohle, 1988; Bhattarai, *et al.*, 2006) and subsistence income (Bhattarai, *et al.*, 2007).

Besides the above, *Manangis* also collect a specific type of fungus with insect larvae locally known as *kira* (*Cordyceps sinensis*) or *Yartsagumba* or *Yarchagumba*. This decade old activity is carried out from May to June in high altitudes primarily above 4,400 m. An increase in both regional and global demand for this species has caused the prices of this species to increase at exorbitant level. For example, Manang district alone sold *Cordyceps sinensis*, worth approximately NRs15 million in the year 2005. Such high level of sales of this species comes at a time when a ban on export, except if processed with permission from the Department of Forest, is in place. These activities raise major issues concerning sustainability both at the national and local level.

As discussed in the preceding paragraphs, a constant glacier retreat is ongoing in Manang. As a result, pine forest is easily colonizing snow free areas along the moraines (Mong and Vetaas, 2006). The same process is expected to cause numerous mountain vegetation belts to slowly adjust to higher levels, although this will require more time before the phenomena becomes clearly discernible in the Himalayas (Ives, 2006).

Animal husbandry

Similar to other mountain societies, animal husbandry involving cow, oxen, yak, sheep, goat and horse occupies a central role in the livelihood of the people of upper Manang. With more than 20 livestock per farm household, Manang is ranked second highest among all districts of Nepal in the number of livestock per farm household (ICIMOD, 2003). Animal husbandry is an important source of earning and animal dung is used as vital organic fertilizer. Pasture lands are freely available to the public for grazing and considering the carrying capacity of these pasture lands, the number of cattle is not considered important. In winter, mountain-based herds are brought down to lower lands surrounding the villages.

The most challenging and vital aspect of livestock management in Manang is fodder supply during the long winter period. Traditionally, communities manage winter fodder supply from private as well as common lands by harvesting fodder at a specified time. Harvesting time from common lands is open only two days prior to harvest starts. As grasses are limited in the winter, agricultural biomass obtained from summer crops,

such as, wheat, barley, and buckwheat, to a great extent fulfill the need for supplementary fodder.

In 1999, Parish and Funnell predicted indications of future climate change in the Moroccan High Atlas. If the trend is towards a drier climate arising from glacier retreat, then it is likely that we shall see an upslope extension of the xerophytic vegetation type, which at best offer some browse for goats but little for sheep and bovines. This type of vegetation is already evident in the drier mountain areas and steep slopes with poor soil of Mustang, Manang and Dolpa (Chaudhary, *et al.*, 2007).

Tourism and Trade

Tourism is the most important source of earning for the *Manangi* people and the industry will remain central for the economic sustainability of Manang. Manang's geographic location as part of the Annapurna Circuit trail—the most popular trekking route in Nepal—has earned significant economic benefits for the people of Manang. Even though the primacy of tourism in the economic development of the nation is unequivocal and unquestioned, the percentage of people that live inside the Annapurna Conservation Area that receive direct financial income from tourism is relatively small—14.9%—(Bajracharya *et al.*, 2006).

At present, a pressing issue is to reconcile sustainable tourism's goals with environmental protection. An even more challenging task is to promote tourism partnership with local communities.

Since 2001, Nar and Phoo, another promising tourism destination in Manang, has been opened for tourism. It is likely that the newly opened areas will provide better opportunities for viewing wildlife such as blue sheep, musk deer and occasionally snow leopard. However, these places still lack in tourism infrastructure in terms of accommodation, food, fuel wood and drinking water availability. Also, the trails of Nar and Phoo are short of trees and the trails are filled with dung pellets.

Since 1790s, the *Manangi* people have been involved in trade (van Spengen, 1987). *Manangs* that have access to national and international markets are engaged in export and import of goods; whereas others still living in the villages visit the *Tarai* for petty trade during the winter. Special trade privileges given to the *Manangs* provided a great opportunity for earning money and to build networks for further enhancement of trade (Subedi, 2007).

Labor Migration

Agriculture in Manang is affected mainly because of labor shortage. The crop sowing season between April and May, the harvesting season between September and October, and irrigation and weeding are labor intensive activities. During these periods, temporary migrants from neighboring districts such as Lamjung and Gorkha fulfill the seasonal demand for additional agricultural laborers. The situation of labor shortage is aggravated resulting from *Manangs* being involved in tourism during those two peak seasons, which happens to coincide with the sowing and harvesting period in the area.

Traditional Knowledge and Intellectual Property Rights (IPRs)

Traditional knowledge and natural resources are complementary phenomena essential to human development. Even though traditional knowledge represents an immensely valuable source of information, very little of this knowledge has been recorded.

Tibetan medicinal practice remains effective in Upper Manang. *Amchis* (Tibetan healers) provide health care in the villages, but do not charge any fee for treatment. The villagers help them in turn with farm work, particularly with plowing in spring, harvesting in autumn and livestock raising. An *amchi* doctor is a respected position in Manangi society and is not only regarded as a medical doctor but also a very strong community leader. Karma Sonam Lama is a senior *amchi* of the area and has been practicing Tibetan medicine for three generations. He is of the opinion that it is of utmost importance to conserve the traditional healing system and to pass this knowledge on the importance of medicinal plants to the next generation (Bhattarai *et al.*, 2006). Since *the amchi's* knowledge and profession are declining, they have underlined their interest in documenting the existing knowledge in Dolpa district for use by future generations (Lama *et al.*, 2001). Despite their invaluable and free health care service, the government in Nepal has never accorded the *amchis* any recognition for intellectual property rights; and *amchis* have received little or no material support for their profession. On the other hand, *amchis* in China

have been given national recognition and their profession has been institutionalized; similarly, in India *vaidyas* and *hakims* have been given legal privileges to collect medicinal plants for customary use.

Paradigm Shift and Future Considerations

Himalayan mountains comprise the most dynamic environment within the global ecosystem. Climate change in terms of global warming has been affecting the Himalayas for the last 150 years, and the pace has been accelerating for the last 30 years, as many of the mountain glaciers have thinned and retreated (Ives, 2006). The upper Manang comprises a dynamic cultural landscape. The bio-physical, socioeconomic and political-economic processes are closely interlinked, working in unison, and determine the management of cultural landscape and sustainable livelihood of that area.

Recent developments in Manang are related to the construction of road, which is considered in general to bring adverse environmental and social impacts at the local level. While the interest behind road construction for Manangis living in Kathmandu could be efficiency in travel to their home towns, local communities in Manang could be provided with other options such as growth of animal husbandry based industry and other increased flow of resources at the cost of local resource use (Aase, 2007). However, the mechanism through which the local population would cope with such global changes is beyond anticipation and is still seen as a huge challenge.

In future, new technologies and hybrid landraces for increasing agricultural productivity are expected to be introduced.

Conclusion

Manangis deal with global changes resulting from glacier retreat and international trade for sustainable livelihood through cultural landscape management that include natural resource management, diversification of activities involving a mixture of agricultural practices, animal husbandry, forest utilization, indigenous health practice, out-migration, cash income through tourism and selling forest products as well as maintaining strong social management practices.

In short, local knowledge of the *Manangi* people, traditional conservation practices and entrepreneurial skills are crucial to sustain cultural landscape, livelihood and production system in Manang. However, in future, these must be cautiously integrated with new technologies based on interdisciplinary research findings. Communities need to be prepared to cope with consequences that will arise from road construction and their impact on livelihood and conservation. In this regard, different adaptive strategies will need to be recognized and addressed by local communities. A paradigm shift in national development activities and international cooperation in the context of globalization and internationalization is required for maintaining a sustainable environment in Manang and to preserve the dynamic culture of *Manangis*.

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PARTICIPATORY MANAGEMENT OF PROTECTED AREAS OF BANGLADESH: PARADIGM SHIFT

Farid Uddin Ahmed¹

Bangladesh has 17 protected areas (PA) and five conservation sites (Table 1) which cover an area of 241,913 ha; an area equivalent to about 10% of the total forest and 16% of the total area managed by the Forest Department.

The Forest Department is the statutory custodian of the PAs. Management of these areas is governed by the Wildlife Act of 1974. Apart from the Sunderbans Reserve Forest and the three Sanctuaries declared under the Wildlife Act within this Reserve Forests, the Department has, until 2003, undertaken very few management activities within the remaining PAs, other than trying where possible to protect the areas.

Nishorgo Support Programme (NSP)

In 2003, the Forest Department launched the Nishorgo Support Project (NSP) which was designed to test a participatory approach to sustainable PA management, under a co-management approach in five pilot areas. The PAs are Lawachara National Park, Rema Kelenga Wildlife Sanctuary, Satchari National Park, Chunar Wildlife Sanctuary and Teknaf Game Reserve.

During designing NSP, the lessons learned from social forestry project in benefit sharing was used. Social forestry project in Bangladesh was started in early 1980s where the encroachers were involved in protection of forests through benefit sharing mechanism (Forestry Master Plan, 1993). This was started in plain land sal (*shorea robusta*) forests in northern Bangladesh with subsequent expansion of the approach throughout Bangladesh.

The NSP utilized the services of three nongovernmental organizations (NGOs) in organizing people, support technical capacity building in collaboration with Forest Department for protection of PAs, improvement of livelihood through different income generating activities and participatory monitoring.

The NSP is now in its fourth year of implementation, and has shown progress towards many of the project objectives and outcomes. A number of lessons have been learned, and are still being learned, from the efforts. The Forest Department has decided to expand this system of management in other PAs and selecting new potential areas to declare protected areas.

¹Executive Director, Arannayk Foundation, House 68, Road 1, Block I, Banani, Dhaka 1213, Bangladesh; farid@arannayk.org

Table 1A: Protected Areas of Bangladesh

S.N	A. NATIONAL PARKS	LOCATION	AREA (HA.)	ESTABLISHED
1	Bhawal National Park	Gazipur	5,022	1974/1982
2	Modhupur National Park	Tangail/Mymensingh	8,436	1962/1982
3	Ramsagar National Park	Dinajpur	27	2001
4	Himchari National Park	Cox' Bazar	1,729	1980
5	Lawachara National Park	Moulavibazar	1,250	1996
6	Kaptai National Park	Chittagong Hill Tracts	5,464	1999
7	Nijhum Dweep National Park	Noakhali	16,352	2001
8	Medha Kassapia National Park	Cox's Bazar	395	2004
9	Satchari National Park	Hobigonj	242	2005
B. WILDLIFE SANCTUARIES				
10	Rema-Kelenga Wildlife Sanctuary	Hobigonj	1,795	1996
11	Char Kukri-Mukri Wildlife Sanctuary	Bhola	40	1981
12	Sundarban (East) Wildlife Sanctuary	Bagerhat	31,226	1960/1996
13	Sundarban (West) Wildlife Sanctuary	Satkhira	71,502	1996
14	Sundarban (South) Wildlife Sanctuary	Khulna	36,970	1996
15	Pabla khali Wildlife Sanctuary	Chittagong Hill Tracts	42,087	1962/1983
16	Chunati Wildlife Sanctuary	Chittagong	7,761	1986
C. GAME RESERVE				
17	Teknaf Game Reserve	Cox's Bazar	11,615	1983
		Total	241,913	

Table 1B: Other Conservation Sites

S.N	D. NAME	LOCATION	AREA (HA.)	ESTABLISHED
1	National Botanical Garden	Dhaka	84	1961
2	Baldha Garden	Dhaka	1	1909
3	Madhabkunda Eco-Park	Moulavibazar	265	2001
4	Sitakunda Botanical Garden and Eco-park	Chittagong	808	1998
5	Dulahazara Safari Parks	Cox's Bazar	600	1999

Co-management System of Protected Areas

Under this system of management, the dwellers living within and around the forests were involved in protection of PAs with consequent

sharing of benefit arising from the PAs as well as through supporting their capacity building in other income generating activities. For management of PAs, all stakeholders of the localities were involved through formation of co-management council and

co-management committees. The number of co-management committees varied with the size of the Pas—the larger the size, the more the numbers. For example, in Chunati and Tekanaf, the number of co-management committees are 3 and 2 respectively. Thus in five pilot areas, there are five co-management councils and eight co-management committees (Bangladesh Gazette, 2006).

Co-management Council

There are a maximum of 55 representatives from different stakeholders. The stakeholders include civil society, local government, public sector organizations, social elites, journalists, religious leaders and freedom fighters. The council has a 15 member executive committee headed by the

Upazila Nirbahi Officer (convener). The Assistant Conservator of Forests of the area works as Member Secretary of the Council.

The representation of the Co-management Council is presented in box 1 and its terms of reference in box 2 below.

It may be mentioned here that to ensure representation of gender, it has been made mandatory of having at least 10 women members in the council. The executive committee of the council is elected for four years. The UNO is the convener and ACF/RO is the member Secretary of Co-Management Council as ex-officio members.

BOX 1 REPRESENTATIVES OF THE CO-MANAGEMENT COUNCIL

Member of Parliament Municipal Chairman Union Parishad Chairman and others	Advisor Member 13 (at least one woman)
Social elite, Teacher, Doctor, social worker, journalist, religious leader and freedom fighter:	6-8
Upazila Nirbahi (executive) Officer	1
Asst. Conservator of Forests/Range Officer	1
Law Enforcing Agency such as Police, BDR, Ansar and VDP	2
Resource user group: RUG	9
	6
Resource owner group (brickfield owner, saw miller, furniture and timber businessmen)	3
Minority/tribal people	2
Local youth group representatives	2-4
Beneficiaries	2-4
Local NGOs/Village Based Organizations	
Others such as Department of Agricultural Extension (DAE), Department of Livestock (DLS), Department of Fisheries (DoF), Department of Land (DoL), Health Service, Department of Social Welfare, Department of Youth, and Bangladesh Rural Development Board (BRDB)	4-6

Co-management Committee

The co-management committee is represented by members from the local government, Forest Department, civil society, resource user groups, resource owners, tribal and minorities, law enforcing agencies, NGOs and other government departments related to agriculture (box 3).

This committee is formed for two years and any member can be elected for any position for a

maximum of two terms. The committee will elect one President and one Vice President and one Treasurer. The ACF/RF will act as Member Secretary of the committee. The Member Secretary and Treasurer will jointly operate the funds. They will establish their own office for the co-management committee. One Accountant cum Administrative Officer will be employed by the committee for full time to provide logistic support to the committee. The expenditure of the committee is audited annually under the guidance of the Advisor.

The specific terms of reference of the Committee is presented in box 4.

Co-management under Nishorgo: Lessons learned

Organizational Capacity Building

Involvement of stakeholders from the planning phase. Co-management council and co-management committees were formed after the NSP was launched. Consequently, the interventions to support protection of PAs did not have enough consultation with different stakeholders with consequent lack of

BOX: 2 TERMS OF REFERENCE OF CO-MANAGEMENT COUNCIL

- The members will have an Annual General Meeting and in addition one meeting a year.
- Review annual work plan and provide necessary feedback to finalize the plan before submitting to the DFO
- The committee shall discuss on issues related to problems of protection and develop mitigation measures
- Advise co-management committee on management of protected areas
- Oversee the distribution of benefit to the resource users group
- Approve work plan of co-management committees
- Negotiate any differences of opinion of committee members

BOX: 3 REPRESENTATIVES OF THE CO-MANAGEMENT COMMITTEE

Upazila Nirbahi (executive) Officer (UNO)	Advisor
ACF/RO	Member Secretary
LG representative (with at least one woman)	3-4
Civil Society Members	2-3
Local Youth Representatives	2
Resource User Groups	2
Resource Owners	2
Minority and tribal people	2
Law enforcing agencies (Police, Ansar, VDP)	1
Other govt. dept. (DAE, DLS, DoF)	2
NGO	1

**BOX: 4 TERMS OF REFERENCE OF
CO-MANAGEMENT COMMITTEE**

- Act as Executive Committee of Council
- Liaise Resource Users Group (RUG) with Forest Department
- Distribution of benefit judiciously to the RUG
- Assist Forest Department in employing laborer as and when necessary
- Assist in developing project proposal and raising fund for development of areas in and around the PAs
- Development of action plan and incur expenditure with approval from DFO
- Maintain accounts of expenditure and auditing by the appropriate organization with support from adviser
- Protect forests and execute any other emergency works after approval by the DFO
- Resolve conflicts between Forest Department and people from the neighboring areas

understanding and trust. Any interventions in new areas should precede formation of council and committees followed by the development of work plan and resource allocation. Specifically, this means that monthly, quarterly, and annual work plans should be developed jointly by the Co-management Committee and the local Forest Department, with the implementing NGO only as a facilitator.

Continuity of local Forest Department staff at site until duration of the project

In the public sector, there is a system of transfer and posting every three years. This erodes institutional memory which is important for specialized activities like PA management. It has been found that many of the staff, after having proper training on working with people in managing forests were transferred to other

territorial divisions and were replaced with new staff with no prior experience with working with people. It is thus necessary that under any new project, the Forest Department staff take steps to ensure that local staff are posted to the same area throughout the project duration.

Development of participatory management plans

The preparation of management plans for the five PAs took, literally, years of effort, discussion and vetting. Now, all five Nishorgo pilot site management plans have been approved. The experience of developing management plans may be used to develop plans in new areas at a faster rate. The Bangla language Nishorgo “Simplified Management Plans” provide an excellent starting point for opening a dialogue with the Co-management Committees and other stakeholders for new areas.

Delegation of authority to ACF

From early on in NSP, it was recognized that a fruitful dialogue with the members of the Co-management Committee/Council would require an ACF-level officer. This is in part because on average, Range Officers do not have the academic qualification or social standing to be able to dialogue directly with the more elite members of the Co-management Councils, including UP Chairmen, UNO, and local elites. Under NSP, this created the cumbersome and inefficient situation (in the absence of an ACF) in which the Range Officer had to defer substantive dialogue with the Council until a DFO or more senior officer was present. Now that NSP has begun posting ACFs to many of the NSP sites, in most cases acting as the Member Secretaries of

the relevant Councils, this dialogue is proceeding more effectively. Future interventions should ensure that this level of officer is present from the beginning and given authority of giving decisions and financial delegations.

Joint patrolling by Forest Department and co-management committees

Unless Forest Department staff are involved from the beginning of the project, any new staff posted under PAs views patrolling by the Co-management Committees as over-exercising their authority and snatching the authority of the Forest Department. To avoid such jealousy, it is better to ensure from the beginning that “joint patrols” include a minimum of one staff from the local Forest Department at all times and report regularly to the Council on status of patrol work. NSP has shown that community members can be engaged as partners to the Forest Department in patrolling.

Initial site appraisal including PRA, RRA, socioeconomic data collection and biophysical data collection. NSP initiated field level programs after proper assessment of the site (physical and social environment). It took quite sometime in the beginning (about a year) to develop the format of appraisal. Now, a procedure has been developed and implemented which includes initial rapid rural appraisal followed by participatory rural appraisal at all the sites. Subsequently, socioeconomic surveys were developed and implemented, and these have provided further detail on the sites. In general, it takes five months to complete total assessment of sites. Any future interventions should plan initial five months for total site assessment.

Develop initial rectified land use and land cover maps. One of the shortcomings of the NSP approach as applied was that local stakeholders were not engaged early in a participatory mapping process, in which they actually got out into the forest and saw its status, potential and level of destruction. This didn't happen under NSP in part because base maps of any kind were not available, but also because the “key” stakeholders were not clear. Later NSP utilized Centre for Environmental Geographic Information System (CEGIS)—an organization specialized in developing base GIS maps. The organization has developed expertise working with NSP and now can produce base maps and subsequent maps capturing developments over time. The same organization may be used for any new area. This will have a great benefit in building awareness.

Undertake flora/fauna inventories through small grant support to MS/PhD student. The tendency of the selected implementing NGO will be to want to undertake detailed inventories of flora, fauna or other natural attributes of the target site. The NSP approach has made it clear that many graduate students at reputed universities are interested to undertake such surveys as part of their research requirements. The project can provide small grants for such research. The Forest Department staff can oversee these surveys but it would be unwise to expect Forest Department officers to lead such studies, given their other commitments.

Identification of core indicators from the start. NSP has been using five basic indicators of forest quality which include population of

flagship birds; basal area; geo-referenced photographs; illegally felled trees; and forest biomass. The methodology for these indicators have been completed and adequately described. These indicators have been found to be effective for overseeing the improvement of PAs.

Awareness on the rights being given to co-management councils

The Councils have been relatively slow to “take up their cause” under Nishorgo for the good reason that they have not been clearly aware of what rights they have been given. At the time of the release of the Government Order in 2005, Council members recognized that the Government had taken a clear step in granting them some rights. But it has taken time to understand and internalize the real and tangible meaning of those rights. In any new areas of intervention, the participants may be advised to have cross-visits which will allow cross-fertilization in discussions about specific rights in mobilizing the communities to take an active role in PA management.

Gender in ensured committee positions, community-wide technology dissemination and day forest patrolling and protection

NSP has identified a number of ways in which women can be more actively involved in co-management from the early phases of implementation. This is important not just for reasons of equity or justice, but more importantly for the success of co-management—because women in the interface landscape have a strong role to play in determining the rate and nature of

extraction of wood from the PAs. Under the NSP, there is a requirement of no less than 10 women in the Co-management Council but there is no minimum number of women in the Co-management Committee which may be set in any future interventions. NSP identified a number of technologies (see discussion of AIG below) that are particularly appropriate for women and in their interest. And, finally, as NSP has moved forward, it has become clear that women may also be involved in patrolling and protection of the PAs.

Using existing groups in formation of Resource User Groups

There are many NGOs already operating in the different forest areas where they provide credit support for different income generating activities. The noteworthy NGOs are BRAC, ASA and SHED. In new areas, the implementing NGO need not start from scratch in forming a federated body of poor user groups. Rather, these existing group members can be brought together from the earliest part of the project, with the understanding that they will ultimately have a role to play in the Co-management Council and possibly Committee. This will require that the implementing NGO(s) be monitored so that they do not spend as much time as they might otherwise wish in the formation of their “own” user groups. There seems to be a tendency for field NGOs to create their “own people” using the resources of a project, and while there is no inherent problem with this, it would not be the most efficient means of reaching large numbers of poor and giving them a voice in the governance of the PAs.

Alternative Income Generation

Support for alternative income generation to those involved directly in patrolling

Under the NSP, early recipients of support for alternative income generation were typically poor women and men from the PAs. While this was laudable, it became increasingly clear that these people had no other direct relation to the PAs under Nishorgo than that they typically consumed or extracted produce from the core zones of the PAs. The initial idea under NSP was to provide these poor households with an alternative, and to keep doing so for all the poor of the areas around the PA. But over time, it became clear that even providing alternatives to those would not stem the demand of hundreds and thousands of extractors, both commercial and household-based that would continue to come to the forests to extract resources. It thus became increasingly clear that direct protection and patrolling measures would need to be taken in all five of the PAs. As a corollary to this, it became clear that those selected to be directly involved in patrolling and protection of the PAs (the “community patrols” or “joint patrols”) should be the primary beneficiaries of all alternative income generation.

Support for alternative income generation was given to the patrol group as well as communities dwelling around the PAs. Common programs were home gardens, cow, beef, pig fattening, poultry or egg production, etc. It was envisaged that the communities and Resource User Groups could be effectively kept away from forest destruction through improving their livelihood options by enhancing their capabilities for income

generation. Some programs like improved homestead management, commercial bamboo cultivation, fuelwood production and other agroforestry interventions were more cost effective. Health and fuelwood related interventions such as the improved *chula* (stove) was used at all Nishorgo sites. These can be extended throughout the community, without being restricted for economic or technical reasons to the already formed Resource User Group members.

Microfinance

In Bangladesh, most of the NGOs operate microfinance along with other technical programs to support community based organizations. Though it has many merits such as providing sustainability of NGOs, people dwelling around forests who are very poor need more focus on managing natural resources and patrolling the protected areas rather than credit support. So, in new areas microfinance support should be excluded. However, where microfinance is needed, it can generally be obtained via an MOU with the Forest Department.

Invest heavily in diversity of NSP-supported social forestry models in the bordering Reserve Forests of the interface landscape

When NSP began, the only models of social forestry under consideration for use at NSP pilot sites were those developed under the Forestry Sector Project and earlier social forestry projects. None of those models were designed to support long-term reforestation of target lands, but rather ended at 10 year rotations with clear felling of the target area. Under NSP, a variety of

conservation oriented social forestry models have been developed, all of which require that at the end of the rotation period, a certain number (~ 380/hectare) of locally appropriate species are left intact after final rotation felling. At this point, NSP is experimenting with different models of social forestry that may allow different benefit formulas than the standard one of the Forest Department's social forestry, under which one family gets one hectare of land.

Landscape Development Fund

NSP has a component called Landscape Development Fund which encourages the Resource User Groups to invest in different roadside plantations with their fund and draw more benefit by the group. Past social forestry practices provided all costs for establishing plantation while the participants received benefits for taking care of the plantations. This system did not replicate in areas other than Forest Department projects.

Capitalize on the community-based tourism approaches

NSP has now implemented a host of community-based approaches in capturing revenue from ecotourism. These include small "eco-cottages", tourism sale stores, eco-guiding by young men and women, sales of Nishorgo specific products (postcards, t-shirts, hats, etc.), and others. One important element of this approach has been the direct involvement of private tour operators (e.g., Guide Tours, Bengal Tours, etc.) in site visits and related activities. These public-private partnerships can be particularly helpful.

Require value chain approach through all enterprise activities.

Under NSP, important lessons have been learned about product design, development and sale of products made locally; whether ecotourism products or handicrafts or even such things as commercial bamboo and stoves. One observation that can be made during the time of implementing NSP is that each partner, whether an NGO or Government institution, seems to be convinced that ecotourism generates revenue for the community.

Other alternative income generating and diverse support

The Committees identified a wide range of activities that have relatively less direct impact on the PA, such as establishment of libraries, computer purchases, environmental education training programs, bee-keeping courses, and other activities.

Improve the Policy Framework

Sharing of entry fees with the community

NSP envisages sharing the entry fees at PAs when managed for ecotourism. It has not yet obtained approval for the retention of entry fee benefits at the local level, but a great deal of progress has been made in this regard. This request for approval of such entry fees can take place immediately upon official recognition of the Co-management Committees by the Government.

Management of PAs by Wildlife Division in new areas

As NSP has progressed, it has been made more difficult by the fact of some confusion between territorial and wildlife divisions. In some cases,

the territorial division works in the Reserve Forests of the interface landscape, while the wildlife division works only in the core zone. In order for the new PAs co-management to succeed, it is critical that the lines of management responsibility be in the hands of ONLY one division of the Forest Department, and that this division has authority not only over the core zone, but also over the reserve forest in the interface landscape.

Leave a perimeter of Reserve Forest around the edges of the PAs for social forestry. One of the recurrent problems of NSP has been that some of the PAs do not have any nearby Reserve Forest on which social forestry can be undertaken and benefits shared with key stakeholders such as those patrollers that need to protect the core. It is critical that a perimeter of these Reserve Forest be excluded so that future beneficiaries can organize social forestry activities on those lands.

