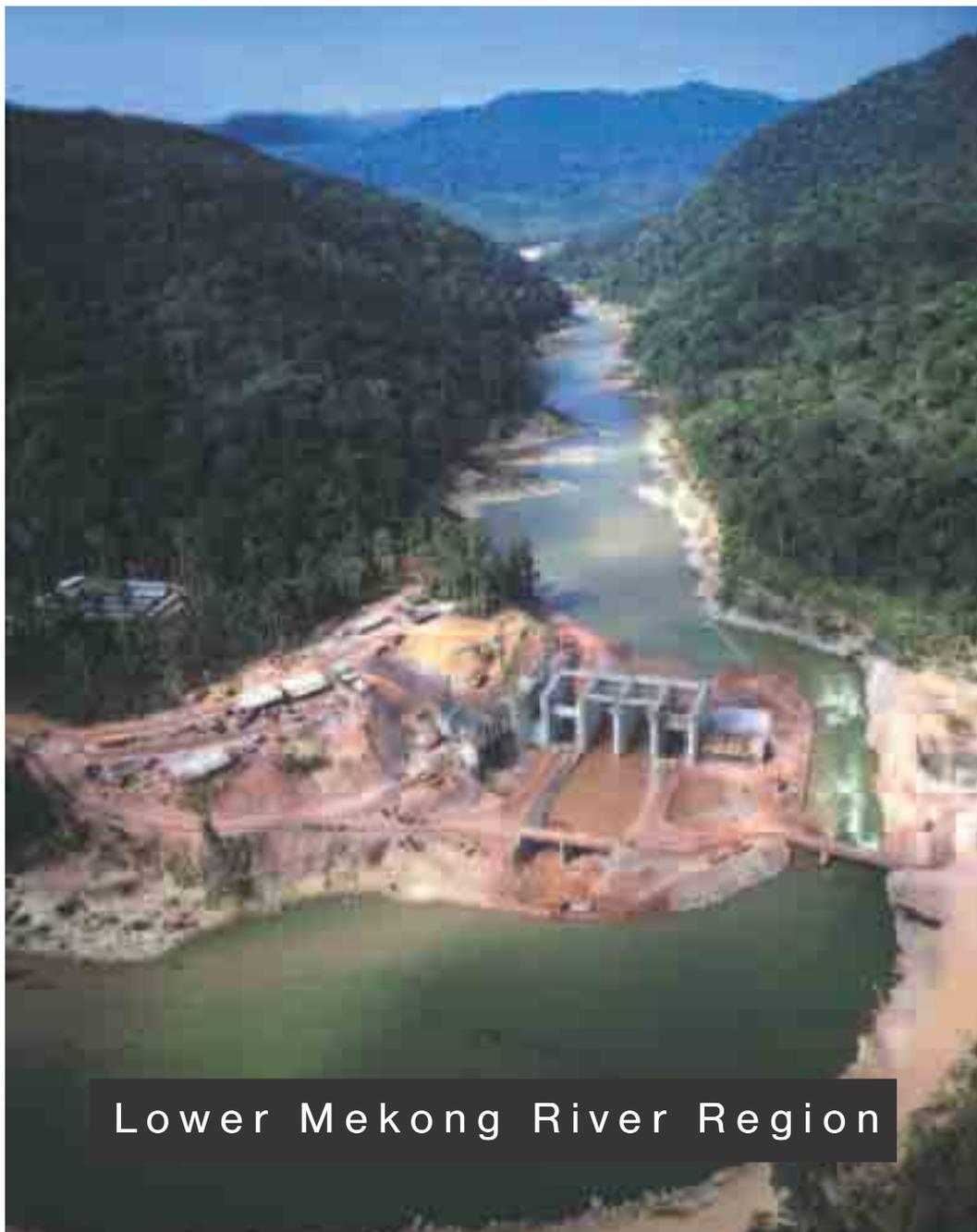


Regional Report



Review of Protected Areas
and Development

Regional Report on Protected Areas and Development



Lower Mekong River Region

Review of protected areas and development in the four countries
of the Lower Mekong River Region

Regional Report

on Protected Areas and Development

November - 2003

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Regional Report

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The PAD Partnership

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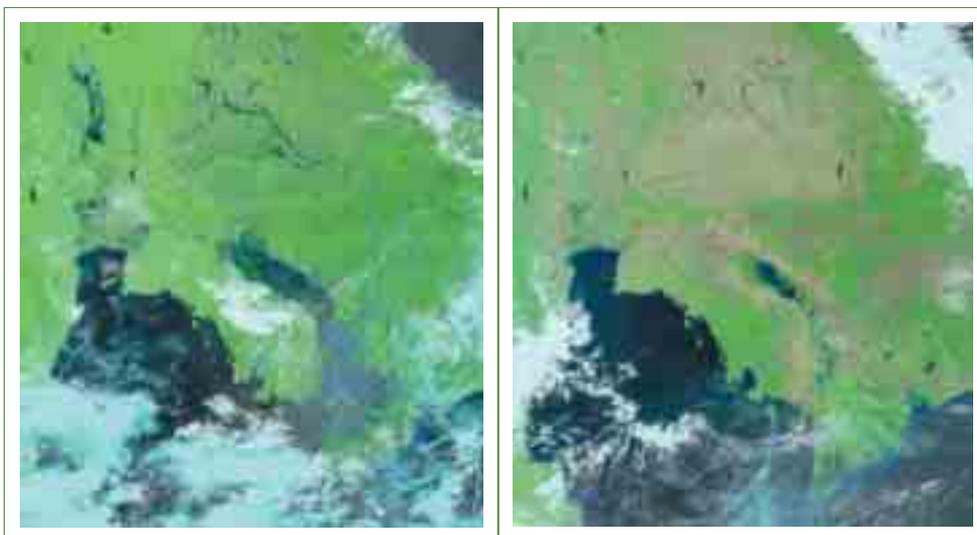
Preface

An outstanding feature of the lower Mekong region is the dynamic energy of its natural systems and how intimately tied most of the population is to that seasonal force. Productivity in agriculture and fisheries, for example, depends on annual floodplain inundation and nutrient dispersal. The immense scale and impact of this natural cycle is well illustrated in the annual flooding of Tonle Sap Lake in Cambodia and the Mekong River Delta which it shares with Vietnam. The satellite photographs below show the Great Lake increasing four times in area, from 2,500 km² to 10,000 km² during the wet season, connecting it to a vast network of wetlands throughout Mekong Basin (Figure 1).

The natural dynamics of the region is one of its most important development assets to be safeguarded and maintained. It is also viewed as a threat and potential impediment to development. In 2000, more than 800 people died in the floods, which inundated more than 800,000 km² and caused damage estimated at over US\$400 million in Cambodia, Lao PDR, Thailand and Viet Nam. In 2001 again the floods struck affecting over 1.6 million people in 12 provinces of Cambodia alone. The flooding destroyed homes, infrastructure and crops.

Over the past decade, much effort has gone to modifying and taming that force through engineering structures including hundreds of kilometers of dykes and hundreds of dams. But current thinking of agencies working in disaster preparedness is that investment should go more to flood mitigation through early warning systems, better land-use planning and the maintenance of natural ecosystems such as upland forests, mangroves and wetlands, than to engineering solutions (WCD 2000; International Federation of Red Cross 2003). In fact, there is mounting evidence to show that the intensity of flooding events in the Mekong region is due in large part to development, which has reduced river channels and raised river beds, obstructed natural drainage systems, reclaimed flood plains and wetlands, expanded urban and residential areas in sensitive areas and cleared most natural forest (ESCAP 2000).

Figure 1: Tonle Sap Lake in Cambodia during the wet season (October 2002) and dry season (January 2003)



The essential role of ecosystems in their natural state for maintaining the stability and productivity of local economies and social systems is becoming increasingly evident in the Mekong region. Few regions demonstrate in such dramatic terms the fundamental links between human and ecosystem well being. Around 80 per cent of its population is directly dependent on the productive capacity of healthy natural systems. The relationship between water resources and protected areas in particular is of growing significance to the regional economy as the chapters in this report show.