Institutional Capacity at Forest Department and Stakeholders

Retaining field staff to ensure posting for the duration of the project. One of the lessons emerging from NSP is that the introduction or replacement of Forest Department field staff (Guards, Beat/Range Officers) causes important interruptions to the implementation of the project. This is because the Nishorgo co-management approach is fundamentally different to this level officer, and is in any case a new approach across the Department. The cost of orienting a newly arrived local Officer is not just the time needed to run a relevant course but also the time required for him to develop personal

relationships with key stakeholders on the Co-management Council and Committee.

Usefulness of courses developed by NSP. Some training courses have been developed for orientation of the staff. These include:

- ▶▶ 5 day orientation course for Range/Beat Officers
- ▶▶ 3 day course for Forest Guards
- ▶▶ 5 day course for training of local Eco-Guides (this includes different sub-modules)
- ▶▶ 5 day course for orientation of Field Organizers of implementing NGO
- ▶▶ 3 day course on replication of native forest species
- ▶▶ Many practical training course materials on: nursery development; pig/goat/cattle rearing; home garden development; etc.
- ▶▶ 3 “Learning Modules” developed for use of the CMCs and covering the following topics: management plans; impact monitoring; and, Landscape development grant fund.

There is no need to redo all these courses, or for any implementing party to redesign them, since they can all be adapted from the NSP archives.

Build in costs of stakeholder cross visits to existing co-management sites. It has been NSP’s experience that cross visits to other areas where versions of co-management are being tested account for an important amount of awareness raising of the limits of power and authority that communities can bring to the PA management process. Under NSP, cross visits were undertaken between NSP sites and also between NSP sites and co-management sites in West Bengal in India. These cross visits were both cost effective and

extremely helpful in building social awareness amongst CM Council and Committee members. The cross-visit can be abroad too such as West Bengal or perhaps other parts of India or Nepal.

Visitor Services and Infrastructure Development

Sequence the construction activities to provide services early on to the first tourists. It is vitally important to develop a medium-term tourism development plan. This should allow for nearly immediate installation of certain vital tourism services in key areas. Such vital and urgent services include toilets, minimal trail improvements, and road sign boards. All of these are essential to providing basic services to initial tourists, who are themselves critical to sending a message to local people that conservation can be good for business, and vice-versa.

Architecture and small-size construction. Under NSP, considerable effort was made to ensure that architectural approaches were consistent with an aesthetic of nature, useful to tourists, and as lasting as might be expected. To this end, designs were executed and vetted for buildings including student dormitory, ACF bungalow, staff barracks, staff quarters, and a Visitor Education Center. In addition, a separate set of guidelines were set out for all other construction to be used in the PAs (signboards, milestone markers, toilets, creek crossings, etc.). These guidelines and architectural specifications may be used at other sites.

Rehabilitation and Restoration in the Targeted Pilot Landscapes

Availability of seedlings for habitat restoration from local nurseries. Each year, the limited number of

Forest Department staff and *mali* (gardener) create nurseries for production of whatever seedlings they expect to use for the following year's plantations or restoration. However, it has become evident during NSP that many or most of these seedlings could be provided by local nurseries with proper training and enterprise development support.

Budget for restoration should not be made on the basis of trees to be planted. In the design of the NSP, the costs allocated for habitat restoration were considerably less than they should have been. In general, it can not be calculated based on the number of trees to be planted; rather the cost is higher than the actual planting cost. Future projects should include more ambitious plans for habitat restoration; no less than double of what is required for normal plantations.

Conclusion

The new approach of PA management has been found effective in terms of gradual increase of wildlife and birds; particularly Red Jungle Fowl (*Gallus gallus*) and Puff-throated Babbler (*Pellorneum ruficeps*) in the lower strata as illicit felling has been reduced significantly over the past four years with consequent recruitment of new vegetations to provide niche for the birds. The number of trees that were removed through illicit felling has been reduced significantly due to strong patrolling. Bangladesh is seriously considering extrapolating the experience of participatory management of PAs in other areas. Arannayk Foundation—Bangladesh Tropical Forest Conservation Foundation is going to collaborate with the Forest Department in their efforts to extend these lessons in new protected areas.



THE MANAGEMENT OF PROTECTED AREAS AND PROMISES IN BIODIVERSITY CONSERVATION IN BANGLADESH: A REVIEW

Dihider Shahriar Kabir¹, Farid Uddin Ahmed² and Md. Naycemul Karim¹

ABSTRACT

Bangladesh possesses firm commitment to the Convention on Biological Diversity. Bangladesh has already promulgated national legislations and policies to strengthen biodiversity conservation both in forests and outside forests. Bangladesh has declared 17 notified Protected Areas (PAs) that have been designated as wildlife sanctuaries, national parks and game reserves. Apart from the 17 PAs, Bangladesh has also declared five other Conservation Sites (CS) and eight Ecologically Critical Areas (ECAs). The PAs cover an area of 241,913 ha today (excluding CS and ECAs) which is 10 % of the total forest area and 16% of the total area managed under the jurisdiction of the Forest Department (FD). On the other hand, they represent almost 2% of the total area of Bangladesh; that are the home of rich biodiversity.

To conserve biodiversity on site, Bangladesh has taken a pilot project in five PAs where co-management is being initiated to bring forest dwellers, other stakeholders and FD staff under the same umbrella of conservation management. This paper critically reviews the present status of PAs of Bangladesh in general and outcomes of the current initiatives in the five pilot PAs. In addition, other interventions to institutionalize the operation of ECA management by the Department of Environment (DOE) and to ensure sustainable use of globally significant fresh water and coastal biodiversity works are in progress.

This paper reviews different approaches of conservation management, identifies strengths and weaknesses of PA governance and sustainability, and recommends new areas for PAs and ECAs. In addition, it recommends specific studies and policies for conservation of tropical biodiversity. This paper also reveals that co-management of PA started showing signs of improvement in vegetation cover in lower stratum which is evident from the increased population of two species of lower stratum birds like Red Jungle Fowl (*Gallus gallus*) and Puff-throated Babbler (*Pellorneum ruficeps*). In the ECAs there are tremendous challenges to operationalize management. Nonetheless, active participation of local stakeholders for sustainable use of biodiversity has been successful.

¹School of Environmental Science and Management, Independent University, Bangladesh; Email: dshkabir@iub.edu.bd

²Arannyk Foundation, House 68, Road 1, Block I, Banani, Dhaka 1213, Bangladesh; farid@arannyk.org

Introduction

An estimated 4,500 species of angiosperm alone are present in Bangladesh according to a pioneer taxonomist Professor Salar Khan. In addition, the country harbors about 2,018 species of animals; of them about 113 species of mammals, over 630 species of birds, 125 species of reptiles, and 22 species of amphibians. In addition 260 freshwater species and 475 marine species (IUCN, 2000) have been identified. It is noteworthy that faunal species include 327 mollusks and 66 corals. The number of insect species is not available but it is highly diverse.

Wildlife Act 1974 (Preservation) (Amendment) provides the legal framework for Protected Areas (PAs) in Bangladesh. Bangladeshi legislation and policy also provide firm commitment for protection of its rich biological heritage. In addition, Bangladesh is a signatory of to the Convention on Biological Diversity (CBD); and many international conventions and protocols. Article 8 of the CBD provides emphasis on in-situ/ecosystems conservation through PAs. Hence, Bangladesh has designated a total of 17 PAs till date. The PAs have been designated wildlife sanctuaries, national parks, and one game reserve (IUCN, 1990; Ali and Habib, 1998; Kabir and Muzaffar, 2002) and few others are proposed. The PA system in Bangladesh includes 9 national parks, 7 wildlife sanctuaries, and 1 game reserve (FD, 2005). In addition, there are 5 other conservation sites that have not been designated into any of the above three categories. Hence, there are 22 PAs in Bangladesh of which 17 are under legally recognized categories. Nonetheless, they cover only 4 distinct bio-geographic zones: (i) Tropical Evergreen and Semi Evergreen

Forest, (ii) Dry Deciduous Forest, (iii) Sundarban Forest, and (iv) Reed Land Forest/ Wetland (Rozario, 1997a).

The PAs falling mainly under IUCN categories IV and V and VI cover an area of 241,913 ha, which is 10% of the total forest area and 16% of the total area managed by the Forest Department (FD). In addition there are additional Conservation Sites (CS) and Ecologically Critical Areas (ECAs).

However, the Forestry Master Plan (1993) recognizes that the present PA system fails to include all the ecosystems that occur within Bangladesh and specifically points out that the fragile fresh water and coastal habitats need to be included in the PA system of the country. These wetland ecosystems are extremely important as they provide habitat to a wide variety of resident and migratory waterfowl and supports subsistence and commercial fisheries. The good news is that eight important wetlands, sandy beach systems, and island ecosystems have been further classified as ECAs for their value as centers of high biodiversity. The baseline survey and other works are in progress by a project named Coastal and Wetland Biodiversity Management Project. However, the Wildlife Act (Preservation) (Amendment) 1974, (article 23), provides a legal basis for declaration of wildlife sanctuary, national park, and game reserve only. No other acts or legal documents of the government regard the ECAs as protected areas in line with international standards developed by the IUCN. Nevertheless, the Environmental Conservation Act (1995) provides some legal basis for the declaration of ECAs.

This paper also reviews different approaches of conservation management of, identifies strengths and weaknesses of PA governance and sustainability and recommends new areas for PAs and ECAs. In addition, it recommends specific studies and policies for conservation of tropical biodiversity.

Objectives

To analyze the needs and practices that are essential for better governance and protection of biodiversity within PAs and ECAs, the following are the objectives:

- ▶ To review different approaches of conservation management, and identify strengths, sustainability and weaknesses of PA governance;
- ▶ To discuss the present status of PAs and ECAs, and conservation management after the inception of Nishorgo and Coastal and Wetland Biodiversity Management projects where bottom-up approach has been prioritized; and
- ▶ To recommend specific studies, projects, programs and policies towards conservation of tropical biodiversity.

Methods

All relevant studies, project reports, and available literature were consulted to compile information on PAs and ECAs. Therefore, the information that has been highlighted in this paper is mostly based on secondary data. However, the authors' academic and research studies data have also been used. In addition, personal observation and communication with relevant officials, researchers and nongovernmental organization have also been utilized in writing this paper.

Perspectives on Forest Management and Protected Areas

During ancient and medieval times in South Asia, forest management was largely participatory and inclusive of the local communities' socioeconomic needs. The first comprehensive Forest Act was established in 1927 under the British rulers. The Bangladesh Wildlife Preservation Ordinance of 1973 was aimed at achieving better management of PAs as well as preserving the local biodiversity. The Forestry Master Plan was enacted in 1993; this was followed by the People-oriented Forest Policy of 1994. Wildlife Act 1974 (Preservation) (Amendment) provides the legal framework for PAs and its management in Bangladesh. The FD works on separate management plans for the PAs, though they are rarely implemented, because of a lack of resources and proper management capacity. The increased commercial extraction of forest products, forest land encroachment due to rising population needs, and illegal timber felling are all threatening the existence of PAs and the biodiversity therein. The above reasons lead to the conclusion that biodiversity conservation priorities cannot be set in isolation from local forest resource use and development priorities because of the traditional dependency on forests and the local biodiversity.

On the other hand, wetland ecosystems are rich in biodiversity and have huge environmental and economic values; however, their ownership pattern is different than that of forests. Management of these wetlands was largely participatory and inclusive of the local peoples' socioeconomic needs since historical times. There had been a harmony in resource use in

these ecosystems although the customary harvesting systems are yet to be documented. The management regime has been changed and the participatory management of wetland ecosystems no longer exists.

Bangladesh has a total of 17 notified protected areas till date and a few others are in the process of being notified (Table 1). In addition to these PAs there 5 conservation sites:

- (i) National Botanical Garden (84,21 ha)
- (ii) Baldha Garden (1.37 ha)
- (iii) Madhabkunda Eco-Park (265.68 ha)
- (iv) Sitakunda Botanical Garden (800 ha)
- (v) Dulahazara Safari Park (600 ha)

Moreover, Hazarikhil Wildlife Sanctuary (2,903), Sango Mouza Elephant Sanctuary, and Inani Protected Forest are three proposed PAs.

Only the Sundarban West wildlife sanctuary meets the category of PA (at least 5,000 ha as per Mackinnon and Mackinnon, 1986) while the other two wildlife sanctuaries: Sundarban and Pablakhai are close to the requirement. The other 13 PAs do not meet this area requirement. However, Mackinnon and Mackinnon (1986) opined that small reserves are easier to manage and protect; and active protective management measures can also be taken when species loss seems imminent. Therefore, both the systems have advantages and shortcomings and in a populous country like Bangladesh, it is a difficult choice. Buffering the reserves by the creation of corridors with similar habitats/areas close by or forming trans-frontier reserves with neighboring countries might be a suitable solution.

Silvicultural Techniques in Protected Areas

In Modhupur and Bhawal National Park where the deciduous plain land forest with Sal (*Shorea robusta*) are dominant, vegetation stocking is not carried out through any silvicultural practice. However, in the Lawachara and Satchari National Park of Sylhet, the first five year management plan recommended that the natural regeneration process be supplemented by enrichment planting of native species, as well as maintaining physical rotation.

On the other hand, the forest management practice employed in the Chittagong Division is clear felling with artificial regeneration of valuable species: Teak (*Tectona grandis*)—an exotic species that was introduced extensively throughout the forest including Chunati and Jaldi Ranges—and alien species like *Acacia auriculiformis*, *Acacia mangium*, and *Eucalyptus cameldulensis*. Presently the forests in this region are highly degraded so replanting is continuing under various projects and revenue budgets. But these exotic species are not suitable for wildlife sanctuaries.

In the Sundarbans selection-cum-improvement felling system is being employed to allow natural regeneration of the harvested areas. At Nijhum Dweep National Park and Char Kukri Mukri Sanctuary, the succession process has stabilized the although it is planted forests.

Natural regeneration of important species has been a principal focus since adequate regeneration is a fundamental criterion of sustainability; therefore in conservation

Table 1: Notified Protected Areas in Bangladesh and their Present Status

NAME AND STATUS	AREA (HA)	IUCN CATEGORY	YEAR OF NOTIFICATION AND BIODIVERSITY (FLORA & FAUNA)	REGION OF BANGLADESH AND BIO-GEOGRAPHIC ZONE
National Park (NP)				
1. Bhawal NP	5,022	V	1982; 224 & 64	Central (Gazipur), DDFBZ
2. Modhupur NP	8,436	V	1982; 176 & 60	Central Gazipur (Tangail), DDFBZ
3. Medha Kassapia NP	396	-	2004; Data insufficient	Southeast (Cox's Bazar), TESEFBZ
4. Himchari NP	1,729	V	1980; 117 & 65	Southeast (Cox's Bazaar), TESEFBZ
5. Nijhum Dweep NP	16,325	?	2001; 77 & 66	Southeastern part of Noakahali, SFBZ
6. Lawachara NP	1,250	V	1996; 222 & 286	Northeast (Moulavibazar), TESEFBZ
7. Satchari National Park	243	-	2005; Fauna-227, Flora- Data insufficient	Northeast (Moulavibazar), TESEFBZ
8. Kaptai NP	5,464	-	1999; Data insufficient	Southeast (Chittagong Hill Tracts), TESEFBZ
9. Ramsagar NP	52	-	2001; Data insufficient	Northwest, (Dinajpur)
10. Rema-Kalenga WS	1,795	V	1981 and extended in 1996; 167 & 250	Northeast (Hobiganj), TESEFBZ
11. Chunati WS	7,761	V	1986; Data insufficient	Southeast (Chittagong), TESEFBZ
12. Pablakhali WS	42,087	V	1983; Data insufficient	Southeast (Chittagong Hill Tracts), TESEFBZ

Table 1: Notified Protected Areas in Bangladesh and their Present Status

NAME AND STATUS	AREA (HA)	IUCN CATEGORY	YEAR OF NOTIFICATION AND BIODIVERSITY (FLORA & FAUNA)	REGION OF BANGLADESH AND BIO-GEOGRAPHIC ZONE
13. Char Kukri Mukri WS	40	V	1981; Data insufficient	Southwest, (Bhola), SFBZ
14. Sundarban East WS*	31,226	IV	1996; Data insufficient	Southwest (Bagerhat), SFBZ
15. Sundarban South WS*	36,970	IV	1996; Data insufficient	Southwest(Khulna), SFBZ
16. Sundarban West WS*	71,502	IV	1996; Data insufficient	Southwest(Satkhira)
Game Reserve (GR)				
17. Teknaf GR	11,615	VI	1983; 111 & 64	Southeast(Cox's Bazar), TESEFBZ

Source: Adopted from Rosario, 1997a; Kabir and Muzaffar, 2002; and Forest Department, 2005)

Notes: *Also designated a World Heritage Site and a Ramsar site and Ecologically Critical Area

SFBZ = Sundarban forest bio-geographic zone; TESEFBZ = tropical evergreen and semi-evergreen forest bio-geographic zone; DDFBZ = dry deciduous forest bio-geographic zone.

management plan it should be given priority. Furthermore, keystone species which provides critical food resources that support frugivorous organisms has not been adequately explored neither in production or protective forestry practices. It was suggested that indigenous long rotation trees be planted in the PAs along with species which provide food and shelter for wildlife at regular intervals. The reproduction biology and seasonality of reproduction should also be taken into consideration in silvicultural operations.

PA Management Practices

Many conservationists argue that corruption is the most notable problem hindering conservation efforts in Bangladesh. However, it would be helpful to look at the causes of forest corruption, and possible remedies. A noteworthy contributor to corrupt practices in the forest sector is the de-facto forest policy as per Pilhilippe and Istique (2007) that has put a high priority on the generation of non-tax revenue from forests for the government budget. In essence, the department, as it operates now, pays for itself. This may seem sensible to someone responsible for reducing government expenditure, but the policy has had a strongly negative impact on the forests; hence a reduction in reserved forest land. The fact that higher-level political actors have benefited from the tree felling business explains why this revenue generation from timber continues. The means of generating this government revenue are well known, and include: (i) proceeds from felling operations, (ii) auction revenue of seized timber, and (iii) issuance of permits. While these are all legal operations, any forest officer will find these

processes a perfect means of aligning public and private interests. Permits given for legal felling operations can be abused, as can operations of transit checkpoints.

Since no legal felling operations can be undertaken in land under the Wildlife Act (all PAs), forest officials see them as “free for the taking”, encouraging and carrying out corrupt practices (Pilhilippe and Istique, 2007). The National Forest Policy, 1994 (Amended) refers to the importance of managing forests for the people, and for wildlife. But the policy is ambiguous—it includes 28 different thematic “statements” on widely varying subjects. However, the civil society urged a more “pro-people” forest policy and legal framework. Therefore, the revenue generation focus of forest management is not appropriate; rather it needs a massive change.

It is a fact that traditional forest management practices which are based on top-down approach is not successful. A new flourishing concept is co-management where the approach of management is the reverse—bottom-up or participatory management. The simple concept of co-management has recently started in Bangladesh and was inspired by the vision of village forests, whose basic essence is that the villagers of the forest would be responsible for its protection with guidelines provided by the government.

Conservation Management issues have been identified and Conservation Plans developed for all national parks and wildlife sanctuaries and game reserve except in Meda Kassapia.

Nonetheless, other than Nishorgo managed sites, the management regime has been similar to that of productive forests in twelve other PAs.

Co-management Under Nishorgo Support Project and Tourism Management

Co-management approach is being piloted in the five forest patches of greater Sylhet and Chittagong districts. Lawachara, Satchari, and Rema Kalenga of greater Sylhet district; and Chunati and Teknaf of greater Chittagong district are notified national parks and wildlife sanctuaries under Nishorgo's pilot sites.

“Nishorgo” is a donor aided project under the FD. Nishorgo aims at achieving management agreements between the forest department and local communities, and other key partners, as well as communicating the rules and policies to the respective stakeholders. Some activities undertaken are establishment of billboards and display centre, marking trails (3 types) and hiking, community patrolling, co-management council formation, and construction of eco-lodge and training guides. Habitat management and controlled extraction of resources is also a key feature of the project. Successful practices such as formation of a committee composed of local stakeholders in each of the pilot sites have been demonstrated. The proposal to share the entry fee with the local stakeholders seems like a new mechanism for sustainability after the project life but it is yet to be approved by the government.

The FD is valiantly trying to protect the forest, but in essence they lack the manpower and

resources and in some areas illegal logging is still prevalent. The FD is operating under the concept that “if we let the people who are living in the forest area take charge of the protection of the forest, they would think it as a part of their own property, and who does not want to save his or her own property?” But there is a discord among the locals and the government regarding the agreement on locals receiving remuneration for their efforts. Villagers in Satchari National Park claim that this has not happened. Furthermore, the forests are a good picnic spot for tourists, and at times, they even go into the core zone. The formation of committees is indeed a new concept in Bangladesh but its functionality is yet to be evaluated.

Ecologically Critical Areas and Coastal and Wetland Biodiversity Management Project

Bangladesh possesses many *haors* (large wetland complexes) and *beels* (small wetland areas). An estimated 4,116 marine PAs cover over 1.6 million square kilometers. However, this represents less than 0.5% of the seas and oceans within Bangladeshi territories. Freshwater and coastal wetlands of Bangladesh are the home of many globally threatened plants and wildlife. They are also the providers of numerous tangible and intangible services from an ecological as well as economic point of view. However, due to indiscriminate exploitation of wetland resources, and inadequate management initiatives, these unique ecosystems of Bangladesh have reached a critical condition both structurally, and functionally. In depth analysis of physical environment, location, area, floral and faunal diversity, ecological history,

habitats types, legal aspects and its implementation, past and present management structures and administration, access roads, trails and other infrastructure, tourism/eco-tourism, and identification of gap etc. are crucial for each ECA.

Considering the critical state of the ecosystem, Coastal and Wetland Biodiversity Management Project was started in 2003 with financial support from GEF-UNDP, under the implementing leadership of the Department of Environment (DoE). It was designed to establish, and demonstrate an innovative system for the management ECAs in Bangladesh, that will have a significant and positive impact on the long term viability of the country's biodiversity resources

and its management. The last 5 years of implementation has witnessed many successes and challenges.

Eight important wetlands, sandy beach systems and island ecosystems have been classified as Ecologically Critical Areas (ECAs) for their value as centers of high biodiversity (table 2). Faunal and floral survey has been completed in five ECAs—St. Martins Island, Himchari Coastal Belt, Tanguar Haor, Barind Tract and Chalan Beel; and two eco-parks have been established. However, they still do not represent all the ecosystems or bio-ecological zones of the country; thus further representative ecosystems need to be included under the PA network.

Table 2: Profile of Ecologically Critical Areas in Bangladesh

NAME OF ECA	DISTRICT LOCATION AND NOTIFICATION NO	AREA (HA)
Ten kilometre strip outside Sunderbans wildlife sanctuaries	Khulna, Bagerhat, Satkhira (PBM/4-7/87/99/245 and (PBM/4-33/38/99/263)	10 km radius from the edge of the Sunderbans wildlife sanctuaries
Cox's Bazaar to Teknaf sea front, including sandy beaches	Cox's Bazaar (PBM/4-7/87/99/245	10,465
Saint Martin's Island	Cox's Bazar (PBM/4-33/38/99/431	590
Sonadia Island	Cox's Bazaar (PBM/4-7/87/99/245	4,916
Hakaluki Haor	Maulvi Bazaar (PBM/4-7/87/99/245	18,383
Tanguar Haor	Sunamganj (PBM/4-7/87/99/245	9,727
Marjat Haor	Jhenaidah (PBM/4-7/87/99/245	200
Gulshan-Baridhara Lake	Dhaka (PBM/4-7/87/2001/839	Not mentioned
Total		44,281

From a bio-physical point of view, the ECAs are generally defined as unique ecosystems of Bangladesh that have structurally and functionally reached critical states due to overexploitation and inadequate management initiatives. On the other hand, from the legislative point of view, the ECAs are PAs, at least by declaration, that has been notified by a gazette of the DoE in 1999 under the Bangladesh Environmental Conservation Act (1995). Among the eight ECA sites declared under the Bangladesh Environment Conservation Act (1995), Coastal and Wetland Biodiversity Management Project is working in four. The project is supporting Department of Environment (DoE) to operate the ECA concept at two main geographical areas; one area in the southern part which includes three ECA sites is the country's biodiversity rich coastal zone (St Martin, Sonadia Island and Teknaf peninsula); and the other in the northeastern part is the largest and most important inland freshwater wetland area of the country (Hakaluki Haor).

ECAs provide a safe haven for commercial fish stocks as well as endangered species and offer alternative sources of income for local people—for example through tourism. Marine parks and fresh water wetlands therefore, act as an insurance policy for the future for both marine and fresh water life and local people.

Objective of the Project

The main objective of the project is to ensure the conservation and sustainable use of globally significant wetland biodiversity through management as ECAs and support DoE to

institutionalize the concept of ECA management using the experiences gained from the project demonstration sites. The detailed objectives are (i) To ensure the conservation and sustainable use of globally significant Coastal biodiversity at the Cox's Bazaar sites through their management as ECAs; (ii) To ensure the conservation and sustainable use of globally significant wetland biodiversity at Hakaluki Haor site through its management as an ECA; and (iii) To support efforts by DoE to institutionalize the concept of ECA management using the experience gained through the above demonstration sites

Current Activities of the Project:

- ▶▶ Regulatory frameworks developed, and the physical delineation for ECAs in Cox's bazaar and Hakaluki Haor
- ▶▶ Community Mobilization for ECA natural resource management in Cox's Bazar and Hakaluki Haor.
- ▶▶ Collection and use of ecological data for Cox's Bazaar and Hakaluki Haor
- ▶▶ Management plans for sustainable use of Cox's Bazaar and Hakaluki Haor are developed and urgent conservation measures undertaken
- ▶▶ Implementation of Project Start-up, Operation and Development

Strength and Weakness

International significance: The Bangladesh Environmental Policy (1994) clearly addresses the issues of biodiversity conservation in light of the CBD, which signifies the government's commitment to conserve the biodiversity resources of the country. Operationally the ECA

concept in Bangladesh is the follow-up of the commitment to the international community, which can be considered as one of the major strengths of these initiatives. On the other hand, although the ECAs in Bangladesh meet the criteria of being wetlands set by Ramsar Convention in 1973, only one site has so far been declared a Ramsar Site.

Gaps in Protected Area Governance

Although some of the following gaps have already been identified, they await implementation in the PA system in Bangladesh.

- ▶ Physical boundaries of some PAs are not well defined. Zoning was proposed in Rosario's plan, (Rosario, 1997a); and Forestry Sector Project's Action Management Plans but current state of PAs suggest it is yet to be implemented.
- ▶ Quantitative and qualitative information are not available for the newly declared PAs and information on floral and faunal diversity is scanty even for the older PAs.
- ▶ Lack of understanding of conservation issues, wildlife protection and management of protected areas by the Forest Department.
- ▶ Unsustainable harvesting of forest resources; including timber, fuelwood and bamboo from PAs has led to degradation of many of the forests.
- ▶ Continued pressures (e.g. fuelwood collection) on secondary scrub and grazing by cattle, is causing damage to the seedlings and preventing natural regeneration. Burning, collection of firewood and clearing of poles in undestroyed vegetation is preventing regeneration of the few remnant natural forests.
- ▶ *Jhuming* (shifting cultivation) which is associated with forest fires is the major factor for the destruction of PAs in the Chittagong hill tracts. Managing shifting cultivation is lacking.
- ▶ Lack of skilled guides to cater to tourists and visitors within the PAs except in Nishorgo sites. Lack of billboards to direct visitors on designated trails and other information in all PAs except in Nishorgo sites. Cooking and use of loud speaker is still allowed inside the PA premises. Lack of garbage disposal facilities and garbage management.
- ▶ Inadequate man power and lack of vehicles with the Forest Department has led to poor forest patrolling. Influential locals are teaming up with local Forest Department staff and contributing to illegal timber felling. However, Nishorgo has developed community patrolling; but the functionality of this new system is yet to be evaluated.
- ▶ Silvicultural practices and treatments are not systematic.
- ▶ The PA system does not cover all the bio-ecological zones within Bangladesh.

Recommendations

- ▶ Encourage in-situ conservation and bring all the representative ecosystems into the PA system
- ▶ Enforce zoning within the PAs and forests in general. Designate core zone, rehabilitation zone, multiple-use zone, recreation zone, special-use zone, buffer zone etc. Buffer zone

management programs focusing on alternative livelihood/income generating activities—which is a critical component of contemporary forest management approach—need to be given utmost priority

- ▶▶ Buffering the reserves by creation of biological corridors with tea gardens and similar habitats close by in case of PAs of greater Sylhet should also be prioritized. Forming trans-boundary reserves with neighboring countries should also be explored and developed.
- ▶▶ Forest surveys at regular intervals should be institutionalized. Geographical Information System (GIS) and remote sensing should be utilized to collect detailed baseline data and to monitor changes in forest cover. This is a powerful tool to understand the dynamics of forest degradation and regeneration.
- ▶▶ Data on insect diversity is scanty while data on microbial diversity and their role on the ecosystem is non-existent. Studies are needed on stocking pattern for vegetation, population study of fauna etc. Funds from the government are provided to conduct well defined justified need based researches and studies on different aspects of tropic levels, food chain, food web and functions of ecosystems as well as structure of ecosystems. Indigenous/ local species needs major attention in case of restoration.
- ▶▶ Independent assessment of forest policy and law should be carried out urgently since the British Colonial Forest Act (1927) is still the backbone of the existing forest law and it does not comply well with the current situation. Therefore, radical changes are necessary both at the policy front and legislations. Right-of-use of forest resources

such as non-timber forest products by primary stakeholders (upon documented knowledge on sustainable harvesting practices) should be accommodated by the law.

- ▶▶ Forest Management has followed a top-down approach over the years. It should be replaced with bottom-up approach. Participatory approaches building on mutual trust between local stakeholders, government, and conservationists need to be the basis for sustainable biodiversity conservation.
- ▶▶ Benefit sharing from the forest ecosystem must be ensured among the primary stakeholders. Reforms of existing governance are needed to accommodate the participation and also to uphold the interests of local stakeholders in co-management.
- ▶▶ Conduct research involving local/indigenous people to list down indicators that address the bio-physical and managerial attributes which are useful to governance of ecosystems approach. Understanding the knowledge of local stakeholders should be prioritized and it needs careful documentation.
- ▶▶ Recognizing the critical state of the wetland ecosystem, the Coastal and Wetland Biodiversity Management Project has already started work for the past five years with many successes and challenges. Nonetheless, Freshwater swamp forests have been neglected for long; therefore, conservation should be ensured developing some participatory institutions and regulatory framework and enforcing them.
- ▶▶ Climate change is inevitable in the modern world, so there is a need of developing adaptation strategies to address such upcoming challenges. More research is

needed on plant biodiversity, climate change and adaptation mechanisms.

- ▶▶ Vegetation stocking should be made available and based on this data specific silvicultural treatment should be applied in the PAs.
- ▶▶ Within short-term activities, a total cessation of clear felling is needed. This could be combined with selective cutting followed by natural regeneration. Ecosystem approach would also require an understanding of nutrient recycling to improve forest functioning.
- ▶▶ Forest fragmentation is a big challenge today. Trails, needed for ecotourism should use existing ones to minimize forest disturbance.
- ▶▶ The role of alien and invasive species and their impacts on ecosystems should be researched. Assessment of the risk of exotic species to ecosystems prior to introduction should be mandatory in the future. Plantations using fast growing native species should be encouraged.
- ▶▶ Awareness rising among communities living in and around the PAs is an important aspect of conservation management. Coordination among different organizations could serve as a starting point for restoration activities and good governance.
- ▶▶ Vehicles parking areas should be designated as soon as possible. The parking place must be restricted to somewhere close to the entrance.
- ▶▶ Immediate steps should be taken on developing waste disposal mechanisms. Local indigenous groups may be given charge of waste collection work.
- ▶▶ Improvements of watch towers by fixing binoculars will facilitate nature lovers to appreciate the PAs. Entrance fees may be

charged for both general entrance and for use of the watch towers.

- ▶▶ One Documentation/display/ interpretation center needs to be established in each PA, preferably at the main entrance. In addition, a website can be developed providing vital information on the PAs.
- ▶▶ Training local indigenous groups and preparing a number of them as freelance guides for PAs other than Nishorgo will empower them and facilitate the eco-tourism industry as well as conservation of the park.

Conclusions

What is a priority in regards to biodiversity conservation in Bangladesh is to encourage in-situ conservation and to bring all the representative ecosystems into the PA system. Proper zoning is yet to be made in forests in general; zoning however, must be ensured in the PAs as soon as possible. In addition, biological corridors should be prioritized and developed.

Reforms of existing governance mechanisms are needed to accommodate the participation and also to uphold the interests of local stakeholders in co-management. Ensuring documented indigenous and traditional knowledge in co-management is a big challenge but wherever possible would help further by involving locals and their initiatives in conservation of biodiversity. Benefit sharing from the PA ecosystems must be ensured among the primary stakeholders will help in developing trust and relationships based on respect between the local stakeholders, government and conservationists and thus foster sustainable biodiversity conservation efforts.

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Theme 3

Economic Tools for Biodiversity Conservation



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CREATING A VOLUNTARY CARBON MARKET FOR PROMOTING SUSTAINABLE FOREST MANAGEMENT

Kamal Banskota¹, Bhaskar Singh Karky², Ngamindra Daha³

ABSTRACT

This paper presents a concept on creating voluntary carbon markets for promoting sustainable forest management by linking forest management with economic incentives. Field data suggests that community managed forests contribute to emission reduction by biological sequestration of carbon albeit not being recognized for receiving payment under the current climate agreement. Hence, sustainable forest management has to rely on voluntary carbon market which has to be created in the first place. Review on voluntary carbon markets and retailers suggest that this market is more attractive than the Clean Development Mechanism (CDM) and is expected to grow globally with rising concerns on climate vulnerability. This paper also highlights the need for new institutional roles and services required for carbon intermediary to play so that this market attracts the private sector in the long run.

¹International Centre for Integrated Mountain Development (ICIMOD); kbanskota@icimod.org

²Research Fellow, ICIMOD and University of Twente

³Energy & Climate Change Coordinator, NTNC; ngamindra@gmail.com

Introduction

Emission from global deforestation range from more than 18% (Stern, 2007) to about 25% (IPCC, 2000) of the total global green house gases (GHGs) emission; the vast majority of this being emitted from developing countries in the tropics which the Kyoto Protocol (KP) does not account for and neither has any mechanism to control (Banskota, *et al.*, 2007). Monitoring biomass change in selected sites in the Hindu Kush Himalaya (HKH) region over three years in the field illustrates a significant role community managed forests can play in sequestering CO₂ from the atmosphere. However, using forests as a climate change instrument relies on the voluntary market which needs to be created in the first place. New institutional services with expertise in carbon finance are also required that result in reduced emission and increased flow of benefit to the host country. Creating a market and developing market based mechanism to reduce emission will create an opportunity to the public that are aware, concerned and voluntarily committed to reduce local emissions within the local economy.

This paper provides a concept on creating voluntary carbon market by highlighting the necessity for linking community forests with voluntary markets for reducing emission and also calls on the need for new institutional services to open this market. Such institutional support is even more relevant and urgent in the forestry sector where the momentum has not gained as in the energy sector and where policies regarding forestry as an instrument for climate change measure are still looming in uncertainty.

The concept presented in this paper intends to address three concerns in reducing emissions from community managed forests:

- (i) At the moment emission from deforestation is not under the control of the KP, hence there must be a mitigation action developed urgently
- (ii) Least developed countries like Bhutan and Nepal have very limited scope under the current KP and hence new voluntary markets must be created to cater to the public in providing opportunities to reduce local emission based on market mechanisms
- (iii) Institutional capacity is urgently required to lead the way in creating voluntary markets for curbing local emission based on least cost approach so that when the government policy eventually catches up to the markets, there will already be a buoyant carbon market in operation

Failure of the Kyoto Protocol in the Forestry Sector

Biological sequestration of CO₂ by forests has numerous benefits to other emission reduction technologies. Firstly, it is considered to be more cost effective than other carbon sequestration methods (Schlamadinger, *et al.*, 2007; Stern, 2007; Kauppi & Sedjo, 2001; and Van Kooten, *et al.*, 2004) which is a globally least cost solution. Secondly, managing forests in a sustainable manner in tropical areas will greatly reduce carbon emissions as it is estimated that global deforestation alone accounts for more than 18% (Stern, 2007) to about 25% (IPCC, 2000) of the global GHG emissions. And thirdly, with huge global deforestation rates in the past, terrestrial

ecosystems now bear the potential to store large volumes of carbon as huge historic losses have occurred from terrestrial ecosystems (Upadhyaya *et al.*, 2005; Kauppi & Sedjo, 2001).

However, in spite of the importance of the forestry sector, KP views activities permitted under this sector differently for industrialized (developed) and non-industrialized (developing) countries. Article 3.3 of the KP requires industrialized countries to take into account in their national inventory of GHGs—human induced afforestation, reforestation and deforestation activities—and adds under Article 3.4, that additional measures in the land use sector that add to the national accounts must also be accounted for. This includes management of existing forests that were there before 1990. This allows the industrialized countries to generate carbon credits and meet part of the KP commitment. Consequently for many industrialized countries where forest biomass is increasing, like for example the boreal forests, inclusion of forest management in the national GHG accounting enables them to gain carbon credits in a relatively low cost manner.

Under the framework of the KP, the permitted forestry activities for non-industrialized countries are only limited to afforestation and reforestation activities under the Clean Development Mechanism (CDM) and does not include avoiding deforestation and other forest management activities. Even the limited permitted activities under CDM has been a failure as till date, there has only been one CDM forestry project (implemented in China) which

reiterates the failure of the CDM policy in the forestry sector. Forest management through avoiding deforestation is not credited under this mechanism for the non-industrialized countries. Community managed forests as those found in the HKH region fall into the category of avoiding deforestation which is also known as reduced emission from deforestation (RED); hence such forest management regimes are outside of the KP and left to rely on the voluntary carbon market.

Action to be Taken Now

For reducing the adverse impacts of climate change, a concerted action by everyone in industrialized nations to non-industrialized nations is necessary. But often times, such need for concerted action remains a mere rhetoric in developing countries as markets and market mechanisms to curb emissions simply do not exist; abatement actions rely on the state's command and control mechanism. Even the global market mechanism of the CDM is out of reach to the communities of the HKH region. It is already clear that community managed forests do not stand any chance to receive funding for their role in climate stabilization. For community managed forests as we find in the HKH, voluntary markets are the only option based on market approach to reward the locals for sequestering carbon.

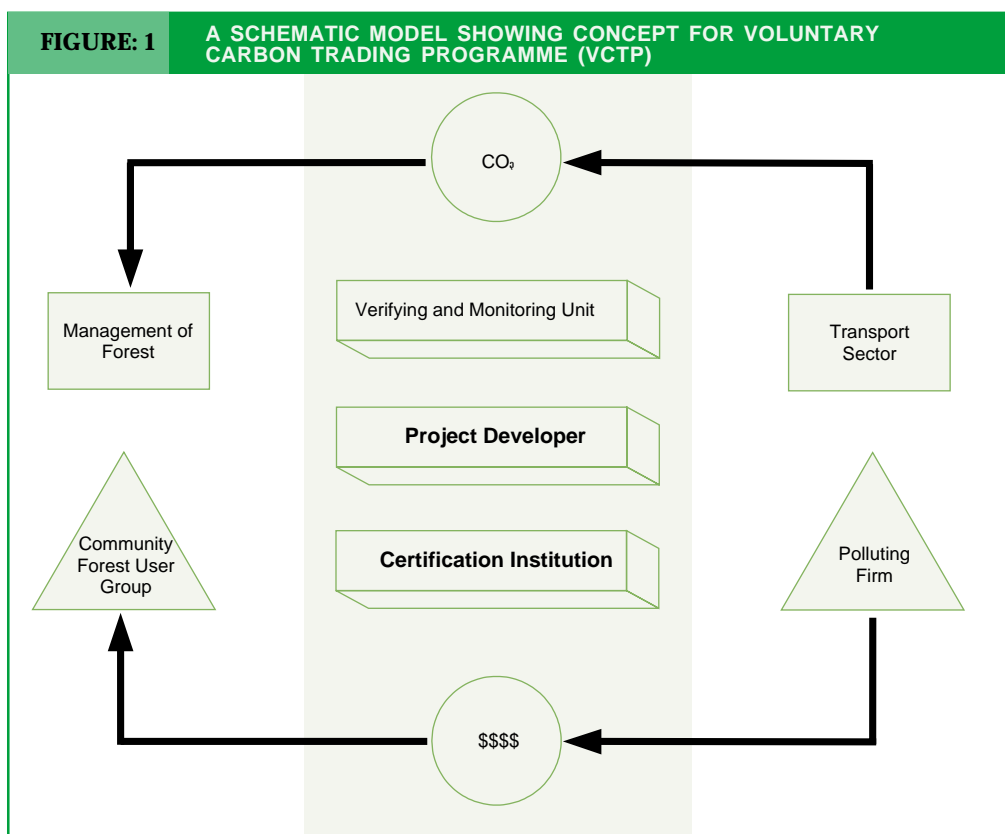
In order to take a market driven least cost solution to tackle climate change, an environment agency must take the lead in designing an innovative market mechanism for the Community Forest User Groups (CFUGs) and

the local polluters to participate in a market under a program called Voluntary Carbon Trading Program (VCTP) as a pilot project. The concept is quite simple: CFUG members that manage forests will get paid for the amount of CO₂ they sequester every year from the polluters. This could provide an incentive to manage forests more effectively and increase their carbon sequestering capacity, simultaneously reducing emission.

As the technicality part is cumbersome and lengthy, requiring scientific methodologies based on the standards set by the Intergovernmental

Panel on Climate Change (IPCC) and which also needs to satisfy the credit buyers, institutional support by an intermediary is crucial. The private sector is unable to take part as creating markets is expensive and requires external support. However in the long run, the private sector is expected to participate in this voluntary market as the size of the market grows.

As illustrated below in Figure 1, the left side depicts the supply side of credits from community forest management while the right side depicts the demand side from polluting firms which is



mainly driven by voluntary action or corporate social responsibility (CSR). The center of the model shows the missing section; this is the role to be played by a carbon intermediary which includes negotiating carbon credit prices, certifying credits, developing projects, verifying and monitoring credits and measuring credits and emissions. Together these two sides along with the intermediary support in the middle make up the voluntary carbon market. Ideally, three different institutions: (i) certification institution, (ii) project developer, and (iii) verifying/monitoring body have a role in creating the vital linkage between the demand and supply sides. These three bodies/institutions with varied roles (as shown in table 1) are responsible in making carbon markets work on a voluntary basis.

CFUGs that have been practicing sustainable forest management and that can show incremental amounts of carbon sequestration annually will form the supply side of carbon credits. On the demand side, an intermediary institution will be promoting this concept of VCTP with business firms, tourism industry, manufacturing sector, event and conference organizers, transportation sector, and international and national nongovernmental organizations (I/NGOs) that have a desire to become carbon neutral or simply reduce their current levels of emission on a voluntary basis. Once trading starts, and with experiences gained, the intermediary institution also has an opportunity to tap into the global market and international brokerage firms to market Verified Emission Reductions (VERs) from the HKH region. It can also add the energy sector mainly from industries and expand trading in all the six GHGs.

In the following section, we discuss on the global voluntary market, VER credits, and how an intermediary institution can progress on an experimental based on learning by doing approach.

Carbon Trading Markets

As a climate measure, there are two types of carbon markets for non Annex 1 countries like Bhutan, India and Nepal: (a) regulated market under the KP, and (b) unregulated voluntary market.

As shown above, buyers can purchase (a) CDM credit called Certified Emission Reductions (CERs) to fulfill Kyoto commitment or (b) non Kyoto compliance credits called Verifiable Emission Reduction (VERs) from the voluntary market. A buyer can also purchase CDM credit on a voluntary basis where the credit will not be used to meet emission reduction targets under the KP, but the project follows the CDM criteria on a voluntary basis. The CDM credits are registered with the CDM board whereas voluntary credits are available through independent retailers.

The Voluntary Market

Voluntary market refers to entities (companies, governments, NGOs, individuals) that buy credits for the purpose other than meeting the Kyoto targets (Taiyab, 2006). Voluntary markets are independent of the KP and mainly driven by CSR of the private sector (Peskett, *et al.*, 2006). In the last couple of years, climate and carbon has gained more prominence within the overall CSR agenda of the private sector and this will continue to grow in the future. The voluntary market

has expanded most rapidly in the last three years. Such growth in voluntary market is a result of increasing CSR which is now targeting climate agenda more than ever before. Improved environmental media coverage and the enforcement of the KP have also raised the level of awareness on climate change globally and thus contributed to the expansion of the voluntary market.

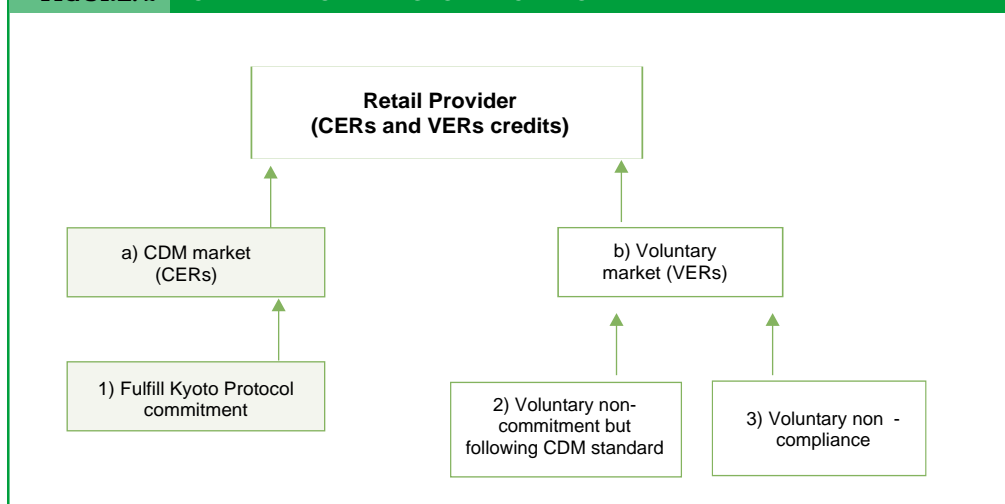
The bureaucratic CDM process which entails a high transaction cost has made the voluntary market more favorable for the forestry sector. The exclusion of avoided deforestation and RED from KP has left community managed forests with only the voluntary market to look upon if they are to be recognized to receive payments for their global services. As the current CDM market of the KP has failed to make progress in the forestry sector especially in the non-industrialized countries, the bulk of finance flowing into the forestry-based mitigation projects are from the voluntary market. Reducing carbon

emissions from the voluntary market has enabled companies to add value to their brand by showing their environmental commitment. The forestry sector is more attractive to the private sector as investing in trees is more tangible than offsets in energy projects and also sells more easily to the public (Taiyab, 2006).

Just as the CDM saw a rise in market size, the voluntary market is also growing. It has seen an eight fold rise between 2004 and 2005 rising from US\$ 5 million to US\$ 43 million (Capoor and Ambrosi, 2006). The Chicago Climate Exchange (CCX) is an example of a voluntary carbon market that started since December 2003 where US based companies purchase offset credits to meet their voluntary targets to reduce GHG.

There are benefits of voluntary markets as well as its demerits. On the merit side, it can channel funds to small-scale projects that promote sustainable development in non-industrialized

FIGURE: 2 OVERVIEW OF THE GLOBAL CARBON MARKET



countries which would not be feasible under the CDM due to the high transaction cost or lengthy approval process. The drawback of voluntary markets is that different retailers adhere to different standards for verification and monitoring which gives inconsistency in VERs. One way to see this is by visiting the webpage of numerous retailers. Many of them have an emission calculator and if one calculates their emissions, one will find calculations are done differently between the different retailers. There are around 40 retailers for carbon credits with most of them in Europe, US and Australia. Taiyab (2006) claims that there were none to be found in developing countries though some could exist. Of the 27 retailing firms found on the internet in July 2007 offering their services, 13 were based in Europe, 11 in the USA and 3 in Australia.

These retailers have different markups added on the VERs to cover their costs and are also found to have varying percentages of revenue expended on marketing, administration and the project. According to Taiyab (2006) one voluntary market retailer was found to spend 25% each on (i) project cost, (ii) marketing and advertisement, (iii) verification, and (iv) overhead and salaries. For example in Germany, there is a law for nonprofit organizations to spend 70% of revenue on projects leaving 30% on administrative costs. On the other hand, international brokerage firms charge around 7.5% commission on using their services.

From a list of 27 companies both profit making and nonprofit found on the internet in July 2007 that provided retail services in the voluntary carbon market, 14 were found to provide credits

from energy projects, 9 from forestry projects and 4 from both sectors with an average selling price per ton of CO₂ in the forestry sector being \$16 as shown in Table 1. At what rates they purchased credits from the project developers is not known.

Table 1: A Survey of Voluntary Retailers Found on the Internet in July 2007

PROJECT TYPE	NO OF FIRMS CO ₂	AVERAGE PRICE (US\$) PER TON
Energy	14	19
Forestry	9	16
Energy & Forestry	4	11

Requiring New Institutional Role in the HKH Region

In the HKH region there is a dearth of carbon intermediary institutions solely dedicated to the development of carbon markets. The requirement for such an institution to act as an intermediary needs numerous expertise in the field to be able to act as retailer, project developer, firm that has the capacity to validate and monitor, is credible enough to certify, and that can negotiate with the local buyers and global wholesale retailers. Consequently, such firms in the HKH do not exist due to lack of appropriate human resource and institutional expertise. Hence, there is no market opportunity for individuals or firms wanting to reduce emissions by purchasing carbon credit in the local market. Therefore there is a need for an institution capable of providing services not just for accounting offset, but more importantly, for creating a market, providing access, convenience and quality assurance between producers and buyers and between local and global carbon markets operating from the HKH region. For

such a role, a trusted institution committed to environmental protection with an international credibility must take the lead and be able to create a conducive market for the private sector to join in the future. An institution taking the lead must also have human resource competent to maintain IPCC guidelines for calculating emissions and offsets.

Below in Table 2 is a list of activities that need to be conducted by carbon intermediaries from developing a project to selling emission credits. There are three main types of roles that different bodies/institutions or individuals need to take. Validating/monitoring and certification are undertaken by different bodies/institutions or

individuals to maintain the standard of the project. The main responsibility lies with the project developer. The lead institution will be required to collaborate with other institutions/NGOs to fulfill these different roles at the project level.

Community Forestry as a Carbon Offset Project

Community managed forests are offsetting carbon from their forest management practices albeit not being paid for the services. Such forest management in the HKH region is not permitted under the CDM and not recognized under the voluntary market. The carbon calculations presented in this paper is based on methods recommended for afforestation and reforestation projects of the CDM.

Table 2: Activities and Roles of Carbon Trading Intermediaries

	ACTIVITIES		INSTITUTIONAL ROLES
1	Identification of project and development of project concept	<ul style="list-style-type: none"> ■ Select market type ■ Select methodology 	Project developer
2	Quantification of GHG and development of project proposal	<ul style="list-style-type: none"> ■ Set project boundary ■ Define baseline and additionality ■ Set crediting period ■ Calculate baseline emission Calculate project scenario Calculate leakage and adjust for leakage 	Project developer
3	Validation of project	<ul style="list-style-type: none"> ■ The project must be validated 	Validating body/institution
4	Marketing VERs	<ul style="list-style-type: none"> ■ Marketing credits in local market ■ Marketing through international brokerage/retail providers 	Project developer
5	Project implementation	<ul style="list-style-type: none"> ■ Implement the project for the crediting period 	Project developer
6	Certification	<ul style="list-style-type: none"> ■ Certify credits ■ Regular monitoring and verification 	Certification/monitoring body/institution

Six community managed forest sites in the HKH region were selected for monitoring carbon flux over a three year period. Based on the methods set out by the IPCC (2003) for LULUCF, carbon pools were measured in six sites (three each in India and Nepal). The forest inventory method used was based on MacDicken (1997); details of the methodology and data are found in Tewari and Karky (2007).

The data presented in Table 3 shows the total biomass (above ground and below ground) in community managed forests over a three year period. Values in parenthesis for India show herb and grass biomass whereas values in parenthesis for Nepal show above ground biomass of trees

> 5 cm of dbh. The three-year data show an annual growth of biomass in all the six sites in India and Nepal which indicate these forests acting as sinks.

Shown below in Table 4 is the annual mean carbon sequestration rate which was found to be the highest in Guna Van Panchayat (4.1 tCha⁻¹yr⁻¹ mean for three years) of Uttarakhand, India. Biomass and annual carbon sequestration rates were found to be twice as much in Uttarakhand compared to Nepal. Similarly, forests in the selected sites of Uttarakhand sequestered annually 13.6 tCO₂ per hectare while the same was only 7.1 tCO₂ per hectare annually for Nepal.

Table 3: Annual Variations in Biomass

BIOMASS

	yr1 tha-1		yr2 tha-1		yr3 tha-1	
Dhaili (India)	297,67	(3,57)	3,5,17	(3,57)	310,83	(2,93)
Toli (India)	190,33	(8,96)	198,37	(8,92)	205,33	(7,74)
Guna (India)			164,30	(3,65)	172,50	(3,45)
Ilam (Nepal)	115,47	(102,64)	121,68	(108,16)	128,31	(114,05)
Lamatar (Nepal)	101,77	(90,46)	104,68	(93,05)	107,69	(95,72)
Manang (Nepal)	61,89	(55,01)			66,24	(58,88)

Source: Tewari and Karky, 2007.