Governments of the region appear to have recognised that the protection and maintenance of its remaining natural systems is essential to national welfare. By 2005, the region's protected area system will approach 22 per cent of the collective national territories (Figure 1.1), exceptional by world standards. Yet, that growing natural estate remains outside mainstream development as expressed in public policy, programs and investment - as though once locked away, it is forgotten. This store of natural capital and its complex linkages with surrounding human activity is not well appreciated in development terms. Consequently, when economic development options arise which appear to use the resources to greater benefit, the status of protected areas becomes tenuous.

There are two main challenges to shifting the perception of protected areas as unproductive forms of resource tenure. First, the methods and skills for systematically expressing their various attributes in financial and development terms are needed in the region. Second, and more fundamental - so long as governments continue to give overriding emphasis to economic growth, other critical dimensions of development relating to quality of life will tend to be sidelined. Some important attributes of protected areas which bring contentment, happiness, health, enjoyment and education to a community, for example, fall outside an economic growth perspective. Most goods and services flowing from protected areas can be expressed in economic terms - but some can not, or at least not readily in terms of growth. This limitation in the concept of development in the region is changing. For example, in 2003, the Chairman of the Dong Nai Provincial Peoples Committee in Vietnam gave recreation and a sense of well being in the growing urban population as two important reasons his government is intending to reform three large State Forest Enterprises in the north-west of the province into forest protection management boards. Change in this arena rests on political will and vision.

Also, it relies on providing governments with the most complete information on which to base and justify their decisions. Currently there is a large information gap in development planning concerning the contribution of natural systems which means that protected areas are not covered in national accounting and are degrading as a consequence.

The PAD Review is a step by the four governments of the lower Mekong in the process to have protected areas treated as productive units in the economy. Each country needs to move to a situation where the natural capital held in their national PA system is subject to regular stock taking with the results reflected in GDP and budgets. The level of investment must match the level of importance of the PA capital to the economy. The investment needs to go to sustaining, restoring and expanding the stocks available within each protected area so it is able to produce more abundant ecosystem services and natural resources (Hawken et al. 1999). The PAD Review and its eight reports provide insights and directions in making this vital shift in the way the Mekong countries account for protected areas to become an essential development strategy.

This report deals with those issues requiring collective action from all countries in the region because of their many natural system and development connections. It has three aims:

1. To help shape and reinforce the strategies set out in each of the national PAD reports
2. To influence the sectoral components of regional development plans and agreements
3. To provide a framework of strategies for a regional conservation action plan and program.

The report examines the relationship between protected areas and key natural resource dependent sectors – fisheries, water resource management, energy, forestry, agriculture and nature based tourism. It defines key challenges in each case and the directions the sector needs to take to obtain optimum benefit from protected areas while safeguarding their assets.

Significantly, the report includes a thorough analysis of poverty reduction and protected areas. This is the highest priority in all countries. Unless protected areas can hold their own in local development terms from other more intensely exploitative forms of tenure then it is very difficult for governments to justify protection regimes. Critical strategies here are to help poor communities maintain their basic livelihoods and to create market opportunities for sustainably harvested PA produce. Most important, systems are needed so that payments from commercial users of PA capital and services ensure benefits are shared and contribute to the advancement of local communities in return for their role in ecosystem conservation. Protected areas can be a nurturing and supportive form of natural resource management for the poorest and most isolated communities in the region.

The natural systems which are the foundation for regional development cross national borders. It is not surprising that some of the most important protected areas are adjacent to others in neighbouring countries. This connection between countries through the independent establishment of separate PAs covering important shared natural systems provides significant new opportunities for political, technical and cultural collaboration leading to mutual economic gains. Border areas are usually remote and relatively poor - protected areas can be a vehicle for social and economic development reinforcing government policies for decentralisation and the promotion of remote regions. Cambodia and Vietnam, for example, hold regular "friendship meetings" at local government level at various points along their shared border and conservation and related community development issues often dominate those discussions, especially where protected areas are located. Transboundary PAs provide the seeds for collaborative action on a region wide protected area system which will bring growing development returns.

Finally, the report synthesises the strategies into a framework for a regional conservation program including a formal agreement and special institutional arrangements as essential ingredients in the regional development strategy. The PAD Review found that a serious imbalance in investment over many years has diminished the region's natural capital through a neglect of maintenance. That imbalance is now impeding development and must be redressed.





Acknowledgements

This regional report benefits from the creative debate and flow of ideas arising from the four national PAD reviews undertaken on the initiative of the four governments of the Lower Mekong Region. The review process began in September 2001 with a series of national round tables involving a wide cross section of government and non-government organisations. Teams of national experts then prepared sector background papers exploring the relationship between key economic sectors and protected areas. They carried out detailed field studies in each country on the links between specific groups of protected areas and their surrounding development landscape. Their assessments of global and national lessons learned led to the preparation of national reports setting out strategies for maintaining and

enhancing the benefits of protected areas. Finally they worked together on this regional report to define issues and directions of common concern.

These review activities involved regular national round tables and meetings of PAD core groups in each country that brought together important national agencies and experts to provide technical guidance. The review led to the formation of national PAD networks of more than five hundred people in total who were kept informed and involved in the review.

At regional level, the PAD review feeds into the Basin Development Planning process. A regional workshop was held in May 2002 in Phnom Penh organised and convened by the MRC Environment Program. It provided an opportunity for representatives of the national PAD review teams to share the lessons of the past decade and to discuss the results of the field studies. The first workshop was a technical exchange and identification of key issues which the review national and regional reports need to address. In October 2002, a second regional workshop was convened by MRC to facilitate exchange on the review findings and key policy strategies. It focused discussion on the national PAD reports then in giving shape to the draft regional report through intensive working groups.

More than 70 senior government staff participated in the regional workshops from the Ministries and departments responsible for protected areas, from economic planning agencies, and from key development sectors. International development and conservation organisations with a special interest in the maintenance of natural resources and networks of protected areas in the Mekong countries also actively joined in the regional discussions. All these specialists contributed to the regional report through their experience, insights and hard work before, during and after the regional events.

Special thanks are due to His Excellency, Dr Mok Mareth, Cambodian Minister of Environment, who strongly supported the PAD Review throughout and led in the regional consultations. Joern Kristensen, Chief Executive Officer of MRC also consistently backed the regional review process directly and through the Commission's Environment Program team, as did C.R.



Rajendran, Director, of the ADB Mekong Agriculture and Environment Division. Their leadership and commitment was a vital element in the success of the consultations and its value for development planning in the Lower and Greater Mekong regions. Henning Nohr of Danida and Urs Herren of SDC played a major role in forging the partnership for the review and in drawing together the resources required for the collaboration between the four countries. Their commitment from the earliest stages of the process was essential to its success.

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Part 1: Regional overview

1 Protected areas and development in the Lower Mekong Region

1.1 Introduction

The four countries of the lower Mekong River Region – Cambodia, Lao PDR, Thailand and Vietnam – have established among the largest protected area systems in the world as proportions of national territory. Many are national parks – or national protected areas, as they are called in Lao PDR - and nature and wildlife reserves in which no exploitative uses are permitted.

Those restrictive national policies are coming under increasing strain faced with growing populations, especially the needs of poor communities living in and around protected areas. In reality, limited capacity and a lenient approach to communities at site level mean that most PAs in the region are multiple use areas despite laws to the contrary.

Also, sector development such as roads, hydropower, tourism, fisheries and agriculture attracted to the natural resources and spaces covered by protected areas are pressing for access. For example, already, more than 40 major hydropower schemes exist, are under construction, or approved with direct links to protected areas in the four countries and thousands more smaller scale units are located on streams originating in protected areas.