Table 4: Annual Variations in Carbon Stock and Mean Carbon and CO₂ Sequestration Rates

Carbon sequestration				Annual mean carbon sequestration rate in six sites	Annual mean carbon sequestration rate in India and Nepal	Mean CO ₂ sequestration rate
	Yr 1	Yr 2	Yr 3			
	tCha-1	tCha-1	tCha-1	tCha-1yr-1	tCha-1yr-1	tCO ₂ ha-1yr-1
Dhaili (India)	148.8	152.6	155.4	3.3	3.7	13.6
Toli (India)	95.2	99.2	102.7	3.8		
Guna (India)		82.2	86.2	4.1		
Ilam (Nepal)	57.7	60.8	64.2	3.2	1.9	7.1
Lamatar (Nepal)	50.9	52.3	53.8	1.5		
Manang (Nepal)	30.9		33.1	1.1		

Source: Tewari and Karky, 2007.

The C sequestration data illustrated above consists of above ground plant biomass with > 5 cm dbh and below ground biomass, but excludes SOC. In India it includes herbs and grasses but they are not accounted for in Nepal.

Based on the internet review of retail providers (shown in table 1), the average price for tCO₂ of VER was \$16 at the consumer end of the supply chain. The farm-gate price or the price at origin would be what CFUGs would receive for their credits which would be lower than the retail price. Taking a conservative value of 62.5% of the retail price would leave \$10 per ton of CO₂ for the CFUGs. At this rate, Uttarakhand India would receive \$136 per ha per year for its 13.6 tCO₂ha⁻¹yr⁻¹ sequestered. Nepal would receive \$71 per ha per year for the 7.1 t CO₂ha⁻¹yr⁻¹ sequestered.

With finance, CFUGs can reinvest in better protection measures, tools and silviculture technologies that will increase forest biomass and increase the carbon pool size. There is tremendous scope to increase additional carbon sequestration capacity in these forests by management and financial investment interventions, mainly by bringing more area under sustainable forest management.

Voluntary Carbon Trading Programme (VCTP)

It can be expected that many private sector firms in South Asia, especially in the HKH region concerned with emission reduction would like to find opportunities to remain clean or carbon neutral in the sense that they would be willing to purchase carbon credits if they were available. It is also expected that there are institutions and corporate firms interested in purchasing credits in proportion

to the emission from the vehicles they operate to reduce their carbon footprint. But such services are not available and consequently such abatement opportunities don't exist. With VCTP, an opportunity will emerge for such individuals/institutions/firms to become clean by purchasing carbon credits from the community forestry sector. In the private sector, VCTP will open an option for hotels, airlines, tourism entrepreneurs, transportation companies, manufacturing sector, etc. to show their CSR for enhancing their image and brand name.

The aim of the VCTP is to bring public, private and NGOs together in forging a partnership to improve environmental performance at the local level by reducing emissions with the assistance of market mechanisms based on least cost abatement solution. Partners for the HKH region may be small and large business firms, industry, manufactures, trade associations, environmental groups, forest user groups, conservation groups, international organizations, donors, and research institutions.

Through this partnership in carbon trading, emission reduction actions will be more cost efficient, socially responsible, and equitable. Being a voluntary action, the government will not command and control emission reduction; in other words, this is about carrots without the stick. This would be a new approach shown to the policymakers and legislators in the region to reduce emissions efficiently and effectively based on market mechanisms.

Conclusion

The findings on climate risk urges us all to take a concerted action now rather than later by reducing emissions in both the industrialized world as well as in the non-industrialized world.

The KP is the single biggest commitment from the industrialized nations to reduce their GHG emissions. But even this protocol is short of addressing the challenge of climate change as much of the emission (18% to 25%) remains unaccounted for in the KP from avoided deforestation. As international negotiations are ongoing for the inclusion of avoided deforestation (RED policy); nothing concrete has come up so far and consequently emissions from deforestation continues unabated, especially in developing countries. Consequently, community managed forests are left with voluntary markets if such forest management is to be utilized as an instrument for reducing CO₂ emissions.

This paper presents a novel concept in bringing community managed forests into the fold of climate change mitigation and adaptation measures by linking economic incentives with forest management practices through the voluntary carbon market. This action also addresses the deficiencies of the KP and the CDM and at the same time promotes least cost solution globally by relying on market based mechanisms for emission abatement that is also equitable and fair. This will open opportunities for the HKH public for the first time to be able to purchase carbon credits aimed at reducing their emissions within their local economy. However, in developing countries like Bhutan, India and Nepal, it is easier said than done because markets for carbon don't exist yet and they have to be created. Another challenge lies within the forestry sector which is less developed in terms of policies and accounting methods for using forest management as a climate change measure; the energy sector is quite advanced with standard methodologies in this regard. Therefore there is

more urgency to begin work in the forestry sector which requires more attention given its significant nexus with the climate.

In addition to creating a market, institutional support for dealing in carbon markets is also lacking and this is where an intermediary institution needs to fill the gap by helping to create a carbon market and launch the VCTP. The intermediary institution needs to play a bridging role to link supply side with demand side and between local markets with the global market. For carbon trading to occur, partnership needs to be forged with various institutions with differing roles as required.

To start with, the VCTP can begin with community forests and credit buyers from urban centers. Since this will be based on learning by doing approach, with greater experience and expertise, it can widen its role and scope to include the energy sector, develop trade with global markets and cover all six GHGs for the HKH region. In a rapidly growing South-Asian economy, there is scope, demand and urgency from corporate firms to make an effort to reduce their emissions on a voluntary basis to enhance their CSR at least cost; however there simply is no retailer offering this service till now.

Acknowledgement

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MAKING PAYMENT FOR ENVIRONMENTAL SERVICES (PES) WORK: A CASE STUDY OF SHIVAPURI NATIONAL PARK, NEPAL

Prakash K. Karn¹

ABSTRACT

This paper highlights the importance of Payment for Environmental Services (PES) as a tool to address currently faced key management issues of conserving the protected areas in Nepal while supporting the livelihoods in and around them. Challenges and opportunities for piloting PES in Nepal are assessed; and a case study of Shivapuri National Park is presented which analyzed the costs and benefits associated with the park, and assessed different management scenarios to find out a more efficient management option that maximizes the total benefit, and also explored to see possibilities for setting up a PES mechanism in this area. It used a rapid and integrated economic valuation framework to test its applicability under limited time and resource availability that would especially be important for developing nations.

¹Environmental Economics Unit, IUCN Nepal; prakash@iucn.org.np

Introduction

Watershed ecosystems are vital for they deliver key hydrological services to sustain the livelihoods downstream, yet their conservation is increasingly becoming challenging. Concerns over diminishing health of watershed ecosystems and resulting decline in quality and quantity of vital goods and services are growing that warrants serious attention to conserving upper catchments. In Nepal, watersheds are often occupied by upland dwellers who depend heavily on these ecosystems for essential goods and services. While conservation of watersheds to ensure sustainable water services downstream entails tremendous hardship and upland livelihood costs, overexploitation of those ecosystems results in high downstream economic costs. Apparently there is a need for innovative approach to watershed conservation that addresses both upland livelihood and downstream water services delivery concerns in a sustainable way.

Traditional 'fences and fines' or 'command and control' approaches have often failed at achieving desired conservation outcomes, as they adversely affect the livelihoods of upper catchment communities by reducing the land and resource use options open to them. Especially in developing countries where the incidence of poverty is high, the communities who manage and use catchments are usually observed to be unwilling and frequently economically unable to tolerate the high opportunity costs incurred by such a protectionist approach. Community-based conservation and development approaches in many cases have shown more positive results in ecosystem and livelihood terms; however, their

sustainability is questioned due to lack of finance. Further in developing countries, national conservation authorities are often unable to provide long-term funding for sustaining these approaches.

This paper aims to provide background information on PES; feasibility, challenges and opportunities for its implementation in Nepal, substantiated by the findings of a detailed case study that investigated economic, hydrological, and livelihood components in a catchment within the Shivapuri National Park (ShNP) of Nepal.

A Case Study: Shivapuri National Park, Nepal

Shivapuri National Park (ShNP) is located about 12 km north of Kathmandu and covers an area of 14,400 ha spanning Kathmandu, Nuwakot and Sindhupalchowk Districts (Figure 1). Lying in the middle mountain physiographic zone, its elevation ranges from 1,320 meters above sea level (masl) to 2,732 masl. The park is rich in biodiversity with more than 2,000 plant species, 21 mammals and 180 birds, and has also cultural and livelihood values for local communities. It contains Shipocho peak which has religious importance, and provides water to three holy rivers. About 25,000 tourists and pilgrims visited the park annually in recent years. This park protects a vita watershed that contributes about one-fifth of total piped water in Kathmandu valley.

Following heavy deforestation and land conversion to agriculture during early 1970s, this

area has received a series of conservation efforts. It was declared as a protected area in 1973, and as Watershed Reserve in 1976, further upgraded as Wildlife Reserve in 1983, and finally declared as Shivapuri National Park in 2002 imposing strict rules for land and resource use.

Besides the downstream water beneficiaries, about one hundred thousand people in and around the park depend on its resources in some way. Particularly about 600 households within the park (in Mulkharka and Okhareni villages) depend heavily on park resources to fulfill their basic needs such as fuelwood, timber, fodder, herbs etc. The incidence of poverty is high among park residents and adjacent communities. About 10% of households are landless, a similar proportion of households female-headed, and more than a quarter suffer recurrent food shortages for 4–10 months of the year (HMG, 1996). With restricted legal access to agricultural land and forest resources, few other income-earning and employment opportunities, little access to markets or basic services, and located in relatively remote enclaves within the national park, the livelihood base of these communities remains extremely weak and insecure.

A key management issue currently facing ShNP is the ongoing effort to conserve the forested catchment that is contained within the park boundaries, in the face of intense and growing threats, and at the same time recognizing the need to ensure sustainable and secure livelihoods for the park-dwelling population. One of the binding constraints in effectively managing the park ecosystem is the lack of financial resources

FIGURE 1 LAND USES INSIDE THE SHIVAPURI NP



available to park authorities, and weak economic incentives to motivate and enable local households to limit their land and resource uses to sustainable levels. While park authorities bear the operational costs of managing ShNP, local communities in and around the park incur the bulk of the opportunity costs of ecosystem conservation. On the other hand, downstream water users in Kathmandu valley enjoy high economic benefits.

Three possible conservation options are observed to address these constraints: (i) Relocate the villagers who currently live inside the park, (ii) Continue the current system of park management which largely excludes the livelihood concerns of park dwellers, and (iii) Setup a more comprehensive mechanism that could generate financial, economic and livelihood benefits for park-resident and park-adjacent populations to act as incentives for conservation. The integrated assessment aims to gauge the value of these alternative land and resource management options for the park.

A Framework for the Economic Valuation of Catchment Ecosystem

Although a range of well developed tools for economic valuation, hydrological assessment and livelihoods analysis are available and widely-used, they are often inappropriate for the use in developing country context due to their complex formulation, more expensive and time consuming field and analytical techniques, and their nature of dealing with the different elements of catchment assessment in isolation from each other.

The conceptual framework developed for this study addresses these challenges by providing a rapid integrated tool based on multidimensional approach to assess biophysical and socioeconomic linkages in catchments together and deals simultaneously to understand economically and financially sustainable management outcomes while maximizing both upstream livelihoods and downstream water benefits. This assessment brings sound evidence and sufficient information for the design of PES and other catchment conservation tools that would help catchment managers to weigh up the relative costs and benefits of different management options and indicate to the winners and losers under each option. It provides information that points to needs and opportunities for using PES to strengthen catchment management in a particular situation.

This integrated tool for rapid assessment focuses on valuation of environmental goods and services in terms of their contribution to livelihoods of upstream and downstream people. It aims to

answer a series of questions about the economic, hydrological and livelihood values associated with catchment ecosystems:

- ▶▶ What is the water service delivery from a given catchment management option?
- ▶▶ Who are the beneficiaries of water service delivery, and how much do they benefit?
- ▶▶ What are the direct and indirect costs of catchment ecosystem management for water service delivery, and who bears them?
- ▶▶ Is there a significant gap in costs over benefits that require compensation, for some or all (upstream) ecosystem service providers?
- ▶▶ Is there a significant net benefit to (downstream) water users that can be captured as payment for environmental services?

This study realized that it is very important and there is need for using multi-disciplinary and integrated approach in understanding the complex relationship between catchment land and resource use and water services, and socioeconomic factors. Rapid approach was adopted for the economic valuation of catchments without compromising in terms of credibility of the methods used and the information generated. A bulk of existing data on GIS, satellite mapping, aerial photos and local knowledge could well be used which are readily available while additional information be supplied from primary sources. This approach turned to be both an appropriate and a useful tool that can be used under time, resources and capacity constrained situations, to generate rapid advice for decision makers. In developing countries, where resources are often a constraint, rapid and integrated approach is more useful over

conventional market-based economic valuation methods.

Land Use and Catchment Water Service Delivery

The study covered Bagmati watershed that covers 67 km² with special focus on the Sundarijal sub-catchment inside it that covers 15.76 km². Remote sensing images indicate improvement in forest cover over time. Between 1988 and 2001, the area of degraded forest in the study area fell by almost 85% while dense forest area increased more than six-fold; while at the same time, encroachment at the fringes around the boundaries and settlements can be seen clearly (Figure 2). Improvement in vegetation cover in the Bagmati watershed and Sundarijal sub-catchment has led to a more steady flow of water downstream, as evidenced by stream discharge records showing a decreasing trend in potentially damaging peak flows and increasing in base flows (FAO, 1996). Investigation was done to understand the biophysical linkages in the catchment, and to arrive at a better approximation as to the magnitude and direction of the impacts of land use change on water service delivery. This was accomplished through a simple water balance and accounting model using historical and current land use patterns within and around ShNP. Water accounting was carried out for three hydrologically representative years: “dry”, “normal” and “wet”. The results of this analysis show that, for a 10-year period containing a realistic combination of these rainfall patterns, only about 22% of inflow is depleted in the Sundarijal sub-catchment and about 30% in the Bagmati watershed.

The major stock of water is flowing out of the watershed, and can be used downstream. Of a total annual rainfall inflow of some 162 million cu. m. of water into the Bagmati watershed, about 27% is from the Sundarijal sub-catchment. Based on this information, three management scenarios were developed and modeled to see the impact of different land use cover patterns (*cet. par.* other environmental parameters) on the amount of effective rainfall retained in the watershed.

- Baseline: Continuation of the *status quo*: 80% mixed forest, 20% agricultural area.
- Scenario 1: Co-management: 80% forest with good cover, 20% agriculture with conservation treatment;
- Scenario 2: Resettlement: 100% forest with moderate cover;
- Scenario 3: Conversion: 100% agricultural area.

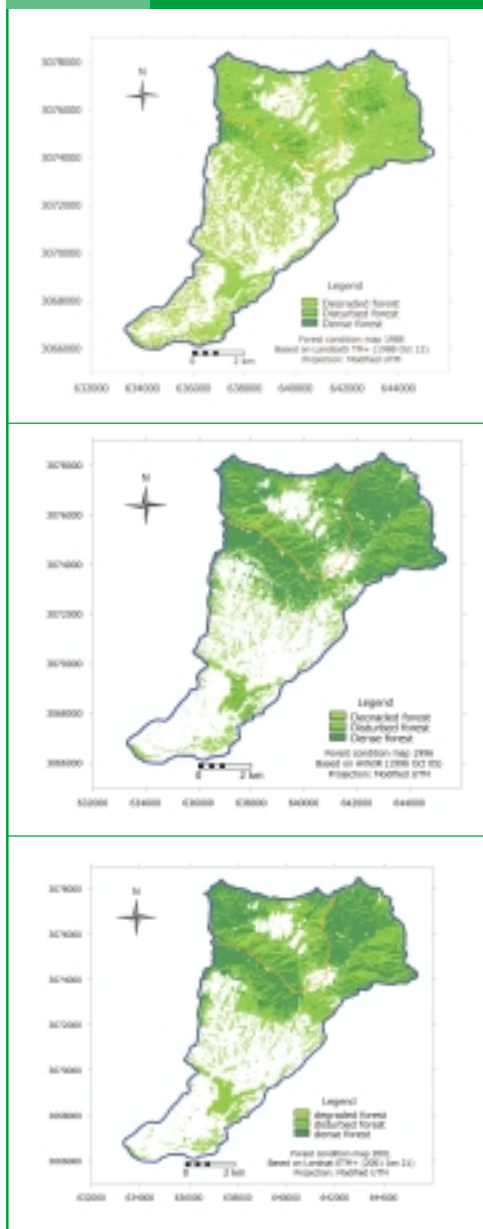
The model indicated that Sundarijal sub-catchment receives about 45 billion liters of water under normal rainfall patterns, of which only about 37% is retained by sub-watershed as effective rainfall for further hydrological processes under baseline conditions. The scenario analysis shows that increase in good forest cover is accompanied by an increase in effective rainfall, thereby augmenting the portion of water that is retained within the watershed during the rainy season; and the higher the effective rainfall the higher is water availability particularly during the dry season.

Downstream Benefits and Beneficiaries of Water Services

Water supplies yield significant financial and economic benefits for downstream users, however, those benefits need to be identified and valued properly to convince the decision-makers about importance of managing upper catchments as a part of water supply infrastructure. Assessment was done to value the water in different uses (hydropower, irrigated agriculture, urban consumption) and for different users, enabling the financial and economic impacts of land use change on water service delivery to be calculated.

Currently, the available water from ShNP is being used for a variety of purposes—mainly irrigation to agriculture, hydropower generation and domestic consumption. It contributes water to over 4,000 ha of agricultural farms to irrigate for the production of rice, wheat, millet, maize, potatoes, other fruits and vegetables. Water from the Sundarijal sub-catchment is collected into a reservoir and channeled to a hydropower plant located in Sundarijal that generates about 4,231,000 KWh of electricity a year. This water from the hydropower plant is finally diverted to Sundarijal Water Purification Plant wherein it is processed and transferred to the city for the distribution to domestic consumers who use about 33.3 million cubic meters of water a year from this source. Each of these water uses generates huge financial revenues and economic benefits. Currently, the net financial value-added across different water uses totals NPR 306 million, or some US\$ 7.65 million, a year (Table 1).

FIGURE 2 FOREST CONDITION: LAND COVER CHANGES



Costs and Cost-bearers of Catchment Ecosystem Management

Table 1: Net Financial Value of Water Uses

	Consumption (million cu.m./yr)	Value added (NPR/ cu.m.)	Total value (million NPR)
Irrigated farming	20.800	0.50-35.00	222.00
Hydropower	18.144	0.63	11.43
Domestic consumption	33.300	2.17	72.26
Total			305.69

The opportunity costs of the local communities of managing catchment ecosystems are often ignored in decision making and they remain uncompensated. This situation turns poor upland communities economically unwilling or unable to support conservation, and the protected area management authority finds it increasingly difficult to achieve the management goal. Thus, the direct (park budgets) and indirect costs (crop damages by wild lives, restricted land use options, etc.) and cost bearers of upper catchment management are assessed through basic financial and economic analysis of the management and opportunity costs of different upland ecosystem management options.

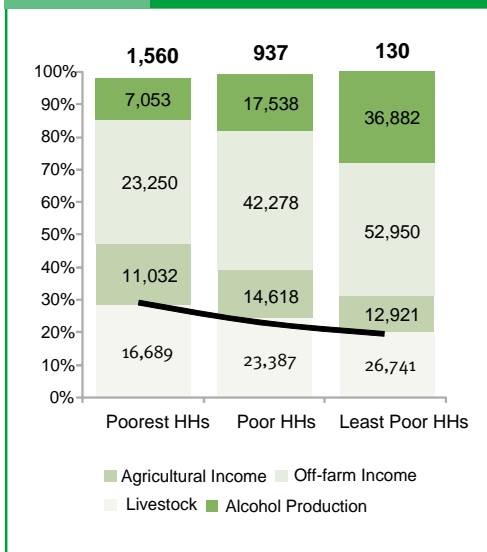
There are two major costs associated with this park management. Direct operational expenditures on conservation activities within and around the park by Department of National Parks and Watershed Conservation (DNPWC) which is about NPR 6.6 million (or US\$ 165,000) annually in recent years. Conservation efforts also implies significant opportunity costs to the local communities in the form of restricted farming,

crop depredation by wild animals, limitations over alternative land and resource uses, and utilization of forest resources of basic need. On average, crop damage costs are worth some NPR 2,873 a year for each park-dwelling household. Loss of use of park resources due to restrictions on harvesting amounts to some NPR 16,000 a year (comprising timber and NTFP use), and loss of access to agricultural markets incurs average opportunity costs of NPR 8,000 per household per year.

Livelihoods in the Upper Catchment

Efforts were made to understand the nature and dynamics of local livelihoods in the upper catchment, and the possible impacts on livelihoods from changes in land and resource use and management options. Stakeholder assessment, sustainable livelihoods analysis and participatory economic valuation techniques were used for this purpose. Required qualitative and quantitative information were collected through questionnaires and individual/group interviews from carefully selected sample households that represented different socioeconomic groups including marginal members (the poor, landless, women and unemployed).

To understand the livelihood better, total household incomes were calculated based on broad definition to include cash income, subsistence values, non-market income and asset sales, and the values were expressed in a common monetary metric. Households living in ShNP depend on a wide range of activities for their livelihoods. In the context of restricted land and

FIGURE 3**CONTRIBUTION OF
DIFFERENT COMPONENTS
TO TOTAL HOUSEHOLD
INCOME**

resource use, the primary livelihood activity is off-farm, which accounts for an average of 41% of total household income. Although largely exploited without license, non-timber forest products (NTFPs) mainly fuelwood, fodder and timber make a substantial contribution of an average of 23% of livelihoods. A third significant source to earn livelihood is alcohol production that earns cash income contributing about 19% of the household income. Production of alcohol depends heavily on fuelwood that are collected from the park. Agriculture contributes some 15% of household income, with the remainder composed mainly of livestock sales and products.

There is a marked differentiation in both the level and the composition of household income

between different socioeconomic groups. Most significant is the varying role that agriculture and the collection of non-timber forest products—the two livelihood components that depend on park resources—play in household livelihoods. There is a direct correlation between household poverty and dependence on the land and natural resources of the park. For the poorest members of the community, park-dependent livelihood components (NTFPs and agriculture) contribute about 47% of total household income, which falls to 39% for poor households and to just 31% among the least poor households (Figure 3). The numbers in this figure indicates the contribution in absolute term. Although the absolute value of these livelihood activities is about one and a half times greater for less poor households than for the poorest, their relative contribution to household livelihoods is much less.

The Economic Impacts of Alternative Catchment Management Scenarios

Modeling the costs and benefits of different land and resource management scenarios for ShNP (continuation of the *status quo*, co-management, resettlement, and conversion) based on the findings of the hydrological, livelihoods and economic assessments points to relative financial and economic worth of different catchment management options. Gap analysis of the magnitude and discrepancy between costs and benefits for different groups points towards cases where economic or financial transfers may be needed, or enabled, to better or more equitably balance the costs and benefits of catchment management to support achieve a desired

management outcome. The analyses make several assumptions about future changes in the demand for forest products, agricultural land and water, based on survey data and consultations with experts. A key assumption is that increase in or loss of water supply downstream under co-management, resettlement, and conversion scenarios rises incrementally and is fully realized over a period of ten years. Changes in management options will lead to changes in the use of forest products and land in ShNP, as well as the amount of water for downstream uses in all the scenarios. Different management options for ShNP also determine both the costs of running the park, as well as the revenues that can be earned from it. Different management options lead to

varying outcomes for different groups as they generate different hydrological, livelihood and economic costs and benefits (Table 2).

Different scenarios maximize different types of benefits. Overall, the co-management scenario that benefits local communities and allows some level of sustainable resource uses yields the best mix of hydrological, livelihood and economic benefits. It incurs a low total cost and is second only to scenario three, the 'no management' costs option. Whereas the 'resettlement' option where no human residence or use of the park is continued, generates the highest difference between upstream and downstream in net present value, it imposes a high cost on the current

Table 2: Net Present Value of Alternative Land and Resource Management Scenarios for ShNP

	Baseline: status quo	SC1: Co Management	SC2: Resettlement	SC3: No conservation
DNPWC				
Benefits (NPV \$mill)	0.29	0.34	0.34	-
Costs (NPV \$mill)	0.86	0.43	0.86	-
Net value (NPV \$mill)	-0.57	-0.09	-0.52	-
Local communities				
Benefits (NPV \$mill)	2.52	3.27	-	4.73
Costs (NPV \$mill)	1.41	1.29	2.11	2.11
Net value (NPV \$mill)	1.11	1.98	-2.11	2.63
Downstream water users				
Net value (NPV \$mill)	39.64	40.48	40.00	38.16
Total				
Difference between upstream and downstream (NPV \$mill)	39.10	38.59	42.63	35.53
<i>Net present value (\$mill)</i>	<i>40.18</i>	<i>42.37</i>	<i>37.37</i>	<i>40.79</i>

residents of ShNP. Continuation of the *status quo* maintains water benefits, but at lower levels than the other two conservation options. Choosing to allow the forest to degrade over time yields high local benefits (from the increased farming activities that could take place in the catchment), but would be insufficient to sustain current high levels of downstream water benefits.

From a management perspective that takes account of multiple ecosystem and livelihood goals, the assessment framework shows that the net benefits of conserving ShNP exceed those of forest conversion. Whereas downstream water benefits accrue even under the scenario where ShNP is de-gazetted and suitable areas of the forest are converted to agriculture, the magnitude and value of these benefits are notably less than under the conservation scenarios. It is particularly noteworthy that for all three of the conservation options (*status quo*, co-management and resettlement), local communities living in ShNP bear the bulk of the costs, and incur a net loss under the resettlement option. Neither the park authority nor the poor communities living inside ShNP are in a position to bear these costs. At the same time, high net benefits to downstream water users, in comparison to the costs of managing ShNP for water benefits, indicate a need and potential for investigating mechanisms for ensuring that a portion of these water values are returned to upper catchment land and resource managers as rewards for ecosystem conservation.

PES as an Innovative Management Approach

With increasing recognition of a need for ecosystem management to ensure a continuous supply of ecosystem goods and services, a number of innovative financing mechanisms have been adopted in different countries, especially when public budgets for this purpose are inadequate. Payment for Environmental Services (PES) is a kind of voluntary contractual arrangement, and is widely implemented as an innovative conservation financing mechanism to achieve the dual goal of environmental conservation and poverty reduction in developing countries. It has been a useful tool where traditional command and control approaches have failed, and the state's fund is inadequate for conservation.

PES is a mechanism to improve the provision of indirect environmental services in which providers of environmental services receive direct payments ('provider gets') from the users of these services ('user pays'). PES mechanisms are usually implemented for hydrological services as upstream land uses affect quantity, quality, and timing of water flows downstream. Service providers (upstream catchment managers) and service users (downstream beneficiaries) negotiate on desired land use practices upstream and the amount of payment to compensate for making such changes. Intuitively, it is in the interests of downstream water users (the beneficiaries) to compensate upstream catchment managers (the providers) to maintain or even improve the provision of ecosystem water benefits. Thus, PES provides a fair and equitable mechanism for capturing the benefits and allocating funding to offset the direct and indirect costs of catchment ecosystem

conservation. It provides economic incentives to motivate and enable upstream landholders to engage in sustainable ecosystem management practices.