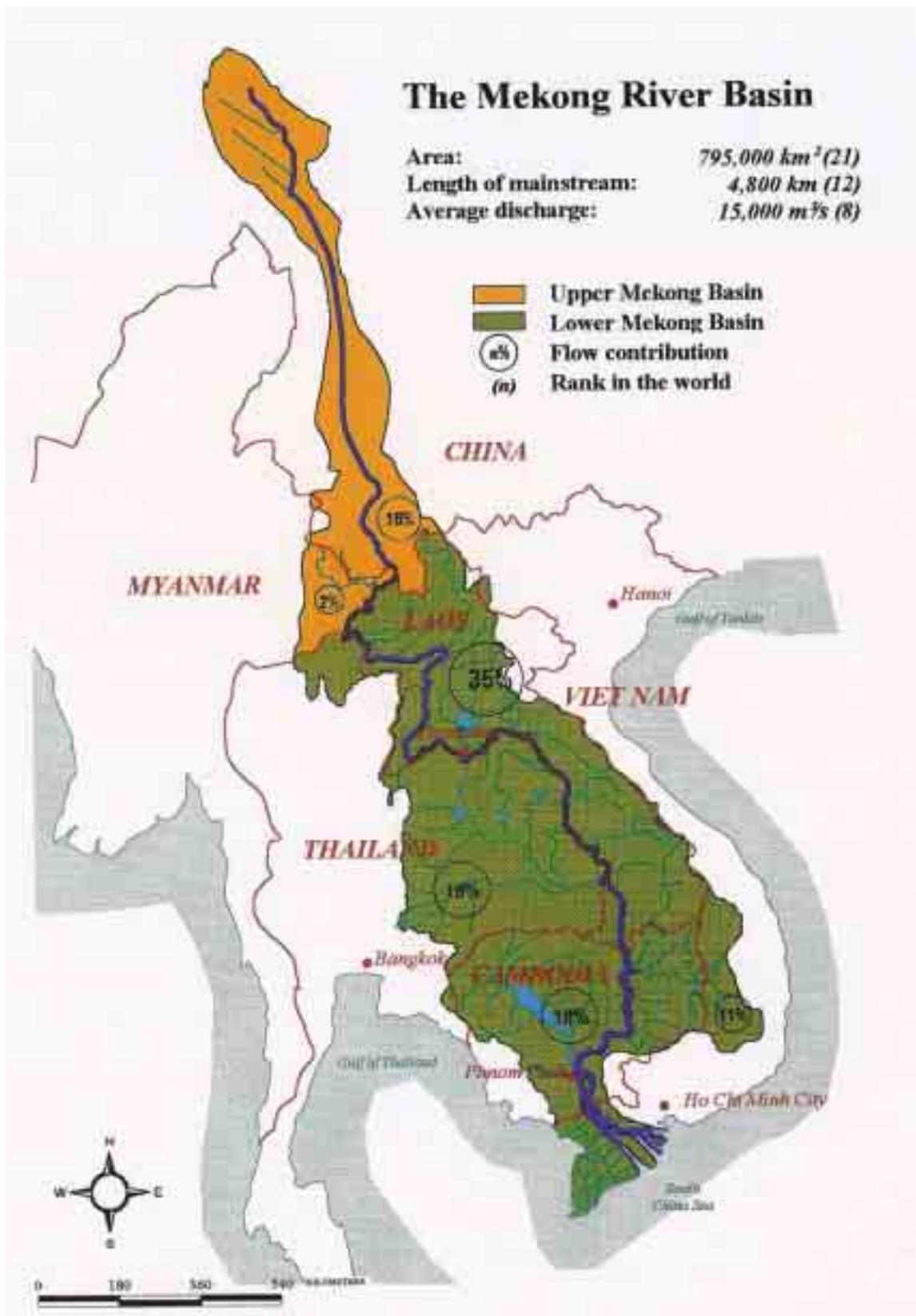
Increasingly the effective management of critical ecosystems will depend on a full recognition of the development benefits they provide when conserved in their natural state. In fact there is growing evidence to show that protected areas and regimes of protection outside them are an essential development strategy for the Mekong countries and a foundation for the supply and servicing of the most important resources for the future – energy, water and food.

Yet, sectors must be convinced that protection across landscapes, including protected areas of various types, is essential to maintaining and enhancing their productivity. There will need to be a fundamental shift in the management of protected areas as islands locked away from development to productive economic assets fully engaged and contributing to the development process. Only in this way will they receive the necessary budgetary support and priority to safeguard their natural assets. Sectors will need to be helped in giving adequate priority in development plans and budgets to conserve the benefits they receive from natural systems. The approach taken to issues such as reform of State Forest Enterprises in Vietnam and of forest, agricultural and fisheries concession systems in Cambodia is becoming a key factor in maintaining those benefits and the full range of development options protected areas provide.

The role of networks of protected areas has a special significance in a region where the countries are so intimately bound together through shared forests, rivers and coastal systems. The Mekong River and its 35 major tributaries and catchments in particular is the dominant natural feature and unifying force in the region. It is the largest river in SE Asia and the world's eighth largest in terms of water flow. With its source in the Tibetan plateau, the Mekong River travels 4,800 km south through Yunnan Province of China, becomes the international border between



Map 1.1: the Mekong River Basin



Source: MRC 1999

Lao PDR and Myanmar, then between Lao PDR and Thailand, before passing through central Cambodia and out through the southern tip of Vietnam to the South China Sea (Map 1.1). The River demonstrates how artificial political boundaries appear when natural resource management needs are concerned, but how fundamentally important they are when it comes to taking management actions.

The relationship between the countries based on natural systems is being consolidated through massive investment in infrastructure development with linking roads, power grids and telecommunications facilities increasing interdependence. The concept of an integrated Mekong region has been promoted politically and expressed in joint development programs, first through the Mekong River Commission (MRC) covering what is called the "Lower Mekong Region" of four countries, and more recently over the past decade through the "Greater Mekong Sub-region (GMS)" of the Asian Development Bank (ADB), taking in China and Myanmar.

Achieving those regional development visions depends largely on the maintenance of healthy ecosystems. A few examples of various facets of development in the region illustrate that relationship. During the past decade, more than 50 per cent of foreign earnings in Cambodia, Lao PDR and Myanmar came from forest products. Twenty per cent of all fish caught from the inland waters of the world come from the lower Mekong region meeting the protein needs of 90 per cent of its population. Cambodia's inland fisheries have an annual value of up to US\$ 500 million with 60 per cent coming from Tonle Sap Lake, directly connected to the Mekong River and dependent on its annual flooding regime for productivity. The Mekong delta contains 34 per cent of Vietnam's farmland and provides 40 per cent of its agricultural output. It relies on the river's annual flooding for soil deposition and fresh water pressure to keep salination at bay. Similarly, in Cambodia and Lao PDR, more than 80 per cent of the population depends on the Mekong system for their agricultural produce. Hydropower has been given centre stage in Lao PDR national development plans. Currently, 3.5 per cent or 627 MW of an estimated 18,000 MW of exploitable hydropower potential has been harnessed. Expanding this capacity is intimately linked with the management of watersheds. Tourism development is a shared priority of the Mekong countries and nature based tourism is the fastest growing sub-sector within the industry.

Each of these situations point to the growing importance of natural systems as the foundation for development in the region as well as the shared nature of many of the development challenges facing the Mekong countries. Well defined networks of protected areas are becoming a key strategy for managing the development potentials of those systems.

1.1.1 The Protected Areas and Development Review

As populations increase and pressure grows to exploit protected areas and natural systems beyond their capacities for renewal, governments are confronted with apparent conflict between their conservation and development priorities. More than two decades ago, the World Conservation Strategy (IUCN 1980) pointed out that conservation and development were two sides to the same coin, but what that meant in practice was not systematically explored in the Mekong region. The two policy goals were pursued separately as competing sectors, with conservation managed as an off-shoot of production forestry. Most sectors, even forestry itself, did not recognise the essential function of conservation in sustaining development.

The situation came to a head towards the end of the 20th century. The immediate development repercussions of massive losses in the condition of forest and water ecosystems began to clarify and national and local economies began to suffer. For example, in Vietnam a government study found that, while US\$2 billion had gone in aid to "environment" projects between 1985 and 2000 (mostly from 1992), it was difficult to assess the overall impact of this investment. Background losses and deterioration in natural resources and systems were so high that the incremental benefits of official development

assistance (ODA) tended to be overshadowed. The study found that those losses were affecting productivity in all natural resource based sectors aggravated by serious under funding of protected areas (MPI/UNDP 1999).

One response to the aid study was Vietnam's decision in 2001 to review the relationship between protected areas and the development sectors as a step to better integrating conservation and economic objectives. The three neighbouring countries of the lower Mekong region also identified this field as a priority concern and, following multilateral discussions, each initiated similar national Protected Areas and Development (PAD) reviews.