Wunder (2005) has identified four types of PES that currently stand out: (i) carbon sequestration and storage (electricity companies are paying farmers for planting and maintaining additional trees), (ii) biodiversity protection (conservation donors are paying local people for setting aside or naturally restoring areas to create a biological corridor), (iii) watershed protection (downstream water users are paying upstream farmers for adopting land uses that limit deforestation, erosion, and flooding risks, and (iv) landscape beauty (a tourism operator is paying a local community not to hunt in a forest being used for tourists' wildlife viewing).

With respect to PES, Costa Rica has demonstrated great success through experimenting different schemes. Costa Rica established tax-based economic incentives for the reforestation sector through its first Forestry Law in 1979, and thereafter a number of appealing and incentive based schemes have been developed incorporating learning from previous policies and schemes and implemented over time (Watson *et al.*, 1998; Chomitz *et al.*, 1998; Pagiola, 2002; Rojas and Aylward, 2003). Many countries around the globe are implementing different schemes for collecting payments to finance watershed protection.

For PES to work, the downstream benefits must be more than the opportunity costs of land use changes upstream. How much the downstream

beneficiaries should pay depends on quantity of benefits they receive or damage avoided through change in upstream land uses, while how much the upstream service provides should be willing to accept as compensation depends on opportunity costs to them.

Economic Valuation and PES Initiatives in Nepal

Economic valuation of natural resources and exploration of innovative financial mechanism are drawing increasing attention of different conservation organizations, and many of their efforts are currently limited to background studies. Though random efforts are made recently in Nepal, it still remains a fairly new concept to most stakeholders. There are very limited studies available in economic assessment of natural resources, and most of the available ones focus on community forestry and few others use environmental economic tools including opportunity cost and willingness to pay analyses (e.g. KMTNC, 1996; Kanel and Varughese, 2000; Karki, 2002; Niraula, 2003; Kanel and Sigdel, 2004; Rana, 2004; Adhikari *et al.*, 2005).

Some of the very recent studies are more focused to economic valuation of natural resources and generating information on feasibility to set up PES mechanism in Nepal. A very recent one on economic valuation (Karn, 2007) has highlighted the importance of Churia hills resources for local communities and the importance of Churia watersheds for hydrological benefits to downstream people, and generated much needed background information for setting up PES schemes. Likewise another recent study (Emerton and Iftikhar, 2005) in Shivapuri National Park

investigated the economic benefits; management costs; possible efficient management option that addresses current key challenges of financial inadequacy for conservation efforts as well as livelihoods of local communities; and highlighted the need, importance and feasibility to set up PES mechanism in this park. This case study is presented in detail in this document.

On the implementation front, a PES like scheme being implemented in Kulekhani hydropower in Makwanpur district is a very good and pioneering initiative. Kulekhani watershed supplies water to two hydroelectric plants that generate a total of 92 megawatt of electricity, and Nepal Electricity Authority earns revenue from its sale. However, its operation often suffered from limited availability of water and heavy sedimentation in the water reservoir. To address these issues, Winrock Nepal facilitated the setup and operation of a reward mechanism to upland communities to motivate them to change their land use patterns. A certain percentage of hydropower royalty is allocated for the development activities for the upland communities in this watershed. Land use changes in upland area has visibly resulted in reduced sedimentation and increased dry season water flow to the reservoir, which in economic terms are estimated at NPR 3.12 million a year.

Opportunities for PES in Nepal

Nepal's rich natural resources and biodiversity are on continuous deterioration though it has large potential to support the local communities and the economy if properly conserved and utilized. PES mechanism seems to have greater

importance in Nepal as the state's conservation fund is inadequate, and the poverty and conservation issues are to be addressed together. The concept is emerging in Nepal now, and many organizations have shown interest and are at different stages, and few studies have already established the feasibility for PES in some areas.

Basic policies and institutional infrastructure required to setup PES schemes are also already in place. The National Park and Wildlife Conservation Act (1973), The Local Self Governance Act (1999), The Electricity Act (1992), The Forest Act (1993), among few others, contain the concept of benefit sharing. The current coalition of major political parties have also agreed to pass the new law on revenue sharing from environmental services such as water resources to be distributed more to local districts where the revenue is generated and to other districts in Nepal. With dual objective to develop incentive systems for resource conservation and to improve the livelihood, Ministry of Local Development has developed guidelines to use environmental funds collected from natural resource use, emphasizing to reward local people, especially the poor, who contribute to provide environmental services. Some initiative has been taken on a case basis, advocating allocation benefit sharing with upstream service providers; this has to be brought to the national policy that facilitates the process elsewhere in the country.

Some Key Challenges Identified

Some of the challenges realized so far concerning PES set up in Nepal are:

- ▶ Lack of scientific evidences establishing linkages between watershed ecosystem management and hydrological services generated. So far this sector has received no attention though there are lots of efforts of watershed management;
- ▶ Lack of awareness about PES concept among people, resource managers and policy makers and thus, lacks recognition in national policies;
- ▶ Lack of property rights in the hills, which adds complexities to design and implementation of PES schemes.

Further Needs

Given those opportunities and challenges, following few activities are suggested which would help promote PES in Nepal.

Capacity building on PES: PES being a new concept for Nepal, many stakeholders, service providers and beneficiaries are not aware of it. Capacity building among concerned government and nongovernment organizations and policy makers, and general awareness creation among local communities upstream and downstream are important.

Enabling institutional, legal and policy structures to support PES implementation: Though existing legal and policy structures broadly support the sharing of locally generated benefits from natural resources, further refinement is necessary to ensure the benefits for the service providers, and to enable generating fund by capturing a part of benefits from the beneficiaries which is essential and very important for sustaining the schemes.

Piloting of PES mechanism: In Nepal, it seems more feasible for PES pilot projects to focus on water resources especially for water supply and hydropower. In recent years, hydropower sector is drawing attention from a range of investors including the private sector. IUCN's recent studies indicate potentiality of piloting this scheme in Shivapuri National Park as well as a few sites in the Churia hill region.

Information dissemination: Learning from the pilot demonstration, best practices cases, gaps, incremental costs of upstream land use changes and associated downstream water benefits (supply and quality), and other policy relevant information are to be compiled and disseminated from local level to policymakers. This would help communicate about PES to a wider mass of people, replicate in other areas, and in making the policy and institutional environment more favorable to PES implementation.

Conclusion

Despite many success stories of PES schemes around the globe, it still has to gain recognition in Nepal as a tool to address dual goal of conservation and livelihoods. Though many efforts are on ongoing, few recent studies have already established the feasibility of piloting this innovative conservation financing tool in some parts of the country, including the Shivapuri National Park which supplies substantial amount of water to Kathmandu valley for domestic purpose, hydropower and irrigation to agriculture. The case study in Shivapuri National Park made use of rapid and integrated economic valuation approach and found it a more useful tool

especially for developing countries wherein researchers and policy makers are to work under limited resources availability. Towards finding a better management option for the park that would consider the livelihood issues of park-dwellers adequately, Co-management option is found more efficient that benefits local communities and allows some level of sustainable resource uses.

Besides technical feasibility for PES indicated by those studies, basic institutional infrastructure and broader policies supporting the concept of benefit sharing are already in place, which would need further refinement to facilitate the PES operation. However, more efforts are needed towards generating scientific evidences on linkages between hydrological services and upland catchment management. Capacity building among stakeholders, service providers, beneficiaries and policy makers is another important part to promote PES in Nepal.

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APPLICATION OF THE RAPPAM TOOL IN MALAYSIA IN ASSESSING MANAGEMENT EFFECTIVENESS OF NATIONAL AND STATE PARKS

Surin Suksuwan¹ and Rahimatsah Amat²

The Rappam Tool

An assessment was carried out using the RAPPAM (Rapid Assessment and Prioritization of Protected Area Management) methodology developed by WWF (Ervin, 2003), which consists mainly of a multiple-choice questionnaire. The RAPPAM methodology is one of several assessment tools within the World Commission of Protected Areas (WCPA) framework. The main assessment elements in the RAPPAM questionnaire are Context, PA Design and Planning, Inputs, Management Processes, Management Outputs and Outcomes. The RAPPAM tool is generally more suited for broad-level comparisons among many protected areas, rather than for a single protected area. There are other tools within the WCPA framework that are more suitable for single protected areas, such as the Tracking Tool. Detailed information on the RAPPAM methodology can be obtained from the RAPPAM toolkit available from WWF.

The Malaysian Protected Area Network

The total land area of Malaysia is approximately 330,433 km², of which 132,828 km² are in

Peninsular Malaysia, 123,985 km² in Sarawak and 73,620 km² in Sabah. Administratively, Malaysia is a federation of 13 states and the federal territory (of which there are three). Peninsular Malaysia consists of the states of Johor, Kedah, Kelantan, Melaka, Negeri Sembilan, Pahang, Perak, Perlis, Pulau Pinang, Selangor and Terengganu, while the states of Sabah and Sarawak are located on the island of Borneo.

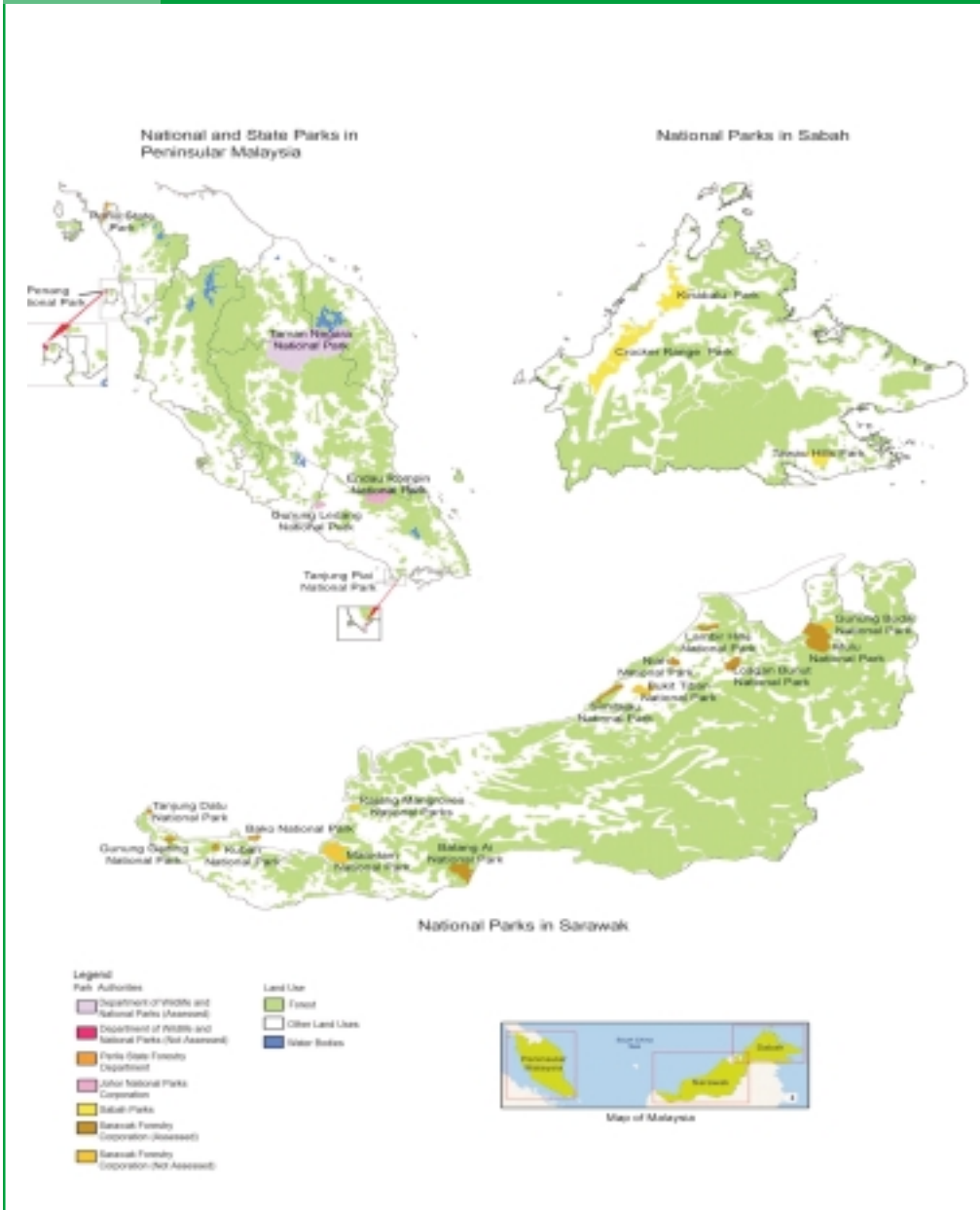
Forest cover in Malaysia is estimated to be 59.5% of the total land area (Thang, 2004), most of which is within Permanent Forest Estates managed by the Forestry Department. Protected area coverage in the country is estimated to be about 7% of the total land area (Thang, 2004) but various figures are provided by different sources, depending on the interpretation of what constitutes a protected area (there has yet to be a master list of protected areas in Malaysia). Figure 1 below shows the forest cover and distribution of national and state parks in Malaysia.

The major forest types in Malaysia include lowland dipterocarp forest, hill dipterocarp forest (for Peninsular Malaysia), mixed dipterocarp forest (for Sabah and Sarawak), montane forest,

¹ Senior Programme Officer, Protected Areas (ssuksuwan@wwf.org.my), WWF Malaysia

² Chief Technical Officer (Borneo Programme) (ramat@wwf.org.my), WWF Malaysia

FIGURE 1 TERRESTRIAL NATIONAL AND STATE PARKS IN MALAYSIA



mangrove forest, peat swamp forest, heath forest, beach or coastal forest and forest on limestone.

It can be said that in practice, there are three different systems for the management of natural resources in Malaysia, corresponding to the geographical regions of Peninsular Malaysia, and Sabah and Sarawak on the island of Borneo. However, there is no single standardized system of protected areas (PAs) common to all the three regions in Malaysia (MoSTE, 1997). PAs in Malaysia include national parks, state parks, wildlife sanctuaries, wildlife reserves, virgin jungle reserves, nature reserves, nature parks, conservation areas and various classes of protected forests. State parks in Peninsular Malaysia, such as the Perlis State Park, are actually “national parks” using IUCN classification (IUCN, 1994), but are officially designated in Malaysia as “state parks” to emphasize the fact that these parks are administered by the State authorities, rather than the Federal government.

In Peninsular Malaysia, terrestrial PAs are mainly managed by the Department of Wildlife and National Parks (DWNP) and the Forestry Department but increasingly, the various state governments are also becoming involved in protected area management. The States of Johor and Perlis now have their own PAs while Kelantan and Perak are in the process of gazetting protected areas. Marine PAs in Peninsular Malaysia are managed by the Federal Marine Parks Section under the Ministry of Natural Resources and the Environment (MoNRE).

All marine PAs in Sabah are managed by Sabah Parks while the terrestrial PAs are managed by Sabah Parks, the Sabah Wildlife Department, the Sabah Forestry Department and the Sabah Foundation (a state-owned agency).

In Sarawak, all marine and terrestrial PAs are managed by the Sarawak Forestry Corporation.

Scope and Objective of Assessment

Given the complexity of the PA network in Malaysia, it was decided that the scope of this assessment be limited to terrestrial protected areas within the IUCN's Category II, i.e. national and state parks. National parks and state parks were chosen for this assessment because they are the most recognizable category of protected areas. Federal and state governments accord high priority to the conservation and management of national and state parks, as compared to other categories of protected areas, because recreation is one of the main objectives of the designation of such areas. National and state parks are viewed as an increasingly important contributor to the local tourism industry. The assessment was system-wide in nature, looking at overall trends across the board, rather than focusing on individual parks. Table 1 provides a summary of national and state parks assessed using the RAPPAM tool.

Out of the 24 terrestrial national and state parks in Malaysia as of 2005, a total of 18 parks were assessed, covering a total area 845,701 ha. Six parks, five of which are under the management of the Sarawak Forestry Corporation (Bukit Tiban National Park, Maludam National Park,

Table 1: Summary of PAs Covered in the Assessment

Parks Covered in this Assessment	Management Authority	Date Established	Size (ha)	Major Habitat Types
Taman Negara National Park	Department of Wildlife and National Parks	1938-1939	434,351	<ul style="list-style-type: none"> ■ Lowland dipterocarp forest ■ Hill dipterocarp forest ■ Montane forest ■ Mangrove forest ■ Peat swamp forest ■ Mixed dipterocarp forest
Perlis State Park	Perlis State Forestry Department	2000	5,017	<ul style="list-style-type: none"> ■ White Meranti-Gerutu forest ■ Limestone vegetation
Endau Rompin National Park	Johor National Parks Corporation	1993	48,905	<ul style="list-style-type: none"> ■ Lowland dipterocarp forest ■ Hill dipterocarp forest ■ Heath forest
Gunung Ledang National Park		1997	10,022	<ul style="list-style-type: none"> ■ Hill dipterocarp forest ■ Montane forest
Tanjung Piai National Park	Sabah Parks	1997	926	<ul style="list-style-type: none"> ■ Mangrove forest
Kinabalu Park		1964	75,370	<ul style="list-style-type: none"> ■ Mixed dipterocarp forest ■ Montane forest
Crocker Range Park		1984	139,919	<ul style="list-style-type: none"> ■ Mixed dipterocarp forest ■ Montane forest
Tawau Hills Park	Sarawak Forestry Corporation	1979	27,972	<ul style="list-style-type: none"> ■ Mixed dipterocarp forest ■ Montane forest
Bako National Park		1957	2,727	<ul style="list-style-type: none"> ■ Heath forest ■ Open scrubland ■ Mangrove

Parks Covered in this Assessment	Management Authority	Date Established	Size (ha)	Major Habitat Types
Kubah National Park		1988	2,230	<ul style="list-style-type: none"> ■ Montane forest ■ Mixed dipterocarp forest ■ Heath forest
Gunung Gading National Park		1983	4,196	<ul style="list-style-type: none"> ■ Mixed dipterocarp forest ■ Montane forest
Batang Ai National Park		1990	24,040	<ul style="list-style-type: none"> ■ Mixed dipterocarp forest ■ Riparian forest ■ Regenerated forest
Tanjung Datu National Park		1994	1,379	<ul style="list-style-type: none"> ■ Mixed dipterocarp forest ■ Beach forest
Niah National Park		1974	3,139	<ul style="list-style-type: none"> ■ Limestone vegetation ■ Mixed dipterocarp forest ■ Heath forest
Lambir Hills National Park		1975	6,950	<ul style="list-style-type: none"> ■ Mixed dipterocarp forest ■ Heath forest
Gunung Mulu National Park		1974	52,865	<ul style="list-style-type: none"> ■ Mixed dipterocarp forest ■ Limestone vegetation ■ Montane forest
Similajau National Park		1976	7,067	<ul style="list-style-type: none"> ■ Mixed dipterocarp forest ■ Beach forest ■ Mangrove forest
Loagan Bunut National Park		1990	10,736	<ul style="list-style-type: none"> ■ Peat swamp forest ■ Mixed dipterocarp forest
	TOTAL		845,701	

Rajang Mangroves National Park, Gunung Buda National Park and Kuching Wetlands National Park) and the remaining one under the Department of Wildlife and National Parks (Penang National Park), were not assessed as they were not yet fully operational.

The overall objective of this rapid assessment of protected area management is to help improve the management effectiveness of Malaysia's national and state park system. More specifically, it seeks to:

- ▶ Update existing data on national and state parks in Malaysia.
- ▶ Determine the general strengths and weaknesses of park management in Malaysia.
- ▶ Identify and analyse the main pressures and threats to the national and state park system.
- ▶ Examine how best to apply the resources and skills of government, research institutions and nongovernment agencies to strengthen the national and state park system.

Following the assessment with park authorities, a Workshop on the Management Effectiveness of National and State Parks in Malaysia was conducted on 3-4 May 2005 in Kuala Lumpur. This participatory multi-stakeholder workshop was attended by about 65 participants comprising representatives from park authorities and other stakeholders such as representatives from relevant government departments, researchers from universities and research institutions, non-governmental organizations, consultants and tour operators.

Preliminary results from the assessment were presented during the workshop and peer-reviewed. Protected area system-wide questions from the RAPPAM questionnaire were answered by workshop participants during a breakout session. In the final breakout session, participants formulated recommendations on how to improve the management effectiveness of national and state parks in Malaysia.

A report was compiled based on the results of the assessment and the workshop, the draft of which was circulated amongst the PA authorities involved for feedback. A second draft was then circulated, incorporating feedback from the PA authorities, before the report was finalized and published in February 2006 (NRE, 2006).

Main Findings and Recommendations of the Assessment

Biological and Socioeconomic Importance

Through the assessment, the perception of the park authorities on the biological and socioeconomic importance of their respective PAs was determined. The assessment showed that on average, the biological importance of parks rate higher than their socioeconomic importance. For biological importance, average scores were relatively high for all the ten individual components (see Figure 2).

Scores for socioeconomic importance was generally high, except for two of the ten components in this section or the questionnaire. Park authorities were mostly of the opinion that the local communities did not depend on the PAs for subsistence

purposes. It was felt that most locals were integrated into the market economy and that were more likely to purchase their basic needs through income gained from the sale of natural resources such as rattans, wild fruits and so on. Existing national and state parks in Malaysia do not score high in terms of religious importance except for Kinabalu Park. All the parks provide a significant source of income for local communities, either directly through employment, whereby locals are hired either as permanent or daily paid staff, or indirectly through the creation of tourism-related business opportunities (see Figure 3).

Vulnerability

The external factors having the most impact on PA resources were found to be high market value

of timber species; strong local and regional demand for vulnerable park resources, including *gaharu* (aloewood), and bushmeat and medicinal products from animal species; high accessibility for illegal activities, as well as easy access to local and international markets for park resources; and difficulties in monitoring of illegal activities due to dense forests and mountainous terrain. Other factors were found to be not very significant in influencing vulnerability of the parks (see Figure 4).

Pressures and Threats

Within the context of the RAPPAM tool, “pressures” are defined as forces, activities, or events that have had a detrimental impact on the integrity of the protected area, i.e. that have diminished biological diversity, inhibited

FIGURE 2 AVERAGE BIOLOGICAL IMPORTANCE

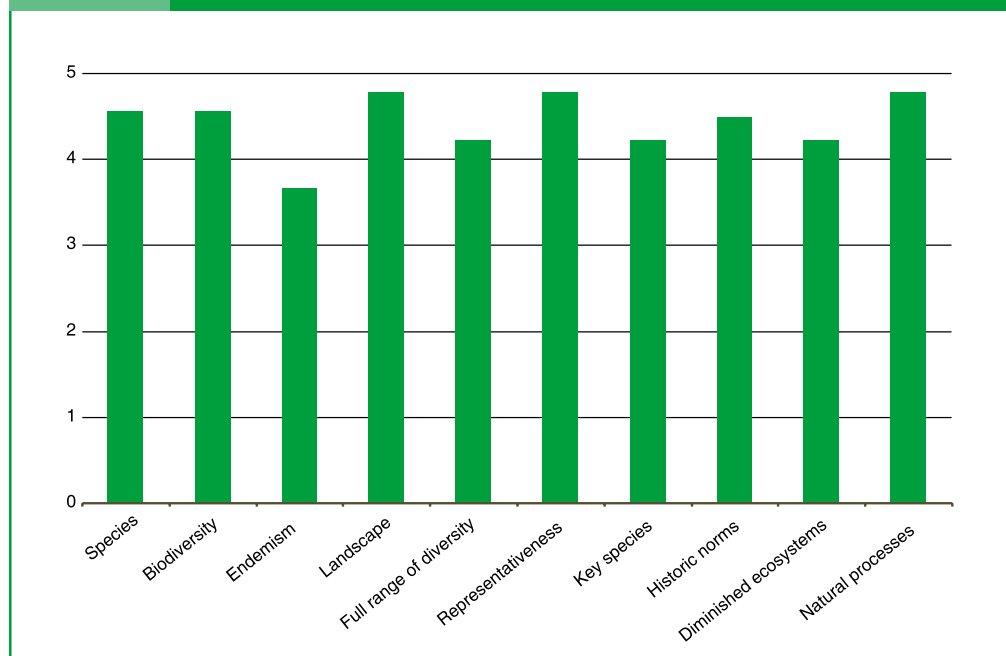
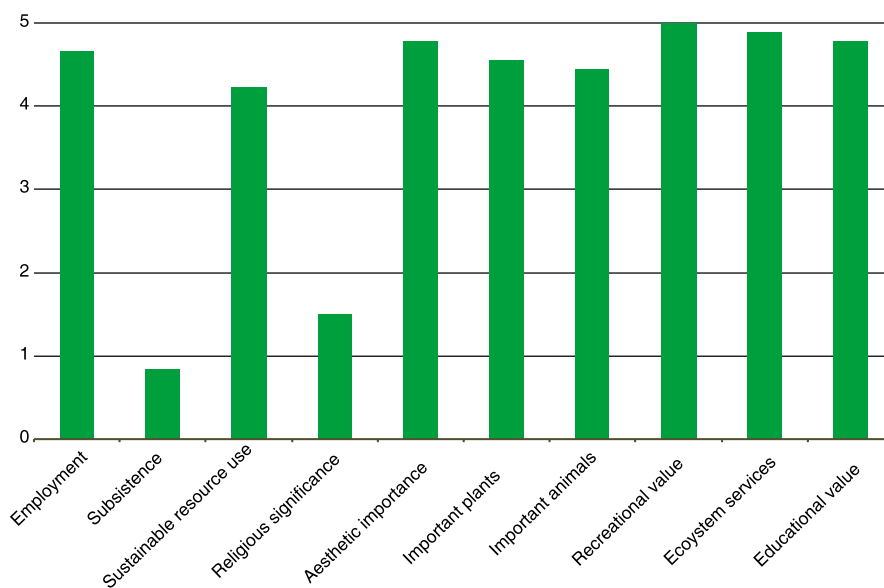
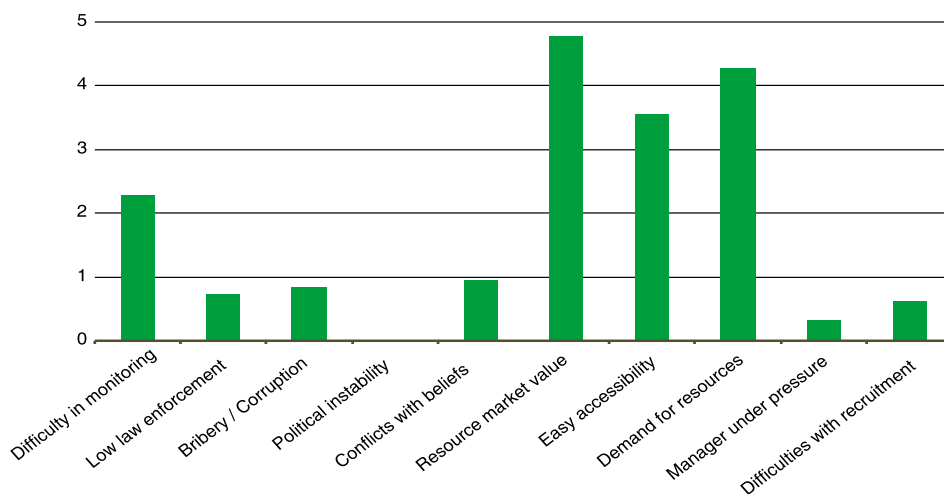


Table 2: Additional Questions Included in the RAPPAM Questionnaire

No.	Section of Questionnaire	Additional Question(s)
1.	Section 1: Background Information	1. i) Habitat types occurring in the PA (respondents asked to indicate top three from a five choices provided).
2.		1. j) Number of visitors in 2004 (respondents were asked to choose from a range of values provided)
3.	Section 6: Objectives - Planning	6. f) PA objective places biodiversity consideration above recreation/tourism.
4.	Section 9: Staffing	9. f) Permanent-temporary staff ration is optimal.
5.		9. g) There is an incentive system in place to encourage consistently high quality standards of performance from staff.
6.	Section 10: Communication and Information	10. f) The PA is well-known among the public.
7.		10. g) Research needs of the PA are adequately communicated to the scientific community.
8.		10. h) There are adequate lines of communication with relevant enforcement authorities.
9.	Section 12: Finances - Inputs	12. f) Visitor charges at the park are reflective of the biodiversity value of the PA and level of visitor experience offered.
10.		12. g) Funding in the last 5 years has been adequate for capital investment (e.f. for park infrastructure).
11.		12. h) Funding in the next 5 years will be adequate for capital investment (e.g. for park infrastructure).
12.	Section 13: Management Planning - Processes	13. f) There is a management committee with local community representation.
13.		13. g) Management plans are reviewed on a regular basis and updated/changed/adapted as necessary in response to changes in existing situations and conditions.
14.	Section 15: Research, Evaluation & Monitoring	15. f) Procedures for conducting research in the PA are clearly defined and communicated.
15.	Section 18: Protected Area Policies	18. k) There is cross-marketing carried out by the different PA authorities.
16.	Section 19: Policy Environment	19. k) There are regular meetings among the different PA authorities.

FIGURE 3 AVERAGE SOCIOECONOMIC IMPORTANCE**FIGURE 4** AVERAGE VULNERABILITY

regenerative capacity, and/or impoverished the area's natural resources, within the 5-year period prior to the assessment. "Threats" are defined as potential pressures which are likely to occur or to continue in the 5-year period following the assessment. Pressures and threats include both legal and illegal activities, and may result from direct and indirect impacts of an activity. Thirteen categories of pressures and threats were identified and modified, where appropriate, to suit the local conditions (as discussed earlier).

The degree of individual pressures and threats is determined based on 3 factors, i.e.:

- ▶ Extent – the range across which the impact of the activity occurs;
- ▶ Impact – the degree, either directly or indirectly, to which the pressure affects overall protected area resources; and
- ▶ Permanence – the length of time needed for the affected protected area resource to recover with or without human intervention.

These three factors were then multiplied to obtain the degree of the pressure or threat. A degree of 1-3 is considered mild, 4-9 moderate, 12-24 high, and 27-64 severe (see Table 2).

A total of 101 occurrences of pressures were recorded from the assessment (see Table 4). The pressures most frequently encountered were tourism and recreation (16 parks), illegal hunting (14 parks), waste disposal (14 parks), and illegal extraction of NTFP (11 parks).

A total of 101 occurrences of threats were also recorded, most of these being current pressures

that are likely to continue in the next five years. The most frequently encountered threat were tourism and recreation (15 parks), followed by illegal hunting (14 parks), waste disposal (13 parks), and illegal extraction of NTFP (12 parks). It should be noted that frequency of occurrence of a particular pressure or threat has little to do with the degree of that pressure or threat. For example, tourism and recreation are the most frequently-encountered pressure and threat but is considered to be a mild pressure and threat.

Management Effectiveness

The assessment takes into account three main aspects of management effectiveness, i.e.: Planning and Design, Inputs and Processes. Each aspect was given a score ranging from one to five, whereby a score of three is considered the threshold for effective management, i.e. a score of four and above is considered as effective. System-wide, management effectiveness was found to be fairly strong, with an overall average score of 3.9 (out of a maximum of 5) for each of the three aspects (see Table 5).

There were 16 criteria within Planning and Design, grouped within three main components, namely Objectives, Legal Security and Site Design and Planning (see Figure 5). The average scores for the criteria were all above the threshold value of 3.0 except for two criteria, i.e. "no land use disputes" and "landscape linkages". It was therefore recommended that system-wide planning should take into account the need for landscape linkages between protected areas. Most national and state parks are guided by management objectives but many of the parks did not have specific objectives related to key

Table 3: Definitions of Extent, Impact and Permanence

SCORE	1	2	3	4
Extent	Localized (<5%)	Scattered (5-15%)	Widespread (15-50%)	Throughout (>50%)
Impact	Mild	Moderate	High	Severe
Permanence	Short term (<5 years)	Medium term (5-20 years)	Long term (20-100 years)	Permanent (>100 years)

Table 4: Summary of Pressures and Threats

PRESSURE AND THREAT CATEGORY	OCCURRENCE OF PRESSURE (NUMBER OF PARKS)	AVERAGE DEGREE OF PRESSURE ¹ (MAX. = 64)	OCCURRENCE OF THREAT (NUMBER OF PARKS)	AVERAGE DEGREE OF THREAT ¹ (MAX. = 64)
Logging	4	9	4	8
Illegal land clearing	7	5	8	5
Extraction of timber	7	10	5	9
Hunting (illegal)	14	5	14	4
Hunting (legal)	4	4	4	4
NTFP (illegal)	11	5	12	4
NTFP (legal)	4	3	4	1
Fishing	7	2	7	2
Tourism & recreation	16	2	15	2
Waste disposal	14	2	13	2
Invasive alien species	5	6	6	6
Semi-natural (fire)	2	1	3	2
Cross-boundary	6	19	6	19
Total number of occurrences	101		102	

1. Average degrees of pressures and threats are calculated over the total number of parks where the particular pressure or threat occurs.



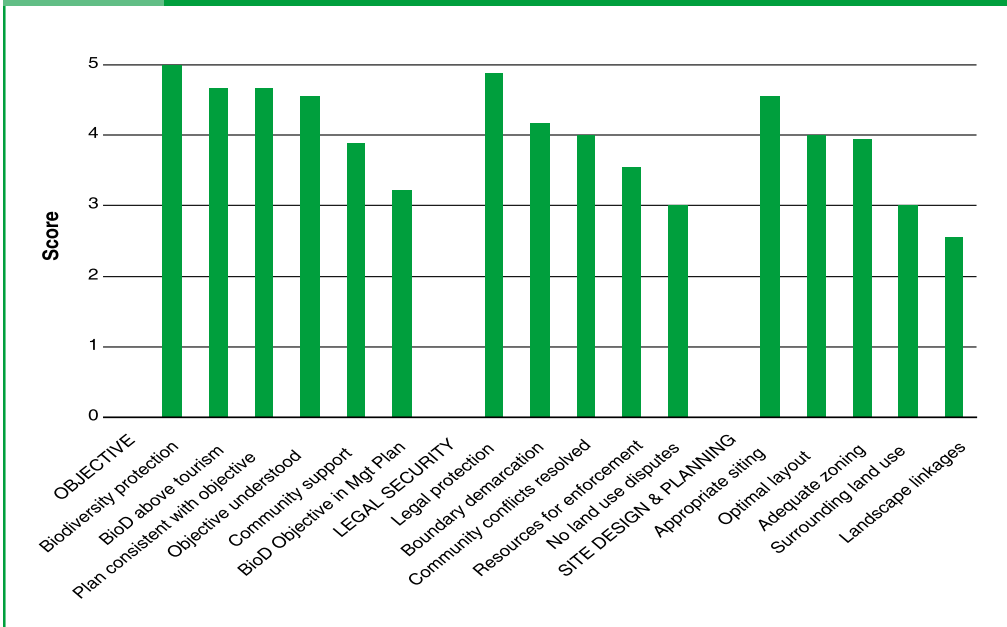
2.  Moderate  High

Table 5: Average Scores for Management Effectiveness Elements and Components

ELEMENT	ELEMENT SCORE	COMPONENT	COMPONENT SCORE
Planning and design	3.6	Objective Legal security Site design and planning	3.8 3.3
Inputs	3.9	Staffing Communication and information Infrastructure and facilities	3.8 3.8 4.1
Management processes	4.0	Financing Management planning Management decision making Research and monitoring	4.0 3.7 4.4 3.8

FIGURE: 5 AVERAGE PLANNING AND DESIGN SYSTEM-WIDE

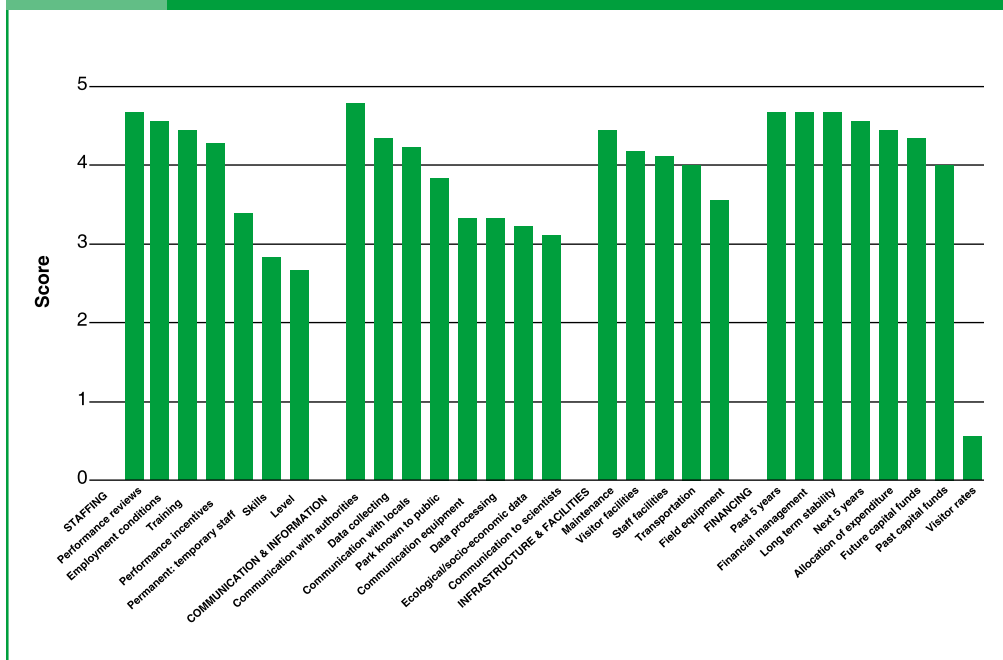
species or habitat, which are important in providing the basis for critical management activities and strategies.

All the parks assessed had strong legal security but some parks did not have clearly demarcated boundaries, leading to problems in law enforcement within park boundaries. It was recommended that standard guidelines for PA boundary demarcation be adopted nation-wide and that boundaries are verified every five years.

Although local communities generally supported park objectives, some segments of certain local communities did not totally support park objectives due to resource-use related issues.

Inputs

For Inputs, there were 28 criteria grouped within four components i.e. Staffing, Communication, Infrastructure, and Finances (see Figure 6). Three criteria fell below the threshold for effective management (i.e. score of below 3.0), specifically “skills”, “staffing level” and “visitor rates”. Some of the parks assessed did not have enough staff or did not have staff with adequate skills to enable critical management activities (defined as activities necessary to prevent, mitigate, or restore irreplaceable or unacceptable losses to natural or cultural protected area resources). Measures proposed to overcome this include the creation of more posts for the planning, coordination and management of PAs

FIGURE 6 AVERAGE INPUTS SYSTEM-WIDE

and implementation of staff exchange programs between parks. There was a very strong perception among park authorities that current visitor entrance rates were too low and therefore it was recommended the fee structure for PAs be reviewed. It was also proposed that other sources of PA financing should be explored, and these could include federal government grants, international development funds and conservation trust funds.

Management Processes

The 18 criteria for Management Processes are grouped under four components, namely Management Planning, Management Decision-making and Research, Monitoring and

Evaluation (see Figure 7). Only two criteria had scores below the threshold value of 3.0, i.e. “resource inventory” and “social research”. Most park authorities were of the opinion that research on key social issues was inadequate for the needs of the parks. Not all the parks assessed had a comprehensive and recently-written management plan, but in some cases the parks that do not have a management plan had a business plan and a park protection plan instead.

Protected Areas System-Level Design

At the system level, it was found that most of the ecosystems in the country were represented within existing national and state parks (see

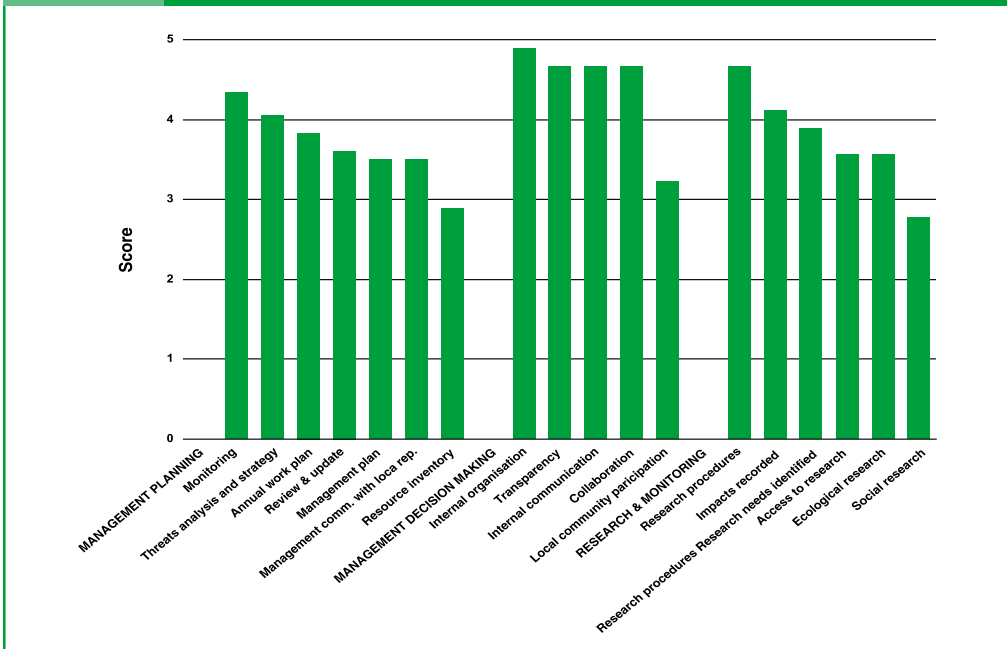
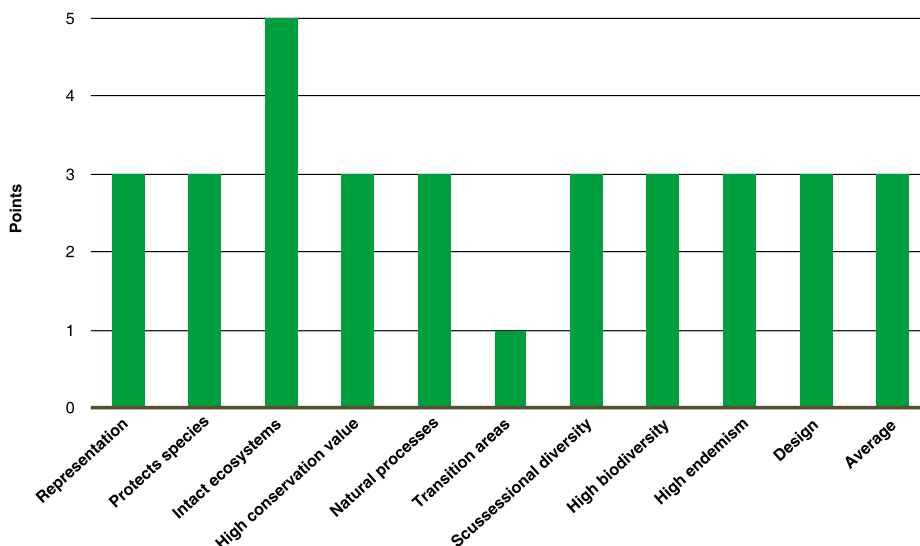
FIGURE 7 AVERAGE MANAGEMENT PROCESSES SYSTEM-WIDE

Figure 8) but some remain under-represented. For example, peat swamp forests, beach forest and open scrubland were only represented in national parks in Sarawak and not in Peninsular Malaysia or Sabah. Some transition areas between ecosystems such as coastal zones, mangrove forests and riverine and marine interfaces were also not well represented within the PA system.

While there was a general perception the national and state park system was adequate for the protection against the extinction or extirpation of most animal species, some of the larger mammals such as the seladang (*Bos gaurus*) and Sumatran rhinoceros (*Dicerorhinus*

sumatrensis) are rare and may not have sufficient populations within the national and state park system for their long-term survival. Among the smaller animals, such as birds, spiders and snails, there are species with more restricted distributions and a considerable number of these may not be represented within the national and state park system or even in the other classes of protected areas in Malaysia. This is also true for certain plant species, especially herbaceous plants, which may only be found on one or a few limestone hills or mountain peaks.

Although it was recognized that it would not be realistic to protect all the sites of high biodiversity and endemism in Malaysia, a recommendation

FIGURE 8 PROTECTED AREA SYSTEM LEVEL DESIGN

was made for a more systematic approach in assigning conservation priorities.

On the whole, there was consensus that the layout and configuration of most of the parks optimize the conservation of biodiversity but there were exceptions; some parks, for example, did not protect both banks of major rivers. It was also noted that the final layout and configuration recommended by resource managers and conservation planners are subject to approval by state authorities, who may have other priorities.

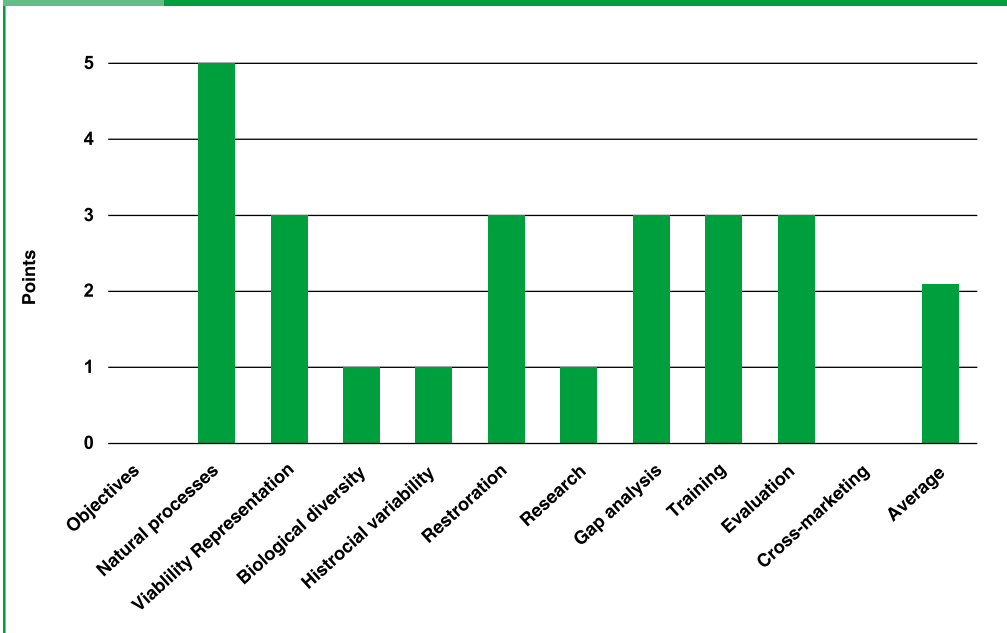
Protected Area System Policies

There was a general consensus that the country on the whole still lacks a clear protected area policy that articulates a vision, goals and

objectives for the protected area system (see Figure 9). The federal and state governments have shown some commitment to protecting a viable and representative protected area network but a more coordinated approach was needed, bearing in mind that the interests of the state should also be safeguarded. Another shortcoming of protected area policy identified was the lack of cross-marketing by different protected area authorities

Policy Environment

On the whole, it was found that the policy environment in Malaysia is conducive for the effective management of national and state parks (Figure 10). There is national commitment towards the effective administration of the

FIGURE: 9 PROTECTED AREA POLICIES

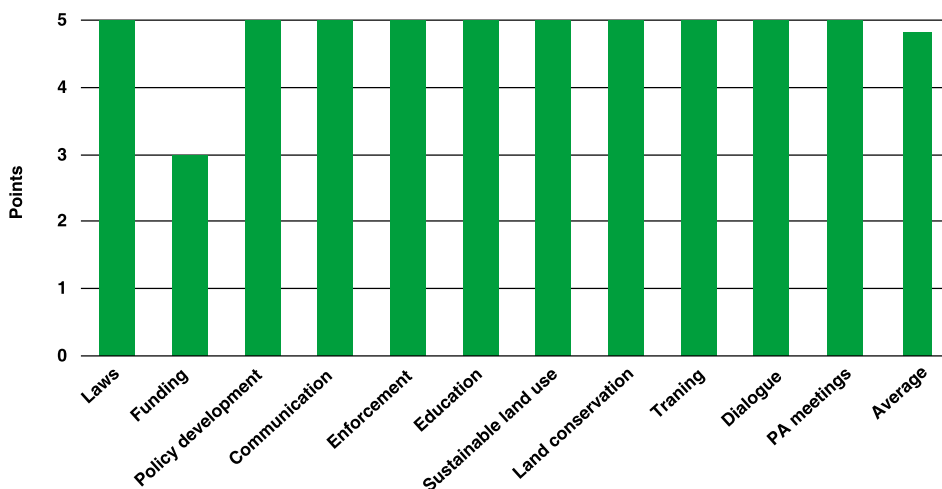
protected area system but there was a general agreement that more funding was required.

Lessons Learnt

For a country like Malaysia which has a complex system of PAs with many issues unresolved (e.g. no master list of PAs; many PAs not assigned IUCN PA category), it may be more beneficial to focus on the more “settled” categories of PAs. The selection of PAs to be assessed should also take into consideration the objectives and nature of the PAs. For example, not all PAs are open to visitors for recreational activities and if the PAs assessed are a mixture of those open to visitors and those that are not, the results of the assessment may be misleading.

It is crucial to assist PA authorities when filling questionnaires as some of the questions are complex and can be interpreted in different ways. Apart from ensuring consistency in how the questions answered, having an assessment team to guide park authorities with the RAPPAM tool promotes trust and helps to convince them of the need for such an assessment.

The RAPPAM tool can be adapted to suit local situations. As discussed earlier, additional questions can be added to the questionnaire, provided that adjustments are made to the scoring system to avoid erroneous results. The categories of pressure and threat provided in the RAPPAM tool are not exhaustive and more categories can be added as

FIGURE: 10 POLICY ENVIRONMENT

required. Refinements can also be made to the suggested pressure and threat categories to remove any ambiguity that may arise.

One of the main benefits of the RAPPAM methodology is that allows for an overview of PA status from a system-wide perspective. There were complaints from some quarters that the RAPPAM tool was based on the perception of park authorities, and therefore the results could be biased. However, it cannot be denied that this drawback is offset by the speed in which the assessment can be carried out, as it does not require time-consuming field assessment of individual PAs.

The indirect benefits of carrying out the RAPPAM assessment include better networking and cooperation among PA authorities. The

RAPPAM tool can also be a catalyst for action – in the Malaysian experience, the assessment led to the production of a Malaysian Parks newsletter of which the editorial committee consists of the almost all the existing PA authorities.

Acknowledgements

The assessment of national and state parks in Malaysia was commissioned by the Ministry of Natural Resources and the Environment, Malaysia (MoNRE). WWF International provided technical and financial support to WWF-Malaysia for the assessment through Project No. 8F0012.01. We are grateful for the cooperation and contributions from individuals who participated in the assessment: Tuan Haji Sahir Othman & Saharudin Anan from the Department of Wildlife and National Parks; Anne Majanil, Francis Cheong, Harban Singh & Lili Tokiman

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Luna Amin, Abang Arabi Abang Amrain, Linek anak Ayok, Abang Abu Mutalib, Augustine Lai, Kamal Abdullah, Mohd. Sanusi Hj. Juni & Sem Pasand @Chrismond from Sarawak Forestry Corporation.

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APPLICATION OF GIS AND REMOTE SENSING FOR PROTECTED AREA MANAGEMENT IN THE HINDU KUSH-HIMALAYAS

Birendra Bajracharya¹

Introduction

The high ridges, deep valleys and extreme weather conditions of the Himalayan region present a rich landscape of cultural and biological diversity. However, the transition from subsistence to market economy in the past decades and developments in infrastructure and communication are influencing the socioeconomic conditions of the region and generating excessive pressures on its natural resources. Land use transformation, habitat fragmentation, unregulated tourism, and unsustainable harvesting of biodiversity have emerged as major concerns of mountain environments (Banskota 2000; Guangwei, 2002; Chettri & Sharma, 2006).

Protected area (PA) systems are seen as one of the most common strategies to achieve the goals of biodiversity conservation (Mulongoy *et al.*, 2004; Jones *et al.*, 2006). Efforts at biodiversity conservation with the initiation of many PAs and related regulations have been initiated in the region since the last four decades. Many of these PAs are located in remote parts of the country inhabited by marginal and economically

deprived communities who have depended on the natural resources for hundreds of years. Thus while the PAs represent a way of effective in-situ conservation, they also need to look into assuring continued benefits to the local communities in the form of traditional resource use or new and alternative livelihood options for successful management of these areas.

Protected Area Management Functions and Role of GIS and Remote Sensing

Conservation planning and management have many goals which are often influenced by socioeconomic goals and preferences. The dual responsibility of ecosystem conservation and poverty alleviation in the local communities at the same time brings about numerous management obligations which often conflict with each other. There are no well defined and widely accepted decision processes for conservation management and many management policies are based on hypotheses in the absence of sufficient data and scientific knowledge about ecosystems (Ekbja, 2004). The evolving concepts of eco-region conservation and

¹International Centre for Integrated Mountain Development (ICIMOD), Kathmandu, Nepal; bbajracharya@icimod.org

participatory approaches involve much larger spatial scales that go beyond species and habitat conservation and demand understanding of the major transformations of land, water, energy and other environmental factors; the sensitivity and vulnerability to environmental variations and changes; and the responses and choices for managing environmental resources (WWF and ICIMOD, 2001). This necessitates a sound information base for analysis and assessment of various biophysical and socio-ecological processes.