The four national reviews were undertaken as a partnership between the protected area agencies, economic planning and finance bodies and the main development sectors. This has become known as the PAD partnership also involving a wide range of international development assistance and conservation organisations. In each country cross-sectoral working groups of government provided the main impetus and direction for the reviews. To facilitate comparative analysis and regional collaboration, each national PAD review adopted the same goal and objectives (Box 1.1).

Box 1.1: PAD review goal and objectives

The development goal:

The development benefits of protected areas are maintained and enhanced through more effective conservation of their natural values.

The objectives:

1. **Identify the main lessons** from past experience in the relationship between development and protected areas.
2. **Assess the effectiveness** of national protected areas systems in meeting both development and conservation objectives.
3. **Explore ways for beneficial integration** between economic and protected area planning processes at national and local levels.
4. **Define practical strategies** to enhance the contribution of protected areas to national and regional development.

All four countries agreed to collaborate in reviewing issues requiring shared management and to feed the results into the Basin Development Plan process managed through the Mekong River Commission. This report sets out the review findings relating to those shared issues which require collaborative management responses - in other words those concerns which are beyond the resources, capacities and political jurisdiction for any one country to tackle effectively. The regional report should be read in conjunction with the four national PAD reports.

1.2 Protected areas status and trends in the region

This section briefly reviews the status and trends in protected areas in the region, in PA investment and in the biodiversity they are set up to safeguard (Box 1.2). It ends with the question – why is biodiversity within PAs in the region continuing to degrade despite increasing coverage and investment?

Box 1.2: Key protected area trends in the lower Mekong region

During the past decade:

- The number of PAs increased rapidly
- The total PA coverage as a proportion of national land area increased rapidly

And trends show that:

- The number and coverage of locally established and managed PAs continues to increase
- Remaining natural forest is being progressively brought under PA tenure

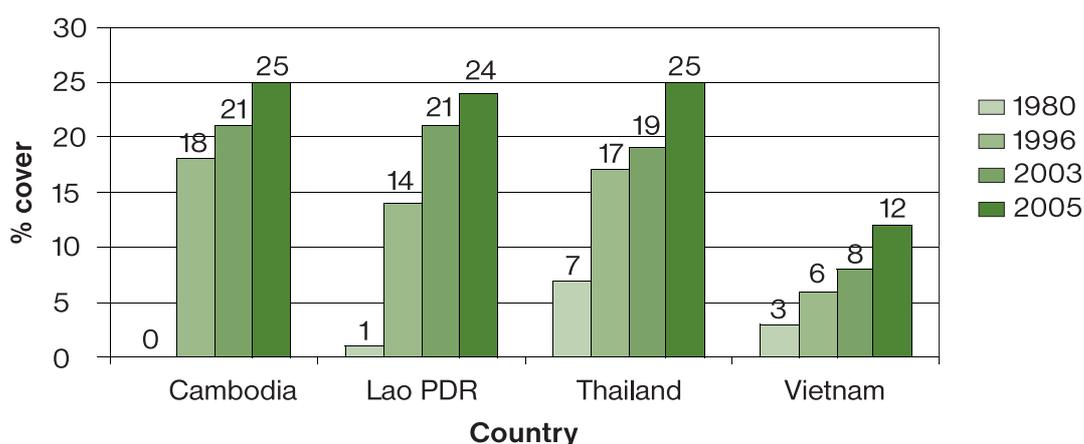
But,

- Few PAs were established in floodplains, deltas and wetlands
- Relatively few PAs were established in the marine environment
- Biodiversity within PAs diminished

1.2.1 Increasing number and coverage of protected areas

Increasing PA coverage: There has been a dramatic increase in the use of protected areas as a mechanism for natural resource management. Protected areas have increased in number and coverage. As a proportion of national territory they have become some of the largest protected area systems in the world (Figure 1.1). The most significant expansions have occurred over the past decade, especially in Cambodia, Lao PDR and Thailand, which are moving rapidly towards a 25 per cent protected area coverage of their collective territory. The entire PA systems in Cambodia and Lao PDR have been established in the 1990s starting from scratch after war and political upheavals swept aside any institutional expression of the forest reserves defined under the French administration earlier in the century.

Figure 1.1: Growth in protected areas in the lower Mekong region (as a percentage of national land area)



Increasing number of PAs: In Vietnam in 1986, only ten years after the American War, 87 protected areas had been officially established covering three per cent of the country. That number has increased to 127. A notable feature of the region's protected areas is that Vietnam has the greatest number distributed throughout the country but the least overall coverage (Map 1.2). Many areas are of historic and recreational value but too small for effective biodiversity conservation (Government of the Socialist Republic of Vietnam 1995; ICEM 2003c). In Thailand, by the early 1980's, 67 protected areas had been

established covering 6.9 per cent of the country. That number has increased to 102, not distributed evenly but many concentrated in clusters often with contiguous boundaries and in regions of remaining forest (ICEM 2003d).

Increasing local government management: In Lao PDR, a system of 18 large National Protected Areas (or National Biodiversity Conservation Areas) was created in 1993, with two areas added later. That system of 20 nationally designated NPAs covers close to 13 per cent of land area. In 2000, the government devolved NPA management responsibility to the District Agriculture and Forestry Offices reflecting another important PA trend in the region - a rapid increase in the number and coverage of locally managed (and in many cases locally established) protected areas. Since the mid 90's, provincial, district and communal PAs of various kinds have flowered in Lao PDR taking the national system to 21 per cent of the country, managed entirely at local level (Table 1.1).

Table 1.1: Locally managed protected areas (2003)

	Cambodia	Lao PDR	Thailand	Vietnam
PAs as a % of land area	21%	21%	19%	8%
% of the national PA system managed at local levels	1%	100%	2%	94%

In Vietnam, the national system also evolved through both centrally and locally established protected areas. Now, all but seven national parks have been devolved for management by the provinces. Significantly though, between 2000 and 2003 the number of "national parks" grew from 12 to 25, as provincial governments reclassified nature conservation areas to raise their status and potential funding.

The growth of locally established and managed protected areas is just beginning in Cambodia, with many provinces expressing interest but awaiting the definition of a regulatory framework for the process. Local capacity remains a constraining factor, as it does in all the Mekong countries. In Thailand, where there is a long history of central control of PAs (until 2003, by the Royal Forest Department and now the Department of National Park, Wildlife and Plant Conservation) decentralisation of responsibilities to regional offices, rather than devolution to local government is the current approach, although there is mounting pressure for the local Tambon Administrative Organisations to take a role.

Increasing natural forest coverage and emphasis on rehabilitation: The region's protected areas are located mainly in forested uplands (Map 1.2). Currently, 66 per cent of remaining natural forest in Thailand falls within the national protected area system. By 2005, if governments meet their targets, 53 per cent of the combined remaining natural forests of the four countries will fall within this form of land tenure (Table 1.2). In Vietnam and Thailand, the past decade has seen an increasing policy and budgetary emphasis on rehabilitation of forest ecosystems – a trend gaining momentum throughout the region.

Table 1.2: Forests and protected areas (2003)

	Cambodia	Lao PDR	Thailand	Vietnam
PAs as a % of land area	21%	21%	19%	8%
Estimate of forests in existing and proposed PAs as a % of total forest in each country	40%	39%	65%	26%

Few protected areas in wetlands, floodplains and deltas: Only 30 per cent of 68 wetlands identified of national importance in Vietnam are within some form of protected area. Similarly, as one moves north

into Cambodia from the Mekong Delta along the mainstream Mekong River and its tributaries and floodplain, there are few protected areas covering wetlands of international and national importance. Over 30 per cent of Cambodia is classified as wetland, a proportion second in Asia only to Bangladesh. Twenty per cent of that area meets RAMSAR criteria of international importance. The story is the same throughout Thailand and Lao PDR – apart from montane rivers and streams within upland PAs, wetlands are the most underrepresented habitat in the regional PA system (Box 1.3). Thailand, for example, has 61 internationally important wetlands, 208 of national importance and more than 40,000 of local significance. A recent survey found that most were not actively protected and require rehabilitation (OEPP 2002).

Box 1.3: Reasons for poor coverage of wetlands in protected areas

Reasons for the lack of attention to wetlands include:

- wetlands are among the most intensively settled, used and converted ecosystems;
- tenure and ownership arrangements for wetlands are not well defined;
- institutional responsibilities and therefore policies for wetlands are not well defined;
- there has been an historical bias towards protected areas covering forested systems;
- there is little appreciation of the economic values of wetlands.

Relative few protected areas in the marine environment: Marine wetlands are a special case in which performance is mixed. No Marine Protected Areas (MPAs) have been established in Cambodia. Ream National Park includes a marine zone now managed cooperatively with a fishing community. One other MPA is proposed by the Department of Fisheries. Vietnam is piloting the MPA approach in one site through the Hon Mun project and 15 other priority locations for MPAs have been identified. In both countries, the main impediment to more concerted action in this field is uncertain and competing institutional jurisdiction (ICEM 2003a and c). In Thailand, on the other hand, where one agency was given responsibility for managing all forms of PAs, there is an expanding MPA system currently with 22 parks making up around 1 per cent of the total national PA system area. Mangroves too are a special wetlands case. Some of the MPAs in Thailand include mangrove systems but they are poorly covered in Vietnam and only in one location in Cambodia. On the other hand, as for other forms of forest, in Vietnam and Thailand there is increasing emphasis on mangrove protection and rehabilitation happening outside formal protected areas. One of the most impressive examples of mangrove rehabilitation and protection is Can Gio Biosphere Reserve near Ho Chi Minh City in Vietnam.

1.2.2 Investment in protected areas has increased

During the past 15 years, there has been a dramatic increase in government and international investment in protected areas.

- Domestic investment, especially relating to recurrent costs associated with staff and maintenance has increased as new areas have been established.
- ODA for PAs saw a rapid increase over the decade from 1990 but in recent years has fallen.
- Direct private sector investment in PAs has been minimal and associated mainly with tourism facilities and hydro-power schemes.

The increases in public sector and international funding have not been consistent throughout the period and from country to country. In the early 90s government funding increased slowly and then quite rapidly towards the end of the decade. More recently it has levelled off or increased more gradually. International aid built up very rapidly, but in Cambodia and Lao PDR dropped steeply in the second half of the 1990's

because of political instability, a lack of measurable progress and ineffective controls on natural resource degradation.

In Vietnam, total government funding for protected areas increased through the 1990s as some 30 PAs and 5 per cent cover was added to the national system. Budget increases went mainly to salaries of an expanding staff. Most of that increase was born through provincial budgets as responsibility for PAs was devolved.

The few centrally managed parks in Vietnam are a special case. Following a sharp increase in funding during the first half of the 1990s, total funding levelled off at just over US\$3 million a year, reached a peak in 2000 and then dropped back to 1996 levels as the number of parks under Ministry of Agriculture and Rural Development (MARD) jurisdiction fell (Table 1.3).

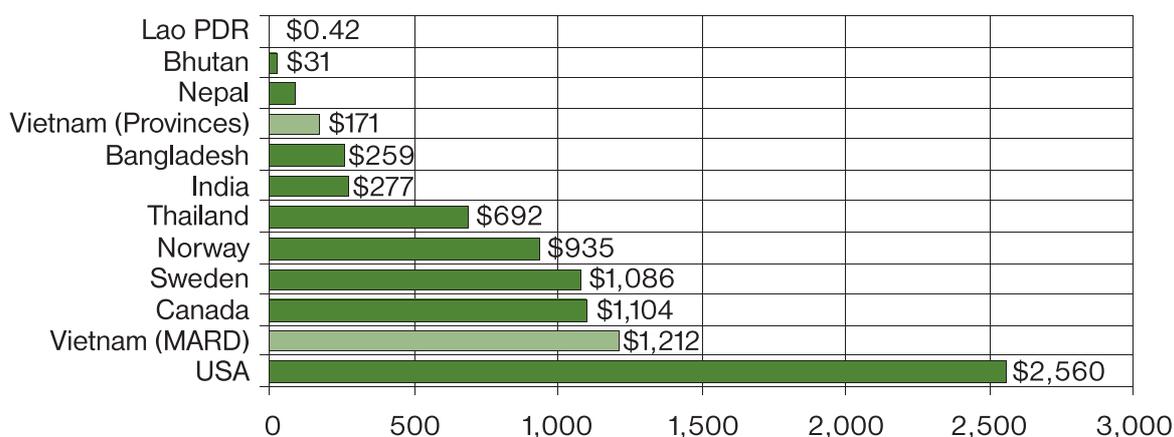
Table 1.3: MARD financing of Protected Areas 1997-2001

	1997	1998	1999	2000	2001
Budget at current prices (VND million)	43,245	46,313	45,764	51,095	44,979
Budget at constant 2001 prices (VND million)	46,005	48,751	47,342	51,785	44,979
Budget at constant 2001 prices (US\$ million)	3.06	3.25	3.15	3.45	2.99

Source: Adapted from IUCN 2002

But on a per unit area basis, government funding to the remaining central parks, now seven of 127 protected areas, has continued to increase. In fact, at an annual average of \$1,212/km²/year the level of public support for those national parks is one of the highest in Asia (Figure 1.2). In developed countries the average government spending on protected areas is just over \$2,000/km² and \$150/km² in developing countries (James et al. 1999).

Figure 1.2: Comparison of government funding to PAs

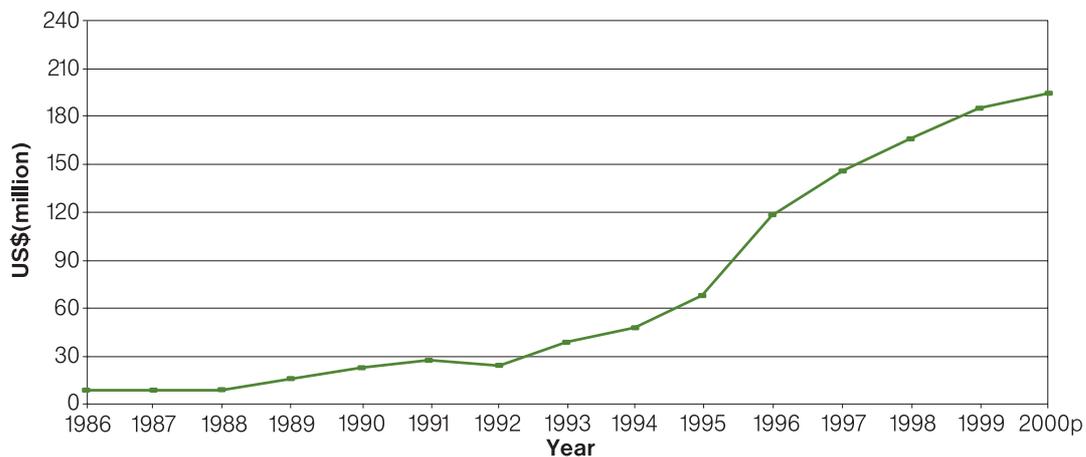


All figures US\$/km²/year. Vietnam MARD average annual funding 1999-2001; Vietnam Provinces average of Na Hang, Hoang Lien and Kon Ka Kinh Nature Reserves, funding for 200 only; other countries from James et al. 1999. All figures are government contributions only, and exclude foreign assistance. Source: IUCN 2002

Most of the 120 provincially-managed PAs receive less, on average between US\$100 and \$300/ km²/year covering only recurrent costs. There are notable exceptions. Can Gio Biosphere Reserve for example, receives more from the Ho Chi Minh City Peoples Committee for community based forest protection work than any other protected areas in the country at US\$21/ha/year.

The flow of international support to the "environment sector" in Vietnam has followed a similar path with a dramatic increase throughout the last decade of the century, in 2000 reaching more than five times the 1990 contribution (Figure 1.3). Biodiversity and natural resource conservation projects made up around 80 per cent of the total. During the five years from 1996-2000 this category of project was contributing around 50 million annually (MPI/UNDP 1999). Since then, environment ODA has declined, especially for protected areas. In 2001, there were about 45 internationally supported biodiversity conservation projects with duration of between 3-5 years and a total funding of almost US\$200 million. The projects contribute an average of US\$4 million a year towards the centrally managed PAs (IUCN 2002).