Geographic Information System (GIS) is described as a computer based system which supports input, storage, analysis and display of spatial information. It helps us to better understand various spatial phenomena and their interrelationships. It provides tools which can assist PA management in many aspects ranging from resource use planning, habitat modeling and assessment, conservation management, and tourism promotion. The present PA management planning processes in Nepal has put forward a number of issues such as management zoning and tourism promotion as priorities (DNPWC, 2005; KTMNC, 2004a and 2004b). Maps are essential tools for these kinds of area based planning, but the spatial visualization and interactivity provided by GIS greatly enhances this process. Some of the application areas related to conservation and management priorities of PAs are listed below.

(i) Mapping conservation management zones: Implementation of zoning system is one of the common strategies adopted in park management.

Management zones such as conservation area, community resource area, and buffer zone area can be delineated in a more systematic way through the process of overlaying various thematic information and multi criteria analysis tools.

(ii) Habitat mapping: Another priority agenda of management plans is protecting endangered species and habitats. Interpretation of remote sensing images supplemented with GIS data such as altitudinal zones, vegetation types, slope and aspects, and field information on species distribution provide a basis for potential habitat mapping. Analysis of species distributions and ecological indicators such as fragmentation and landscape metrics facilitates in developing various conservation strategies.

(iii) Resource mapping: Many rural areas have traditional practices which emphasize conservation and sustainable use of natural resources. With the growing complexities in national regulations for PAs and the growing pressures on their natural resources, assessment of available resources and planning for benefit sharing is getting more demanding. Resource mapping, analysis of proximity and accessibility from settlements, and delineation of watersheds are some of the tools that GIS provides to support such activities.

(iv) Tourism management: Tourism promotion and management is another area which is generating alternative options of livelihood to the communities in and around PAs. Web-based mapping solutions based on GIS are emerging as

powerful tools for tourism information and promotion. GIS also plays an important role in identification of new tourist destinations and planning for tourism related infrastructure and their potential impacts on the environment.

(v) Socioeconomic mapping. GIS and remote sensing (RS) are also effective tools to support the implementation of management plans and monitor the socioeconomic impacts of interventions at different locations and scales.

GIS Applications in the Hindu Kush Himalaya Region

The use of GIS and RS is gradually increasing in the Hindu Kush Himalaya (HKH) region. Some examples at ICIMOD related to conservation planning and PAs are illustrated here.

Development of Conservation Corridors in the Kangchenjunga Landscape

A multi-level and multi-stakeholder transboundary conservation effort was initiated in 2002 in the Kangchenjunga landscape of Nepal, Bhutan, and India with the overall objective of restoring fragmented and deteriorating forest resources through development of conservation corridors and adaptation of conservation measures, moving from a species approach to a landscape approach (Chettri *et al.*, 2007). GIS and RS tools were used to supplement and delineate corridors and cross-check the potential forested areas for connectivity. Habitat analysis of 15 mammalian species and rhododendron species was carried out to identify areas with high potential for developing corridors in between the existing PAs.

Land cover maps of 2000 and 1977 were generated using LandSat ETM+ and LandSat MSS images to study the pattern of changes in vegetation cover. Detailed land use and land cover maps were generated on the identified corridor areas using IRS LISS IV images. The information from community consultations and field research supplemented by results from these analyses helped in identification of biological corridors and development of conservation strategies.

Monitoring of Glacial Lakes and Simulation of Glacial Lake Outburst Flood (GLOF) in Sagarmatha National Park

GLOF are common natural hazards in the Himalayas. These floods, usually of large magnitudes can severely affect the fragile mountain ecosystems and the limited economic activities in addition to threats to human life and habitats. Sagarmatha (Mt. Everest) region is one of the most extensively glaciated regions of Nepal. Temporal series of satellite images and field data showed an expansion of Imja Lake from 0.82 km² in 2001 to 0.94 km² in 2006 and an increase in length from 1,647m to 2,017m. GLOF hazard in the Sagarmatha region was assessed using dam break and hydrodynamic modeling. The available data from Dig Tsho GLOF of 1985 was used to validate many of the model outputs. The technique was further applied for GLOF hazard assessment of Imja Lake, the largest and potentially dangerous glacial lake in the region. A GLOF vulnerability rating map was prepared and an assessment of vulnerable settlements was carried out. The study is found to be a cost effective means of obtaining preliminary

information on the extent and impact of possible GLOF events which are useful for developing plans for early warning systems and implementing management plans.

Tourism Planning in Sagarmatha National Park

This case study was carried out as an example for training course on applications of GIS for PA management. Uneven concentration of tourists during the peak season and high seasonal variations are some of the issues of tourism management in Sagarmatha National Park. With an objective of identifying new locations for tourism promotion, areas at low altitudes were located from where highest number of mountains including Mount Everest is visible. Also a feasible route to this area was identified using cost distance analysis considering the existing trails, hotels and other infrastructure as well as environmental costs. This case study illustrated the analytical tools provided by GIS for supporting tourism planning within a national park.

Conclusion

PA management and conservation activities are getting complex with many interlinked political,

socioeconomic and natural functions. GIS and remote sensing tools are coming up as essential tools to provide a spatial insight in these activities. They provide a framework for developing conservation strategies and monitoring the impacts of development interventions on the environment. The availability of remote sensing data of varying resolutions makes it possible to carry out analysis at different scales and times. This is more significant for the mountain areas where accessibility is a major challenge.

GIS can best serve conservation activities when adequate biological and socioeconomic information linked through a sound topographic base are available. Another challenge is to match the data and analytical tools, and the scale at which questions about landscapes need to be addressed. Developing an infrastructure on natural and socioeconomic data and capacity building of the national and local institutions involved in conservation planning and management will be an important strategy for continued use and benefits from the opportunities provided by these tools and technology.

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CONCLUSION AND RECOMMENATIONS

Siddhartha B. Bajracharya¹ and Ngamindra Daha²

Managing protected areas (PAs) in the context of climate change and environmental stresses compounded by population pressures and globalization has become a challenging task in the 21st century. In recent years, the task has been further complicated with global warming and climate variability adding stresses on PAs that are already under pressures from multiple fronts such as park-people conflicts and poaching. It has become clear that responding to the emerging challenges of PA management now requires deeper understanding and broader vision. Climate change alone has wide and persistent implications on nature and people. Though the global changes expounded by climate change have already affected vital components of natural systems at varying scales, scientific information and knowledge to explain the extent of impacts, particularly on ecosystems and species is lacking. This is a topic that PA planners and managers have considerable interest for shared learning through dialogue.

Maintaining a balance between healthy ecosystems and sharing economic benefits equitably among key stakeholders has long been a key objective of PA governance. However, the philosophy of PA management has evolved over time from simply maintaining hunting reserves

for sporting purposes to conserving biodiversity in their natural form for the benefit of present and future generations. Depending on dominant national perspectives and needs, various strategies of ecosystem management practices in different regions and scales have been tried and tested to safeguard natural ecosystems and species. As effective and sustainable PA management is largely dependent on economic viability, various economic tools for supporting biodiversity conservation have emerged. Generating funds by tapping various functions of PAs is a commonly used logic for economic sustainability. Some important functions of PAs include biodiversity, tourism, forest products, local amenities, soil conservation, carbon sequestration, research, cultural values, watershed protection, and storm protection. The way these functions are transformed into benefits for people, including the rural poor living in and around PAs, will depend on the management objectives of the PA and effectiveness of these objectives converting into action. In this context, managing PAs has always been a dynamic process seeking to address diverse issues from local to global consequences.

A key objective of organizing meetings and conferences is to enhance knowledge through

¹Executive Officer, Projects & Programmes Development, NTNC; siddhartha@ntnc.org.np

²Energy & Climate Change Coordinator, NTNC; ngamindra@gmail.com

sharing of experiences, information, and knowledge, and creating an enabling environment for identifying and executing priority actions for the future. The *Regional Conference on Managing Protected Areas: Shifting Paradigms* was successful in achieving this objective through a series of deliberations in four days. Contributing authors of this book have identified and analyzed pertinent issues with the aim of resolving underlying complexities and challenges. Through the Conference, priority actions have been identified for more effective PA management in the 21st century. The priority actions serve as references to formulate new or refine existing policies and programs for bringing desirable changes on various dimensions of PA management.

Among the multi-dimensional scenarios of PA management, (i) ecosystem management, (ii) governance, and (iii) economic tools for biodiversity conservation were the major themes chosen for the conference deliberations. Lessons derived from applications of various models and scales of ecosystem management practices, governance and economic tools provided a basis for making important policy decisions. Though each paper of this book stands alone to describe specific contextual issues, there is a common message among them—although new problems and challenges are emerging in PA management, so are more tools and opportunities; but there is a need to work out a balanced approach.

The core issues of ecosystem management, PA governance and economic tools for biodiversity conservation are intricately interlinked and

overlap in many cases. Various forms of payments for environmental services, particularly for water, tourism, forest resources and carbon sequestration were a major focus of the discussions. Packaging of more than one service for economic valuation was suggested. Protected area management is a sensitive task as most local and global events and changes have direct or indirect impacts on the environment. For example, globalization and climate change are two of the most influencing interlinked processes affecting local ecosystems and having impacts on all vital natural and human systems. Though the impacts are still to be adequately assessed, implications on PA management have already witnessed shifting paradigms at various dimensions. These views are also reflected in the earlier chapters and in the papers.

Though the perspectives of the authors support knowledge enhancement and policy refinement on diverse issues and contexts, they also share common elements for forward actions. These action-elements include innovation, incubation, analytical documentation and dialogues. Innovation requires for responding to emerging challenges, incubation for preceding pragmatic interventions, documentation, and analysis for promoting informed dialogues through sharing of ideas and knowledge in the long term. Open and creative mindsets are essential to respond to emerging challenges and complexities. The strategies for resolving complex legal and institutional challenges and strengthening the capacity and resilience of underlying PA management systems must be sought through innovative ways at different layers. Nurturing is

an essential process of capacity building, testing and evolution of diverse approaches and development that contribute to strengthen PAs for adaptive management. Analytical documentation is the next important need to enhance capacity over the long term when every PA has to respond to climate change and other global challenges. Dialogues among key stakeholders of PA management effectively contribute to build cooperation and minimize conflicts. It is the key action for shared learning. Internalization of these four stepping elements in the PA management process, however, requires a broader consensus among stakeholders and their continuous commitment. The key message of the Conference is that PA management in the 21st century must respond to emerging challenges and complexities through better regional collaboration and sharing of regional good practices amongst the stakeholders.

Finally, authors have come up with a range of actions as recommendations based on specific contexts described in the preceding chapters. Some of these include:

- ▶▶ Conserve blocks of natural habitat large enough to be resilient to large-scale disturbances and long-term changes that corresponds to major ecological and evolutionary processes that create and maintain biodiversity; better addresses the ecological and behavioral requirements for maintaining species populations; and allows assessment of representative features of biodiversity
- ▶▶ Represent all distinct natural communities in conservation landscapes and protected area networks
- ▶▶ Maintain viable populations of species, and ecological and evolutionary processes that create and sustain biodiversity
- ▶▶ Identify differentiated roles of various actors and factors in the ever changing paradigms
- ▶▶ Pay attention in building resilience power and adaptive capacity of PAs
- ▶▶ Keep analyzing the trends and impacts of climate change on biodiversity (PA, corridors, landscapes), applied research on ecosystem services & resilience, knowledge packages on effective options and adaptive mechanisms, advocacy and up scaling of successful models in other potential areas
- ▶▶ Realize the need and importance of landscape/ecosystem approach, community acceptance and participation on the corridor development planning process, integrative corridor and landscape management plans linking conservation with development, and partnerships with other major players
- ▶▶ Maintain transparency as it produces double edge consequences to achieve higher objectives
- ▶▶ Assess conservation objectives in the context of climate change and increasing environmental stresses
- ▶▶ Promote 'adaptive management' action plans for action-oriented socio-ecological process based participatory research
- ▶▶ Understand the paradigm shift in the current disciplinary ways of doing things,

- and consequent shift in methodologies—both in biophysical and social analyses
- ▶▶ Develop ‘hybrid technologies’ based on a proper mix of ‘traditional and ‘formal’ knowledge
 - ▶▶ Bridge gaps through wise management actions to create win-win situations for both humans and nature
 - ▶▶ Think and act innovatively to capitalize ‘payments for environmental services’ as an economic tool for biodiversity conservation—such as the emerging carbon markets that has opened a vast scope to add value on services of PAs through carbon sequestration.





PROCEEDINGS OF THE REGIONAL CONFERENCE ON MANAGING PROTECTED AREAS: SHIFTING PARADIGMS

Held on April 22-26, 2007 Kathmandu, Nepal

Day 1: Opening Day (April 22, 2007)

The conference was inaugurated by Mr. Matrika Prasad Yadav—Hon'ble Minister for Forests and Soil Conservation, Government of Nepal. The keynote speaker of the inaugural session was Mr. Jeffery McNeely—Chief Scientist, IUCN Headquarters. Mr. Tirtha Raj Sharma, Secretary, Ministry of Forests and Soil Conservation (MoFSC) chaired the session of the opening day.

Inaugural Speech by Mr. Matrika Prasad Yadav—Hon'ble Minister, MoFSC, Nepal

Hon'ble Minister Matrika Prasad Yadav remarked that seminars and conferences conducted in a traditional manner do not contribute to new and innovative ideas. Thus, he encouraged participants to think innovatively to deliver outcomes different from those of the previous years. Emphasizing on human made challenges, he stressed that in an era of technological growth, these were difficult to overcome compared to natural challenges. However, he also noted that these challenges could be mitigated through effective role of wardens. He announced that the Nepalese people had accepted the transformation of a New Nepal and sought the conviction of all to bring about a change in traditional and autocratic forms of thinking.

Address by Mr. Tirtha Raj Sharma—Secretary, MoFSC, Nepal [Session Chairperson]

Mr. Tirtha Raj Sharma conveyed his conviction on the significance of PAs in terms of scientific, cultural and ecological management. Moreover, he expressed that PAs have embraced different cultures and environments, habitat for wild flora and fauna and is a source for humans and livestock. Mr. Sharma concluded by indicating the right of every species including human-beings to survive and to play an important role in the ecosystem.

Welcome Speech by Dr. Krishna Chandra Poudel—Director General, DNPWC, Nepal

Dr. Poudel confirmed that the Regional Conference is a true reflection of the interest and commitment towards nature conservation. He conveyed that the PAs represent (i) the world's most unique ecosystems, (ii) last repository of biodiversity, and (iii) habitat area for endangered flora and fauna. Dr. Poudel emphasized the pressing need and our duty to preserve these resources for the present and future benefit of mankind.

Address by Mr. Bhim Prasad Neupane—Hon'ble Member of National Planning Commission, Nepal

Mr. Neupane informed participants that NPC is in the process of preparing a draft of the Three-Year Interim Plan. He stated that the outcome of the regional conference will provide an impetus for developing policies on biodiversity conservation. He affirmed that the outcomes of the conference should be a milestone that the National Planning Commission could use in development of policies and plans.



Minister for Forests and Soil Conservation-Nepal, Matrika Prasad Yadav lighting the inaugural lamp

Remarks by Dr. Siddhartha B. Bajracharya—Member Secretary, NTNC

Dr. Bajracharya announced that NTNC has been closely working with the government in its mission to conserve biodiversity. In that context, NTNC is currently managing two PAs (i) Annapurna Conservation Area (ACA), (ii) and Manaslu Conservation Area (MCA). Dr. Bajracharya stressed the significance of the conference to (i) share regional experience in PA management, (ii) learn from best practices from PA management, and (iii) strengthen networks in the region. Dr. Bajracharya noted that experts from 10 countries had gathered in the



Director General of DNPWC-Nepal, Dr. Krishna C. Poudel delivering welcome speech

conference to build a knowledge base on area specific best practices that could be replicated elsewhere.

Key Note Speech by Mr. Jeffery McNeely—Chief Scientist, IUCN Headquarters

Mr. McNeely highlighted that PAs need to be managed in new ways if we expect them to continue meeting the needs of people in the 21st Century. He expressed that though it is now well known that PAs are an essential element of strategies used by modern societies to ensure that natural resources are managed sustainably, and that biodiversity is conserved for present and future generations; it is less appreciated that PAs provide a wide range of economic, social, cultural, recreational, scientific, and spiritual values,

generating considerable economic benefits, ranging from tourism development to carbon sequestration to watershed protection. He explained that more recently, a very strong consensus has developed that protected areas need to make a concrete contribution to poverty alleviation, going far beyond simply doing no harm.

He then highlighted the ten most important benefits that PAs provide to human welfare:

- (i) **Biodiversity:** Conserve genetic resources and biological diversity more generally, enabling evolution to continue and providing raw materials for biotechnology.
- (ii) **Watershed protection:** Protect watersheds for downstream hydroelectric, irrigation, and water supply installations.
- (iii) **Storm protection:** Protect coastlines against damage from storms (especially coral reefs and mangroves), and absorb heavy rainfall (especially wetlands and forests).
- (iv) **Tourism:** Provide destinations for nature-based tourism and recreation.
- (v) **Local amenity:** Ameliorate local climate conditions and provide amenity values to nearby communities.
- (vi) **Forest products:** Provide a wide range of non-timber forest products, and limited amounts of timber.
- (vii) **Soil:** Build soils, control soil erosion, and recycle nutrients.
- (viii) **Carbon:** Sequester carbon, thereby contributing to global efforts to address anthropogenic climate change.
- (ix) **Research:** Provide sites for scientific research on a wide range of ecological, social, and economic topics.
- (x) **Cultural values:** Conserve culturally important sites and resources, and demonstrate the nation's interest in its natural heritage.

Mr. McNeely explained that major threats to PAs were (i) habitat destruction, (ii) climate change, (iii) impacts of invasive alien species, (iv) excessive harvesting of valuable species, and (v) impacts of pollutants. Mr. McNeely then highlighted the management challenges facing PA managers as follows: (i) help society adapt to climate change, (ii) build public support for PAs, (iii) help local people capture benefits from PAs, (iv) recognize new values of PAs, and (v) integrate PAs into regional planning. Mr. McNeely emphasized that the future direction for PA management was to work at a landscape scale. He concluded by expressing that PAs are an expression of human culture and If we wish to conserve what remains of biodiversity, PAs are an essential tool. However, PAs need public support and active management if they are to provide us with the goods and services we desire. This will require integrating PAs into larger landscapes that provide multiple goods and services to people.

Day 2: Technical Session on Ecosystem Management, Theme I

Presentation on Eco-regional Planning for Ecosystem Conservation by Dr. Eric Wikramanayake—Conservation Science Program, WWF, United States of America (USA)

Dr. Wikramanayake explained that an “ecoregion” *was a large area of land or water that contains a geographically distinct assemblage of natural communities that (i) share a large majority of their species and ecological dynamics; and (ii) share similar environmental conditions; and ecoregion conservation was a strategic approach to conservation planning at scales most suited for meeting the fundamental goals of biodiversity conservation.*

He then highlighted the fundamental goals of biodiversity conservation were to:

- » Represent all distinct natural communities in conservation landscapes and PA networks
- » Maintain ecological and evolutionary processes that create and sustain biodiversity
- » Maintain viable populations of species
- » Conserve blocks of natural habitat large enough to be resilient to large-scale disturbances and long-term changes

Dr. Wikramanayake also emphasized on the following key principles of ecoregion conservation:

- » Planning and implementing conservation at scales at which natural ecosystems operate
- » Articulating a 50-year biodiversity vision to conserve the full range of biodiversity—including species, natural habitats, and ecological processes characteristic of an ecoregion
- » Providing geographical/ecological flagships for developing a sense of stewardship

Defining Conservation landscapes as the units of conservation action, Dr. Wikramanayake explained the following key features of conservation landscapes:

- » Include representative biodiversity of the ecoregion, including species, communities, and processes
- » Adequate core PA coverage
- » Plans for restoration of critical habitat, if necessary
- » Linkages between core areas

A case study of the Terai Arc Landscape (TAL) was presented as an example of a landscape level conservation effort where fourteen PAs are linked in India and Nepal through biological corridors with the aim of protecting ecological processes and habitats for the survival of flagship species. TAL covers a total area of 43,000 sq. km and represents (i) the world’s tallest grasslands; (ii) home to globally important populations of Royal Bengal Tiger (*Panthera tigris*), Greater One-horned Rhino (*Rhinoceros unicornis*), Asian Elephant (*Elephas maximus*), Gangetic Dolphin (*Platanista gangetica*), and Bengal Florican (*Houbaropsis bengalensis*), and (iii) world renowned PAs. Dr.

Presentation on Landscape and PA Management: A case of Bhutan Biological Conservation Complex by Dr. Sangay Wangchuk—Bhutan

Dr. Sangay Wangchuk presented a case study of Bhutan Biological Conservation Complex and explained the progress made by Bhutan in expanding its conservation efforts from single species level conservation to landscape level conservation. In this endeavor, the different methods that Bhutan has adopted are linking PA corridors, use of Geographic Information System (GIS) mapping, management strategies etc, to move from species level conservation to landscape level conservation.

Presentation on Linking Tangible Benefits with the Intangibles: Experiences in PA Management by Professor P.S. Ramakrishnan—Jawaharlal Nehru University, India

Prof. Ramakrishnan emphasized that the problems concerning PA management are not merely ecological or economic in the traditional sense of the term, but also touch upon the social, cultural and spiritual dimensions of integrated socio-ecological systems. Thus, an integrative view of knowledge systems is crucial for developing appropriate strategies for PA management. He raised the issues regarding the gap in socio-ecological theories and practices in the field.

Providing some good examples from India, he explained how including cultural landscapes with traditional ecological knowledge based inputs to conserve socially valued species has development.



Professor P.S. Ramakrishnan presenting on linking tangible benefits with the intangibles

Prof. Ramakrishnan—Jawaharlal Nehru University, India

Prof. Ramakrishnan emphasized that the problems concerning PA management are not merely ecological or economic in the traditional sense of the term, but also touch upon the social, cultural and spiritual dimensions of integrated socio-ecological systems. Thus, an integrative view of knowledge systems is crucial for developing appropriate strategies for PA management. He raised the issues regarding the gap in socio-ecological theories and practices in the field. Providing some good examples from India, he explained how including cultural landscapes with traditional ecological knowledge based inputs to conserve socially valued species has development.

Presentation on Trans-boundary Conservation Initiatives in Nepal by Dr. Krishna Chandra Poudel—DNPWC, Nepal

Dr. Poudel introduced the following transboundary features:

- » Common habitat for wildlife
- » Porous border
- » Common culture
- » Traditional knowledge
- » Inaccessibility

Further, he highlighted the following key transboundary issues:

- » Illegal poaching and trade of parts of tiger, rhino, Himalayan musk deer and cordyceps spp.
- » Pressure on forest and wildlife
- » Weak enforcement capacity
- » Lack of strong trans-boundary mechanism

Dr. Poudel stated the common goals of transboundary conservation as (i) biodiversity conservation, (ii) community development, (iii) cultural preservation, and (iv) sustainable tourism. He then raised issues and problems related to each country and progress made in the form of transboundary arrangements for PA conservation in India, Nepal and China. In conclusion, with regards to the tripartite transboundary arrangements, he made the following recommendations: (i) follow up on past decisions, (ii) strengthen Inter-

agency cooperation, (iii) capacity building, (iv) information sharing, (v) border point cooperation, and (v) regional network on wildlife trade control.

Presentation on Responding to Challenges of Human Well-Being: Lessons learned from NERCORMP-IFAD project in Nokrek Biosphere Reserve of Meghalaya, Northeast India by Dr. Vincent Darlong—NERCORMP-IFAD, Shillong, India

Dr. Darlong presented a case study of the North Eastern Region Community Resource Management Project (NERCORMP) for upland areas, a project to increase rural livelihoods through improved management of community natural resources and environment protection. He shared the experiences of NERCORMP-IFAD and showcased the process interventions of NERCORMP-IFAD in planning, implementation and sustainability strategy. He emphasized that these could be lessons learned for paradigm shift in responding to challenges of human well being in PA management, particularly in re-designing eco-development programs.



Dr. Eklabya Sharma, ICIMOD, delivering presentation on trans-boundary biodiversity conservation efforts in South Asia

Presentation on Biodiversity Conservation Beyond Boundaries: An initiative on regional cooperation in the Hindu Kush Himalaya by Dr. Eklabya Sharma—ICIMOD, Nepal

Dr. Sharma highlighted the conservation overview of the Hindu Kush Himalaya (HKH), its importance, historical trends in management, goals of mountain biodiversity, and identified potential transboundary complexes in the HKH. He explained that conservation efforts have evolved from charismatic species conservation focus starting in the nineteen thirties to the concept of landscape level conservation since the late nineties.

He discussed the different steps undertaken to support cross country PAs. Discussions were raised regarding the need of different terms based on political boundary, regional policies and threats from specific countries.

Presentation on the Governance of PAs and Promises in Biodiversity Conservation in Bangladesh by Mr. Dihider Shahriar Kabir—School of Environmental Science and Management, Independent University, Bangladesh

Mr. Kabir presented the state of PA management in Bangladesh and its strengths and weaknesses. He explained the following as weaknesses in PA management in Bangladesh: (i) inadequate institutions; (ii) information gap; (iii) lack of physical boundary; (iv) inadequate understanding of conservation issues, wildlife protection and management issues; (v) unsustainable harvesting of forest resources; (vi) inadequate skilled manpower; (vii) shifting cultivation/encroachment; (viii) unsystematic silvicultural practices and treatments; (ix) absence of display centers, bill boards and direction of trails; (x) absence of skilled guides to cater to tourists; (xi) shortage of garbage disposal facilities; (xii) Inadequate coverage of PA system to represent all the bio-ecological zones; and (xiii) lack of zoning and people participation.

Accordingly, Mr. Kabir made the following recommendations for effective PA management:

- ▶▶ Inventory and baseline surveys are needed for PAs, specially newly declared PAs
- ▶▶ Special emphasis should be placed on the protection of the Sundarbans

- » Regular monitoring and study of both floral and faunal diversity
- » Restoration program is needed in many PAs

Presentation on Bridging Sustainability and Productivity in Sri Lanka by Dr. Deveka Weerakoon—Sri Lanka

Dr. Weerakoon informed participants that the decline in forest cover had resulted in conflict between man and elephant—the flagship species of Sri Lanka’s biodiversity. Explaining the positive impacts of slash and burn cultivation practices within the buffer zone area in the creation of habitat mosaic for elephant existence, Dr. Weerakoon proposed a management strategy that would allow elephants to access critical food resources in the buffer zone during the dry season. This buffer zone management strategy would allow people and elephants to co-exist with minimal conflict.

Presentation on PA Governance: A Regional Perspective by Dr. Gernot Brodnig—Policy Advisor, UNDP’s Regional Centre in Bangkok

Dr. Brodnig highlighted that governance issues have always played a key role in natural resource management and conservation, but lacked prominence in the design and implementation of biodiversity/protected areas projects. He pointed out that the 2003 World Parks Congress recommended the:

- » Recognition and support for a diversity of governance types—government managed, co-managed, private and community-conserved—for PAs, as different governance types are more responsive to conservation threats and thus more sustainable and effective in the long run; and
- » Adoption of good governance principles for PAs, as the quality of governance shapes the achievement of conservation objectives, and their social acceptance and sustainability.