Figure 1.3: ODA to the environment sector in Vietnam: 1986-2000

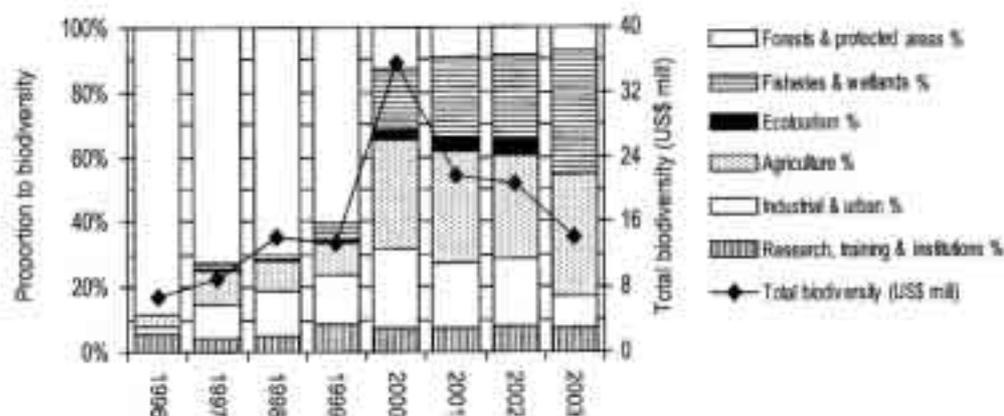


Source: MPI/UNDP 1999

The story is similar in Cambodia where government funding to PAs has increased significantly especially during the three years to 2003 with field staff increases, but levels of ODA dropped. In Lao PDR too, local government in particular has steadily increased the staffing commitment as PA management responsibilities were devolved. But ODA to protected areas has all but shut down, after reaching a peak in 2000 (Figure 1.4). Further, the proportion of biodiversity conservation ODA going to protected areas has dropped from around 85 per cent in 1996 to just 4 per cent in 2003 (Somvang et al. 2003).



Figure 1.4: ODA to biodiversity conservation in Lao PDR: 1996-2003



Source: Somvang et al. 2003

1.2.3 PA biodiversity values have diminished

Remarkably little is known about ecosystems and species diversity in the lower Mekong River region. Fewer than 10 per cent of species have been given scientific names. Yet, the more information that comes to light, the more important the region becomes internationally for its biodiversity. The region falls within one of the world's 25 biodiversity hotspots (Mittermeier et al. 1998). It includes five of the world's Global 200 priority ecoregions (Balzer et al. 2001).

Despite the region's importance, the news on the status of biodiversity is discouraging. It is difficult to get an overall sense of rates of species loss but all evidence shows that populations of large mammals, many primates and birds, and many fresh water and marine species are in serious decline (MacKinnon 2002). In a situation of limited information at the species level, probably the best indicator of biodiversity loss is rates of habitat destruction. While figures vary the overall trends are clear. There have been major losses in area and quality of forests, wetlands and marine ecosystems. Reduction of forest in each country ranges from 46 to 75 per cent of original area (Table 1.4). The greatest losses have occurred in Thailand and Vietnam, which retain around one quarter of their original forests - Cambodia and Lao PDR have more than half of theirs (Table 1.5). Wetland loss through conversion to agriculture has been more extensive, a World Resources Institute (WRI) estimate putting it as high as 99 per cent in Vietnam for example.

Table 1.4: Percentage losses in area of original forest, wetland and marine ecosystems

	Cambodia	Lao PDR	Thailand	Vietnam
Forests	48%	46%	71%	75%
Wetlands	45%	30%	96%	99%
Mangroves	15%	NA	84%	37%
Coral reefs - severely threatened by human activities	100%	NA	77%	96%

Sources: WRI 1994, 2003; FAO 2001, ICEM 2003 a-d; Burke et al. 2002

The rates of loss in forest coverage have slowed very significantly when comparing the ten years from 1980 to the last decade of the century. Yet, quality continues to seriously degrade. Between 1990 and 2000, the rate of forest loss in Cambodia, Lao PDR and Thailand ranged from 0.4 to 0.7 per cent annually. Official figures in Vietnam show a recent increase in cover at 0.5 per cent annually due to replanting. In 1995, the

National Biodiversity Action Plan gave Vietnam's forest cover as 25 per cent of total land area - now government estimates 30 per cent, raising the all-important issue of forest quality in terms of biodiversity and capacity to provide ecosystem services. Only from 2 to 10 per cent of the remaining original forests in the region can be regarded as relatively undisturbed (Dauvergne 2001). Around 85 per cent of Lao PDR is covered by vegetation not under active management, but much is secondary forest and climax grassland (Chape 2003).

Table 1.5: Forest status

	Cambodia	Lao PDR	Thailand	Vietnam
Original forest area as a % of total land area	88%	68%	49%	85%
Forest area in 2000 as a % of total land area	52%	40%	22%	30%
% of original forest remaining in 2003	52%	54%	29%	25%

Sources: FAO 2001, ICEM 2003 a-d

Degradation in quality takes many forms. For example, the trade in wildlife is selective in the species it targets but is leading to an "empty forest syndrome" in which cumulative extractions have a knock on effect of simplification and disruption throughout the ecosystem. The wildlife trade is hitting protected areas hard. Most of the main trade routes from Lao PDR and Cambodia, for example, link back directly to protected areas. The collection of non-timber forest products (NTFPs) and encroachment by local community and commercial interests are also eating away at biodiversity values and the size of protected areas.

Remaining forest in the region is not evenly distributed across the four countries, Thailand and Lao PDR together holding about 60 per cent of the resource, and Vietnam and Cambodia around 20 per cent each (Table 6). But Vietnam's forests are highly fragmented when compared to the other three countries and many of their development values have diminished accordingly (Map 2). Lao PDR is less than half the size of Thailand but has similar levels of the region's forest resources. Similarly, Cambodia is about half the size of Vietnam but retains the same proportion of the region's forest (Table 1.6). Illegal logging practices now tend to be more focussed in Cambodia and Lao PDR. Intensity of logging effort transferred to those two countries following the moratoriums and more intensive controls on the forest industry introduced in Thailand and Vietnam. Cambodia attempted to reign in unbridled logging, first through a voluntary restructuring process from 1999 and then in 2002, by suspending all logging operations pending the preparation of environmental management plans by each concession holder. The 2002 Forestry Law makes it a crime to cut trees outside concession areas, in national parks, in wildlife sanctuaries, or other designated areas.

Table 1.6: Distribution of forest in the lower Mekong region

	Cambodia	Lao PDR	Thailand	Vietnam
Land area (in 000 km ²)	176.5	230.8	511.8	325.4
Forest area in 2000 (in 000 km ²)	93.3	125.6	147.6	98.2
Proportion of total forest in region	20%	27%	32%	21%
Proportion of region's forests in national protected area system	8%	10.4%	21%	5.6%

Sources: FAO 2001, ICEM 2003 a-d

An outstanding feature of forest loss in Cambodia and Lao PDR, and to a lesser extent in Thailand and Vietnam, is that intensive illegal logging tended to continue outside protected areas. On the whole, the forests of officially designated protected areas ended the century in better shape than those around them. This is most remarkable in situations such as Cambodia where much of the PA system established through Royal Decree in 1993 lacked field staff throughout the decade.

Certainly, there continues to be many small scale logging infringements within protected areas. Yet, despite a number of serious exceptions in all four countries, the level of destruction has been greatest in the landscapes around them. Forty five per cent of the region's forests fall within protected areas (Table 1.6). That figure is especially significant as protected areas now contain the bulk of the best quality forests and of the remaining original forests in the region. This is a positive perspective on a decade of negative trends for natural systems. In summary, forests and other biodiversity appear to have been safer when within protected areas, but by no means secure. Many factors continue to reduce its values and resilience.

1.3 Why is the quality of protected areas reducing?

Why is it that despite increasing attention, protected areas are continuing to degrade even if more slowly than surrounding biodiversity? There are three fundamental reasons:

1. Investment in PAs while growing is still a very small proportion of GNP given the size of the areas and importance of the natural resources involved.
2. Populations are increasing rapidly along with natural resource demand and people are moving to areas of remaining biodiversity wealth.
3. Natural resources outside protected areas are diminishing due to neglect and overuse by development sectors.

Investment: Over the last 5 years to 2000 in Vietnam, for example, the percentage of GDP allocated to protected area financing averaged approximately 0.13 per cent of GDP and 0.5 per cent of total government budget (IUCN 2002), compared with Cambodia where, in 2001, government PA funding made up 0.18 per cent of the national budget. In Thailand, forest conservation through the Royal Forest Department received 0.4 per cent of the national budget in 2000. Throughout the region, the national PA systems receive well under one per cent of national budgets despite covering almost 20 per cent of the most valuable natural resources and ecosystems the region possesses.

Demographic issues and sectoral impact on natural resources in the region are of such importance to the planning and management of protected areas that they receive special attention in the following sections 3 and 4 as a back drop to the other chapters in this report.

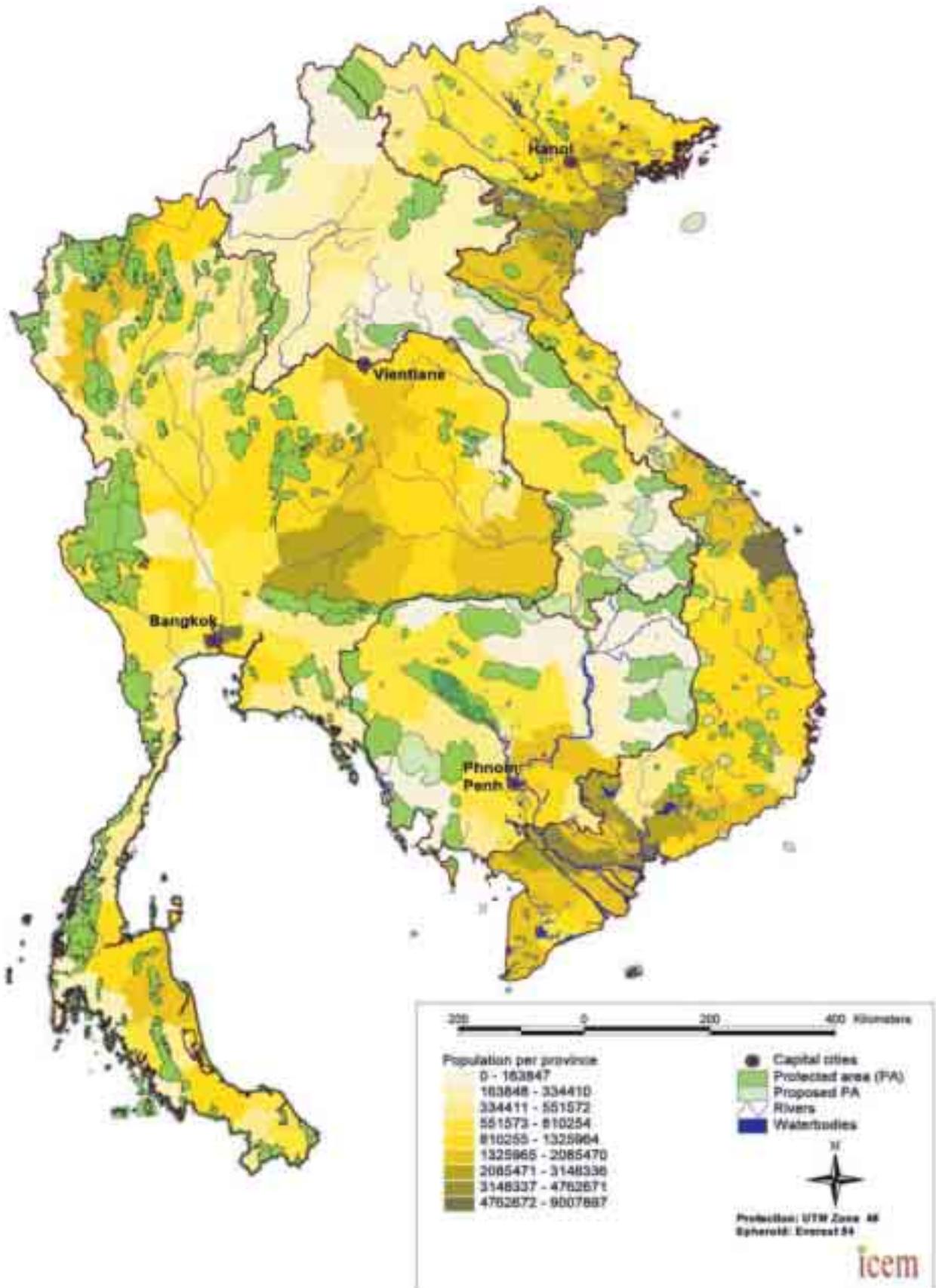
1.4 Population dynamics and protected areas

The PAD review found a number of important linkages relating to population: In each country:

1. protected areas tend to fall in the least populated locations (Map 1.3);
2. protected areas are situated in regions of medium to high poverty;
3. there is increasing migration towards protected areas and regions of biodiversity wealth; and,
4. there is a direct correlation between population density and the level of community pressure on protected areas.



Map 1.3: Population density and protected areas



At a regional level, population becomes a key driver for natural resource consumption patterns and international relations. Cambodia and Lao PDR with close to 50 per cent of the lower Mekong's quality forests and much of its water and hydropower potential have a shared population of just 19 million surrounded by 230 million people who are experiencing increasing resource scarcity and demand (Table 1.7). Since the 1960s populations have doubled and may double again before levelling out over the next 50 years. Cambodia and Lao PDR are facing a future in which the populations of their neighbours - Thailand, Vietnam, Myanmar and Yunnan province - will reach 3-400 million within several decades. The pressure is great on the Mekong nations to exploit their resources (and those of their neighbours) to cater for growing demand.

1.4.1 Population distribution

Populations in the region are not evenly distributed. For example, in Cambodia 80 per cent live in 20 per cent of the land area largely concentrated in southern portion of Mekong basin. Similarly in Vietnam populations concentrate in 27 per cent of the country mainly in the Red River and Mekong River Deltas (Map 1.3), which are devoted to paddy cultivation. The Red River Delta has one of the highest population densities in Asia at 1000/km².

There is a very good reason for these population concentrations – they are directly linked to available natural resources such as soils, water and fish and the natural systems which maintain and enrich them. Generally, protected areas have not been established in these regions of traditional high population density. Most protected areas are relatively isolated and located in areas of low population density - but this is changing.

As populations grow and local resources come under stress through excessive exploitation and disruption, people are forced to move. It is not only local resource constraints changing population dynamics. The relationship between population concentrations and movement and management of upstream ecosystems is critical but poorly understood. For example, it is estimated that 50 per cent of the fluctuation in low land rice yield in Vietnam is attributable to disruption of natural water regulation due to upstream forest loss (Government of the Socialist Republic of Vietnam 1995).

Table 1.7: Demographic features of Cambodia, Lao PDR, Thailand and Vietnam (2003)

	Cambodia	Lao PDR	Thailand	Vietnam
Population (millions)	13	5.9	64	81.6
Growth rate %	1.8%	2.5%	1.0%	1.3%
% rural/mountain	85%	83%	70%	75%

Yunnan Province in China has a population of 42 million and growth rate of 1.2 per cent. Myanmar's population is 42.5 million and growth rate of 0.5 per cent. Source: CIA 2003

1.4.2 Migration

People are moving seasonally and permanently in increasing numbers. The migrant population in Cambodia is 31.5 per cent and rural to rural migration remains the most common at around 70 per cent of the total (ICEM 2003a). As densities in the delta region increase, for example, people are moving west along the coast and into regions of biodiversity wealth and complexes of protected areas. More people are living in and around PAs. Elsewhere in the country the story is similar. The protected areas on the western border in Battambang and Pallin provinces have very high population densities largely due to recent immigration.

In Vietnam the most notable migration of the last decade has been from the heavily populated north, especially the Red River Delta region, down to the central highlands. Districts around Yok Don National Park in Dak Lak Province experienced population growth rates of 14 per cent annually, compared to the 1.3 per cent national average and equivalent to some of the fastest growing urban centres in the country. During the decade from 1992, the overall provincial population grew 231 per cent.

Over the same period, just south of Dak Lak, the population in the buffer zone of Cat Tien National Park grew 34 per cent or 3.4 per cent annually (Polet et al. 2003).