As a result, governance issues are now part of the CBD Work Programme on PAs.

Dr. Brodnig stressed on the need for the development of a governance framework for biodiversity conservation. In relation to governance and ecosystem management, he emphasized that (i) through its emphasis on integrated resource management and complex conservation spaces, the ecosystem approach gives center stage to governance issues; and (ii) diversity of governance options raises issues of optimal choice of PA regimes. He then highlighted UNDP’s role in developing a PA governance framework and discussed governance types that best fit particular conservation objectives, the role of the enabling environment and the effects of good governance on conservation outcomes.

Finally, he made the following recommendations for developing a governance framework for biodiversity conservation:

- » Develop the framework into pragmatic tool for conservation planners and PA managers
- » Enhance capacity of the conservation-governance nexus
- » Establish partnerships to exchange good practices and lessons learned

Presentation on Role of Barandabhar Corridor Forest (BCF) on Landscape Level Management by Mr. Ganga Jung Thapa—Executive Officer, NTNC, Nepal

Mr. Thapa explained the role of corridor forests in species conservation and introduced the BCF in Chitwan as a landmark in the development of corridor forests.

He explained that the BCF had received protection status even before the emergence of the landscape corridor concept upon the recommendation of a Forest Management Consultant in 1934 and consequent establishment of the *Gaida Gasti* (Rhino Patrol) to protect rhinos in the area.

Mr. Thapa explained that the BCF:

- » Provides crucial forest connectivity for the Chitwan-Annapurna linkage within the Narayani Basin Ecosystem
- » Ensures forest connectivity for movement of migratory bird species
- » Ensures existence of a corridor for movement of other terrestrial species, such as leopards, clouded leopards, and other significant wildlife species into and out of the Chitwan – Parsa – Valmiki (India) ecosystems
- » Maintains connectivity between the northern and southern sectors of the Terai Arc Landscape within the Chitwan Valley
- » Serves as a breeding habitat for tigers and rhinos
- » Serves as a potential dispersal corridor for tigers and rhinos from Chitwan to move east
- » Provides sanctuary for migrating birds especially the Bish Hajari Tal, a Ramsar-designated wetland of global importance
- » Serves to protect the watershed

Explaining that the Tiger Rhino Conservation Project was the first landscape level conservation effort undertaken by the National Trust for Nature Conservation with the objectives of (i) managing and restoring critical ecosystems for movement of wildlife, (ii) providing improved and diversified economic options to communities bordering the corridor, and (iii) reducing pressures on the resources in the corridor, he highlighted the major achievements:

- » Significant reduction in pressure from livestock grazing, firewood collection (probably timber extraction as well) and fodder collection from the core of the corridor leading to enhanced forest regeneration and improved prey species populations
- » Strengthened anti-poaching initiatives
- » Socioeconomic upliftment of the communities bordering the corridor
- » Detailed monitoring of wildlife movements within the corridor, particularly tiger and rhino movement, proving the importance of the BCF in providing critical habitat for wildlife particularly in the monsoon and post-monsoon period and a breeding habitat for tiger

Presentation on Climate Change: Impacts on and Implications for China's Biodiversity Conservation by Dr. Yan Zhaoli—ICIMOD, Nepal

Dr. Yan highlighted the following facts on climate change:

- » Rate of climate change increased dramatically during the 20th century
- » Atmospheric CO₂ level have risen from 280 ppm³ in pre-industrial times to 380 ppm³ today, with largest growth rate in the last decade
- » Warming of climate system is unequivocal and now evidently observed from temperature increase, snow and ice melting and sea level rising
- » Climate change is happening now and will affect everyone and everywhere

He discussed the impact of climatic variability in China's biodiversity and the challenges for biodiversity conservation arising from unbalanced setting of PAs.

Discussion

Participants underlined the need to integrate new approaches towards biodiversity conservation in PAs. Issues such as building partnership between different countries and learning and supporting from each other, development of regional policies etc were emphasized. However, some critical issues were also raised with

respect to large scale conservation practices involving trans-boundary and ecoregions. Some of the issues raised are as follows:

- » Whether large scale conservation would ignore local well-being such as agro-biodiversity. Further, the scale of large scale conservation was also questioned
- » How would large scale conservation including the development of biological corridors cope with developments occurring in the region
- » Issues concerning climate change and its impact on biodiversity. Participants discussed about climate change impact on species as well as human survival
- » In case of HKH the need for redefining terms such as endemism, and regional policies were discussed
- » Participants commented that discussion and presentations were predominantly based on technological problems while ignoring political influences
- » Presentations on large scale conservation approaches via ecoregions, trans-boundary networking and biological corridors ignored institutional structures necessary to bring participating countries together. In addition, responsibilities of nested and overlapping institutions are largely ignored for conservation and management of PAs

Day 3: Technical Session on Governance in PA Management Theme II

Presentation on Governance of PAs: Paradigm Shifts in National and International Policy by Dr. Ashish Kothari—India

Dr. Kothari discussed the differences between management and governance of natural resources explaining that “management” is *what to do* whereas “governance” is *who decides what to do*.

He explained that for most part of human history, the main decision makers and managers of natural resources have been local communities and a huge diversity of management practices & institutions characterise this history (e.g. sacred spaces/species, rules restricting use, etc). More recently, the state has taken over common property in many countries, with successes and failures but there is now a shift towards bringing back the central role of communities in natural resource management. He however cautioned on the need to be mindful of the changed context (greater threats, commercialisation/privatisation, politicisation etc.).

Further, he underlined the following four main governance types for natural resource management in the present day:

- » Government
- » Indigenous peoples and local communities
- » Private owners
- » Collaborative partners

Dr. Kothari explained the three defining characteristics of community conserved areas (CCAs):

- » Specific indigenous peoples or local communities related to them culturally and/or because of livelihoods
- » Such communities are major players— i.e., hold power (de jure or de facto) in deciding, implementing & enforcing management decisions
- » Community initiative is achieving conservation results— although their intention may not be necessarily related to conservation.



Dr. Sangay Wangchuck of Bhutan presenting on a case of B2C2

He also explained their worldwide significance and proposed CCA as the best approach for biodiversity conservation. He also highlighted the CBD Programme of Work on Protected Areas and questioned whether the principles of good governance are integrated in law/policy.

Presentation on Shifting Paradigm in PA Management by Dr. Amat—WWF, Malaysia

Dr. Amat presented the Rapid Assessment and Prioritization of Protected Areas Management (RAPPAM), a monitoring tool for the assessment of PA management. The tool was found to be useful in assessing PA's effectiveness in biodiversity conservation.

He highlighted the lessons learnt from the application of the tool in several PAs in Malaysia:

- » Selection of PAs should take into consideration objectives and nature of the PAs, e.g. not all PAs are open to visitors
- » Need assessment team to guide PA authority in answering questionnaire and ensure consistency
- » The RAPPAM tool can be adapted to suit local situations
- » Indirect benefits include better networking and cooperation among PA authorities
- » Can be a catalyst for action

Presentation on Participatory Management of PAs in Bangladesh by Dr. Farid Uddin Ahmed—Executive Director, Arannayk Foundation, Bangladesh

Dr. Ahmed gave an overview of the PA network in Bangladesh emphasizing that PA management in Bangladesh focused on traditional top-down command and control systems under the Wildlife Act of 1974.

He then introduced the Nishorgo support program started from 2003 in five pilot sites. He highlighted that Nishorgo was a new approach in PA management in Bangladesh based on participatory approaches and co-management. The approach taken by Nishorgo emphasizes:

- » Focus on buffer zone
- » Benefit sharing mechanism of social forestry
- » Deployment of NGOs for HID of participants
- » FD in technical capacity building
- » Joint patrolling
- » Eco-Tourism development

Presentation on PAs of Afghanistan by Mr. Sayed Mohammad Rahimi—Afghanistan

Mr. Rahimi gave a detailed overview of Afghanistan and explained Afghanistan's progress in biodiversity conservation through PAs, even in the midst of war.

Presentation on Kangchenjunga Conservation Area in Nepal by Dr. Sabita Thapa—WWF, Nepal

Dr. Thapa gave a brief history of the development of the process that led to the total handover of the Kangchenjunga Conservation Area management to the local community—a first in Nepal. Dr. Thapa emphasized that KCA is a paradigm shift in PA management. KCA is the first conservation area in Nepal entirely managed by communities.

Dr. Thapa noted that community mobilization, inclusive decision making and public hearing and public auditing are necessary components to develop a democratic, transparent and participatory system of governance; and also stressed on three key areas: sustainable, financial and environmental development.

Country Presentation on PA Management in Pakistan by Dr. Shahzad Jehangir—Deputy Inspector General Forest, Ministry of Environment, Pakistan

Dr. Jehangir provided insights on steps that Pakistan is undertaking for biodiversity conservation and PA formation. He explained that mountain ecosystems remained the priority for conservation but recent focus has shifted to include dry lands, wetlands, coastal and marine ecosystems. Further, he mentioned that PA management requires (i) management effectiveness, (ii) management equity, and (iii) effective resolution of social conflicts, thus leading to enhanced public support.

Dr. Jehangir highlighted four governance categories in Pakistan and explained their essential features: (i) Government managed PAs, (ii) Co-managed PAs, (iii) Private PAs, and (iv) Community Managed Areas.

He explained that the concept of government managed PAs is operative in state owned PAs prior to 1997 and is still applied as a last resort in areas where:

- » Land under critical ecosystem is commercialized;
- » High social conflict exists; and
- » Political influence is very high.

Co-managed models on the other hand exist, to date, only under funded projects except for one recent government funded program for mountain area conservation. He opined that although co-management has become a national policy, (i) government departments are not fully equipped with social and anthropological tools, (ii) legal and institutional barriers exist to facilitate co-management, and (iii) presently, financial benefits of co-managed initiatives for communities are far less than the ecological services.

He explained that private and community conserved areas are motivated by environmentalist groups, activists or co-managed partnership and are focused on game species and habitats. The model emphasizes single or multi species conservation with limited trophy hunting. He expressed that this model employs benefit sharing between the government and communities on a 20:80 basis; and the money is mostly spent on conservation through local communal decisions. He expresses that the model:

- » Is highly participatory and thus effective
- » Enhances level of local empowerment and high level of ownership
- » Supports the government's conservation efforts through local guards
- » Has seen a gradual increase in population of species of critical status such as Markhor (*Capra falconeri*)
- » Has seen attitudinal change towards predators; from enemy to friends in conservation
- » Increased level of awareness in common masses about biodiversity

Country Presentation on Governance in PA Management in Nepal by Mr. Shiv Raj Bhatta and Mr. Jhamak Karki—DNPWC, Nepal

Mr. Bhatta and Mr. Karki briefly discussed the development of PA governance in Nepal which began with the Wildlife Conservation Act (1958) which established the Rhino Patrol to the fourth amendment to the National Parks and Wildlife Conservation Act (1973) in 1993 provisioning for the establishment of buffer zones which puts people in the midst of conservation efforts. As per the new provisions, buffer zone

communities are entitled to 50% of the revenue of the PA and 100% of income from community forests within the buffer zones.

They explained that this shift in policy which began to consider linking development needs of the local communities around the PAs with conservation goals was brought about by the third amendment in the Act in 1989 which provisioned for the establishment of Conservation Areas. This opened up the way for a national NGO to manage the Annapurna Conservation Area which puts people in the center of conservation goals.

Governance of PAs in Nepal has now evolved to the handover of the Kangchenjunga Conservation Area entirely to a local Community Based Organization—the Kangchenjunga Conservation Area Management Committee.

Discussion

Following the end of the technical session on Governance in PA Management, the following issues were raised:

- » Interest variations between communities and government in conserving species
- » Prioritizing the community needs rather than biodiversity conservation needs, thus impeding biodiversity conservation objectives
- » Difficulties in brining three stakeholders together: park managers, communities and wildlife
- » Empowerment of the community: if equal power with respect to sharing of power could be or has been addressed in such community management plans
- » Financial sustainability of the community's council for management
- » The forces behind such paradigm shift: either interest of park managers or communities themselves

Day 3: Technical Session on Economic tools for Biodiversity Conservation, Theme III

Presentation on Shifting Paradigm on PA Management with Focus on Land Use by Dr. Ram Prakash Yadav—Vice Chairperson, Poverty Alleviation Fund, Nepal

Dr. Yadav discussed the issues concerning globalization and its effects on changes in cultural landscapes. He provided information on Nepal's (i) economic performance, (ii) population growth rate, (iii) irrigation infrastructure, (iv) road infrastructure, (v) hydropower, (vi) land use in Nepal, (vii) farm size, and (viii) community forestry.

Dr. Yadav pointed out that between 1961 and 2001 the area of cultivated land has increased by 57.5% from 1.70 million ha to 2.65 ha. Average holdings has increased from 1.54 million to 3.36 million whereas average size of holdings has decreased from 1.10 ha to 0.80 ha. This has significant implications for biodiversity conservation efforts as the area of forest land decreases and smaller land holdings confounded by population growth means more pressure on the remaining forests.

Dr. Yadav proposed that some possible solutions to mitigate this trend were:

- » Establishment of land bank
- » Promotion of land rental markets
- » Promotion of community forestry
- » Promotion of leasehold forestry
- » Increased people's participation in PA management

He pointed out that Nepal has made commendable progress in promoting community forestry which has a proven track record for better protection of forests. Until December 2005, a total of 1.2 million ha of national forests have been handed over to community forestry groups benefiting 1.65 million households.

Presentation on Joining Hands with Civil Society for PA Management—An Opportunity Through The Critical Ecosystem Partnership Fund, Eastern Himalaya by Dr. Sarala Khaling—India

Dr. Khaling explained that the Critical Ecosystem Partnership Fund (CEPF) was a joint initiative of Conservation International, the Global Environment Facility, the Government of Japan, the John D. and Catherine T. MacArthur Foundation, and the World Bank.

She explained that the CEPF provides strategic assistance to NGOs, community groups and other civil society partners to help safeguard earth's biodiversity hotspots and that a fundamental goal of the CEPF is to ensure civil society engagement in biodiversity conservation.

Dr. Khaling proceeded to explain the (i) conservation results/strategic direction and investment priorities of the organization, (ii) civil society groups on the ground, (iii) implementation modality in terms of regional and national coordination, and (iv) access process for grants.

CEPF support to date in the eastern Himalaya has been extended to:

- » Bhutan Biological Conservation Complex (Bhutan)
- » Kangchenjunga-Singhalila Corridor (India)
- » North Bank Landscape (India)
- » Kaziranga-Karbi Anlong Landscape (India)
- » Kangchenjunga-Singhalila Corridor (Nepal)
- » Critical Areas of Terai Arc Landscape (Nepal)

Presentation on Developing Community Carbon Forestry Projects by Dr. Kamal Banskota—ICIMOD, Nepal

Dr. Banskota introduced community forestry as an opportunity for global carbon sequestration and management of climate change. He pressed on the advantages of community forestry and stated that the Global Kyoto Protocol has to address community forestry for policy support from International parties. Further, he stressed the necessity to link community forests with voluntary markets to reduce emissions and also called on the need for new institutional services to open this market.

Arguing that the current Kyoto Protocol only permits afforestation and reforestation, he highlighted the following concerns in bringing community carbon forestry projects under the Kyoto Protocol framework:

- » Least developed countries like Bhutan and Nepal have very limited scope under the current Kyoto Protocol. Hence, new voluntary carbon markets must be created to cater to the public in providing opportunities to reduce local emissions based on market mechanisms
 - » Institutional capacity is urgently required to lead the way in creating voluntary carbon markets for curbing local emissions based on least cost approach so that when the government policy eventually catches up to the markets, there will already be a buoyant carbon market in operation
- Providing examples of community forests in the HKH, he suggested that these were reliable and cost effective ways of carbon sequestration and recommended monitoring of community forests in the HKH over extended periods to evaluate their real capacity in stabilizing emissions of CO₂ into atmosphere.

Day 4: Continuation of Technical Session on Economic tools for Biodiversity Conservation, Theme III

Presentation on Application of GIS and Remote Sensing for PA Management in the HKH by Mr. Birendra Bajracharya—ICIMOD, Nepal

Mr. Bajracharya explained the role of GIS in PA management. He outlined the possible applications of GIS in (i) conservation planning, (ii) resources use, (iii) potential habitat mapping, (iv) tourism planning and management, (v) monitoring impacts on socio-economy and environment, and (vi) promotion and awareness.

He explained that GIS and remote sensing technology facilitated (i) spatial data capturing, (ii) spatial and temporal analysis, and (iii) innovative visualization of data.

Presentation on Sustainable Financing for PA Systems by Sultana Bashir—UNDP Regional Center, Bangkok

Ms. Bashir pointed out that the total annual global expenditure required for effective PA management is estimated between US\$ 5 billion to US\$ 100 billion whereas the actual spending in 1999 ranged between US\$ 2–3 billion. She expressed that most PAs are believed to be under financed to varying degrees.

Ms. Bashir stated that since 1992 there has been an overall decline for conservation finance due to diversification of financing interests. She underlined the following common barriers to sustainable PA financing: (i) general lack of public and government willingness to pay for PAs, (ii) unfavorable policy and legal framework for effective financial planning, and (iii) private sector lobbying to keep taxes and charges low. Thus, she recommended financing needs to be (i) approached in a different manner, more systematically, comprehensively and proactively at a systems level as well as site level, and (ii) development of sustainable financial strategies and plans for individual PA sites and PA systems.

She also gave an overview of the Financial Sustainability Scorecard developed by the UNDP to help governments, donors & NGOs and other stakeholders assess, analyze and document key elements of an effective PA financing system. He highlighted that the scorecard:

- ▶▶ Is designed to be used at the national level but could be adapted for use at other levels, also needs to be adapted to country-specific circumstances (e.g. the score weighting system)
- ▶▶ Allows for comparisons between years in a given country
- ▶▶ Allows for comparisons between countries
- ▶▶ Very much a work in progress – to be trialed and tested

She concluded that:

- ▶▶ Examples of countries that are relatively advanced in their sustainable financing planning for national PA systems include South Africa, Namibia, and Tanzania



Dr. Siddhartha B. Bajracharya presenting on linking tourism and PA management

- » Need for increased use of economic and financial analysis in PA management planning – ‘business planning’
- » Catalyzing the sustainability of PA systems remains a priority under GEF 4 (July 2006 – June 2010)
- » A key strategic area of work under this priority is the sustainable financing of PA systems

Presentation on Tourism and PA Management by Dr. Siddhartha B. Bajracharya—NTNC, Nepal

Introducing the Annapurna Conservation Area as the first conservation area and the largest PA in Nepal, Dr. Bajracharya highlighted the Annapurna Conservation Area as a paradigm shift in PA management.

He shared experiences and lessons learned from the Annapurna Conservation Area Project to put across the point that sustainable management and success of PAs require certain management characteristics such as:

- » A “stewardship ethic” among all stakeholders
- » Local support and their involvement in all stages of management process
- » Management system that promotes PA landscape approach based on fair decisions
- » Tourism that facilitates long term revenue generation opportunities
- » Government Policies and Acts aimed towards the promotion of sustainable tourism products/facilities within PA landscape
- » Judicious utilization of the environmental resources for sustainable management of the PA landscape

Finally, he highlighted the challenges facing the Nepalese tourism industry and the stress it places on many of Nepal’s PAs, in its resource base and revenue earning capacity.

Presentation on Local Effects of Large Scale Global Environmental Changes by Professor Ram P. Chaudhary—Tribhuvan University, Nepal

Professor Chaudhary reflected upon the different processes that interact at the local, regional and global levels to manage the cultural landscape of Manang. He addressed measures that the communities in Manang had developed to cope with global changes such as glacier retreat and international trade for sustainable livelihood. Such measures include natural resource management, diversification of activities involving a mixture of agricultural practices, animal husbandry, forest utilization, indigenous health practice, out-migration, cash income through tourism and selling forest products as well as maintaining strong social management practices.

Presentation on Making Payments for Environmental Services (PES) Work by Mr. Prakash K. Karn—IUCN, Nepal

Mr. Karn explained that PES is a mechanism to improve the provision of indirect environmental services in which:

- » those who provide environmental services get paid for doing so (‘provider gets’)
- » those who benefit from environmental services pay for their provision (‘user pays’)

He explained that PES initiatives and studies on PES in Nepal were limited and restricted mainly to economic valuation of forest products and PAs. He then proceeded with an example of a PES study in the Shivapuri National Park which tries to estimate costs and benefits to upstream and downstream people under different management options.

Country Presentation on Developing PES Mechanism: Seeking Opportunities for Vietnam by Ms. Nguyen Thuy Duong—Vietnam

Ms. Duong started with an overview of the biodiversity of Vietnam and its PA networks. She then discussed the efforts made by the Government, the private sector and the NGOs in developing PES in Vietnam. She explained that some of the obstacles and impacts in the government's efforts were :

- » Inadequate price mechanism à weak motivation, unsustainability
- » Land use/property right problem à no long-term investment
- » Difficult to change lifestyle of ethnic people
- » Weak monitoring à perverse incentive
- » Difficult to coordinate à Unequally allocated land à social impacts

Some other obstacles cited were:

- » Lack of awareness of economic values of environmental services
- » Difficulties in changing local practices
- » Lack of credit and start-up funds
- » Unclear property rights
- » Non-supportive legislation leading to low enforcement and high transaction costs

Discussion

Notwithstanding the relevance of the issues raised for PA management and conservation in the above presentation, questions regarding the reliability of specific case studies were raised and discussed. The following issues were discussed:

- » Contribution of forest fires, trees as a source and a sink, and response of different species in carbon sequestration etc.
- » If local civic organizations have been considered for CEPF fund.
- » Costs and benefits related to different users in watershed management.

Day 4: Group Work

Following the completion of the technical sessions on the fourth day, group works on each theme, (i) ecosystem management, (ii) governance in protected area management, and (iii) economic tools for biodiversity conservation were performed. Participants voluntarily chose their preferred theme for the group discussions. Outcomes of the group work were presented during the closing session.

Group: Ecosystem Management

Gap Analysis

- » Existence of disparities in research objectives and management need
- » Management plans not followed
- » Lack of focus on the real needs of local people
- » Ideas being forced upon local populations
- » Absence of interdisciplinary and long term research
- » Absence of proper inclusion of academia in PA research activities
- » Dearth of issues such as agro-biodiversity, climate change in ecosystem management
- » Non-existence of inter-country programs to address trans-boundary issues, regional forum; for example SAARC not yet fully utilized
- » Low involvement of university graduates in research and local people in program formulation
- » Difference in understanding among countries of conservation level and law enforcement procedures
- » Existence of information and data gaps on species-area relation and other specific issues related to ecosystem

- » Presence of knowledge gaps in linking conservation with development
- » Countries have several conservation examples as success stories

Action points and recommendations:

- » Reduce gap between research and management by developing partnership
- » Revitalize conservation related organizations such as MAB and strengthen their information networks
- » Publish a comprehensive document comprising important and replicable conservation examples and success stories
- » Share examples of failures
- » Plan and conduct long term research at ecosystem level
- » Increase interactive forums for scientists and managers
- » Conduct action oriented research to address pertinent and immediate issues

Follow up

- » Identify conservation partners
- » Government as policy maker should formulate policy and law, identify priority and enforce law and monitor
- » International organizations and donors should provide financial and technical support
- » Independent think tanks and NGOs—pathfinder of moving knowledge
- » Academia: knowledge generator on the basis of research and training
- » Community: beneficiaries and safeguards

Group: Governance in PA Management

Gap Analysis

- » Absence of national level institutions to involve all stakeholders in PA planning and management
- » Inadequate involvement and power sharing with local communities and local government at PA level
- » Shortage of compensatory mechanism for wildlife related damages including trans-boundary
- » Lack of sustainable financing mechanism
- » Many PAs are neglected
- » Trans-boundary:
 - Inadequate follow up of trans- boundary meetings at the central level—especially in case of India-China-Nepal
 - Low NGOs and community participation
- » Minimal equitable sharing
- » Insufficient documentation support and legal provision for CCAs
- » Conservation of the critical corridor and bottlenecks are not adequately addressed by policies

Points for Actions

- » Co-management of PAs: laws and policies should move towards collaborative management of PAs
- » Multi-stakeholder forum: a forum for policy decision at national level
- » More power to community: people should be given more authority in every aspect of resource management and government should provide technical and legal backup
- » Mainstreaming environment: PA authority should be part of broader environmental institutions, such as, biodiversity authority and environmental commission
- » Establish compensation mechanism at PA level, including trans-boundary
- » Documentation, recognition, support and benefit sharing for CCAs—even those that are not legally recognized

- » Connectivity: consider all governance types of PAs to improve connectivity in landscape
 - Defining CCAs: Clear criteria needed for defining CCAs, especially to ensure their importance in conservation
 - Local participation needed in determining category and governance type of each PA
 - Trans-boundary: ensure NGO and community participation in trans-boundary conservation and follow up on the decision made in the trans-boundary meeting

Follow Up

- » WCPA-South Asia could follow up and IUCN and ICIMOD can coordinate
- » Request IUCN and ICIMOD to organize workshop on Governance of PAs where laws and policies of each country can be reviewed and changes suggested
- » SAARC could also be an appropriate forum
- » Develop a working group of CCAs, especially for information sharing
- » IUCN/TILCEPA has offered to help with further actions on governance

Group: Economic Tools for Biodiversity Conservation

Gap Analysis

- » Transparency in resource mobilization (governance)
- » Business plan
- » Economic valuation of parks
- » Communication with the community
- » In depth analysis of income-expenditure

Success Stories

- » ACA and KCA, Nepal
- » Serengeti National Park, Tanzania
- » South Africa, Bangladesh, Sikkim, India
- » Trophy hunting, Pakistan and Bhutan Trust Fund

Recommendations

- » Promote domestic and intra-regional tourism
- » Economic valuation of local area by taking sample parks
- » Exchange knowledge by using mediums such as the world wide web
- » Develop or improve markets for biodiversity, for example NTFP
- » Involve media personnel for documentation
- » Carry out exposure visits to experience learning projects
- » Integrate business plan within the management plan of parks
- » Carry out valuation of park services
- » National Protected Areas Trust Fund (NPATF)—Mountaineering fee and tourism revenue

Closing Remarks

Mr. Tirtha Raj Sharma, Secretary, MoFSC; Dr. Krishna Chandra Poudel, DG, DNPWC; Dr. Siddhartha B. Bajracharya, Member Secretary, NTNC; Mr. Prabhu Budhathoki, Country Representative, IUCN, Nepal; Dr. Sabita Thapa, WWF, Nepal and Professor P.S. Ramakrishnan of JNU made the closing remarks.

The speakers conveyed their conviction of the significance of the conference and thanked the organizers for hosting the conference successfully. They emphasized on broader cooperation and partnerships to address emerging challenges.

National Trust for Nature Conservation

P.O. Box 3712, Kathmandu, Nepal

Jawalakhel, Lalitpur

Tel: +977 1 5526571, 5526573

Fax: + 977 1 5526570

Email: info@ntnc.org.np

Web: www.ntnc.org.np