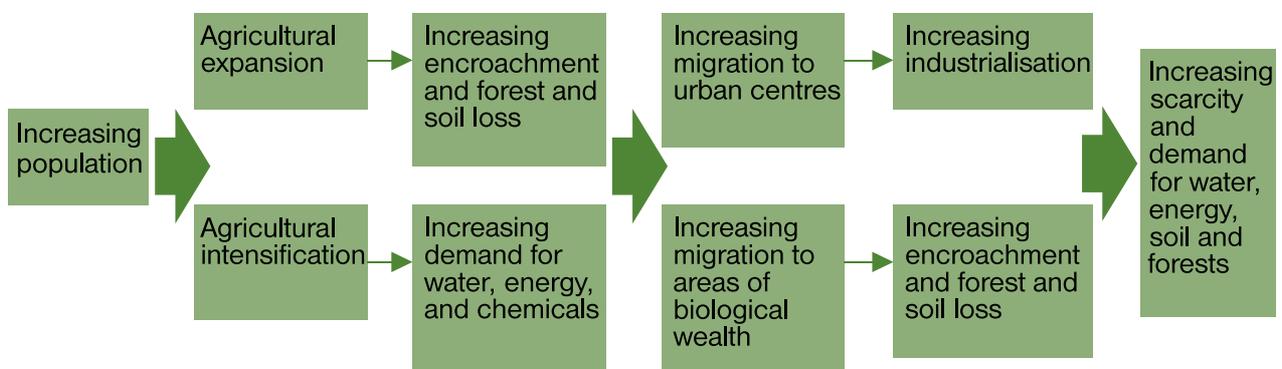
As Thailand's population increased, land poor families migrated to forest frontier areas declared as National Reserved Forest. By 1980, an estimated 10 million people, or more than 20 per cent of the country's villages, were located in these forest regions which included the national protected areas system (ICEM 2003d). For example, following intensive migration from the east of the country, one of the most densely populated regions of Thailand is now bordering Khao Yai, Thaplan and Pangsida National Parks just north west of Bangkok with all the associated challenges of encroachment and illegal resource use.

Protected area managers are confronted with rapidly changing management situations involving community development demands which they are not resourced or skilled to handle. People are increasingly mobile and have growing access to once isolated parts of the country. Infrastructure is expanding to accommodate these growing and mobile populations. The relationship between roads and PAs has become a critical issue in the region. For example, in Vietnam the initial proposal for the Ho Chin Minh Highway now under construction passed through 13 protected areas. This major field of development alone requires that the economic values and benefits of PAs in local and national economies are better understood.

1.4.3 *The population - natural resource equation*

Over the past few decades in all countries, there has been a clearly identifiable set of relationships linking populations and natural resources and fuelling development and pressure on protected areas. They are intensifying with far reaching implications for the way protected areas need to be viewed and managed (Figure 1.5).

Figure 1.5: The population – natural resource use equation



In short, mounting population leads to agricultural expansion and intensification, increasing pressure on forests, soil and water resources. Intensification also increases demand for energy and chemicals. Diminishing resource availability fuels migration to towns and cities and areas of biodiversity wealth which in turn leads to further industrialisation and agricultural expansion, and increasing resource demand, encroachment and scarcity. These chains of cause and effect are constraining the capacity of natural systems for renewal and servicing of development and reducing the availability and quality of natural resources.

In situations of rapid population increases protected areas become natural capital banks of last resort, and can quickly degrade without adequate investment.

1.5 Sector productivity and the protection of natural systems

Many sectors in the region are suffering to a greater or lesser extent from neglect of their natural resource base. This increasing threat to economic productivity provides an opportunity for protected areas and linked regimes of protection across landscapes to be recognised as critical development strategies. Yet, it is also placing protected areas under increasing stress as sectors seek to exploit their spaces, products and services without due regard to sustainability.

Natural system decay may be due to intentional and aggressive exploitation of the “consume and move on” type or because natural functions and contributions are taken for granted - but it has the same negative impacts on sector productivity all the same (Box 1.4). Examples of the immediate connection between sector productivity and the condition of the resource base are easy to find in the region. Fisheries, hydropower and agriculture illustrate the relationship.

Fisheries: In Vietnam, Thailand and Cambodia coastal fisheries have collapsed. Throughout the region there has been serious loss of habitat and productivity in fresh water capture fisheries - and a transfer of investment attention to aquaculture.

Hydropower: Although the situation varies greatly from one facility to another, the neglect of upper catchments is reducing overall productivity. Larger hydro schemes have much greater capacity to absorb the effects of sedimentation and increasing fluctuations in water supply. Yet, in recent years, reservoir levels in smaller schemes have dropped so low during the dry season in some areas of Vietnam that output was down to 10 per cent.

Agriculture: In the Sakae Krang watershed situated in the central plain of Thailand forest loss and poor agricultural practices have led to annual soil losses of up to 39 mt/ha/yr (Eiumnoth 2002). Similarly in Vietnam's Central Highlands some areas cleared of forest for coffee, mulberry and tea plantation experience 20 mt/ha/year soil losses annually. Forest loss has also increased the seasonal variation in rice production due to increased lows and highs in water flow. In Thailand and Vietnam water quality and supply for agricultural is becoming more unreliable. In 1999, Thailand suffered its worst drought in many decades. Six million people in 44 provinces were affected. Thailand's plan to divert water from the Mekong to irrigate its drought-stricken North-east was met with concern from its neighbours who also depend on the system's water resources.

Those examples emphasise the critical importance of natural system maintenance in the regional economy. Increasingly, availability of energy, water, forests and arable land are the commodities constraining development. All countries are reaching (or have reached) the limit of their available arable land. Countries that maintain the capacity to conserve and renew those resources will have a distinct competitive advantage in the long term (Figure 1.6).

Box 1.4: Sector productivity and natural resource base

Forestry – increasing forest product processing and demand, with 50% decline in the resource base

Fisheries – effort increasing - catch per unit effort is decreasing (due to collapse of stocks in coastal and fresh water systems)

Hydropower – increase in demand and investment in electricity supply - real cost per unit of energy increasing (due to a failure to fully account for watershed maintenance and other environmental services)

Agriculture - production costs increasing (due to soil loss, chemical inputs and fluctuation in water supply)

Industry - cost of water supply and treatment increasing (due to reducing water quality and access)

Nature based tourism – rapidly increasing demand and investment leading to diminishing quality of “products”

Figure 1.6: Potential resource availability per head of population

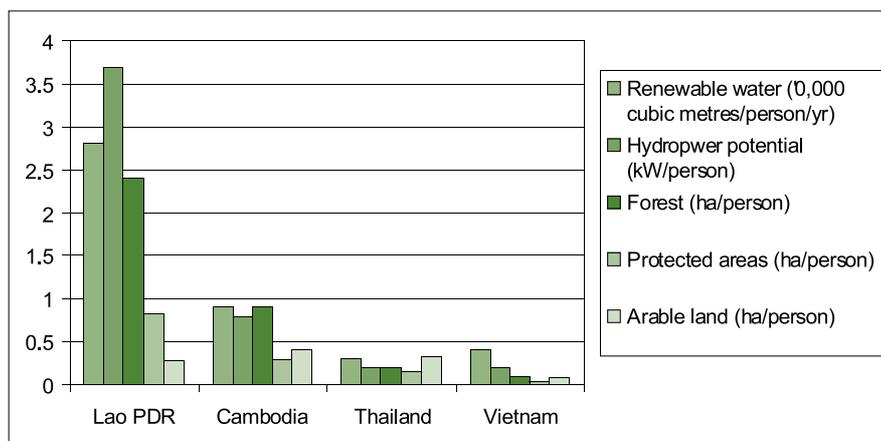


Table 1.8: Potential resource availability per head of population

	Lao PDR	Cambodia	Thailand	Vietnam
Renewable water resources ('0,000 m ³ /person/yr) ¹	3.5	1.0	0.3	0.4
Hydropower potential (kW/person) ²	3.7	0.8	0.2	0.2
Forests (ha/person) ³	2.4	0.9	0.2	0.1
Protected areas (ha/person) ⁴	0.82	0.29	0.15	0.03
Arable land (ha/person) ⁵	0.28	0.4	0.33	0.08

Sources: (1) UNDP 2001; (2) ASEAN 2003; (3) FAO 2002; (4) ICEM 2003 a-d; (5) FAO-RWEDP 2002

Cambodia and Lao PDR are sitting in the front seat in terms of potential water, forest and energy availability per head of population (Figure 1.6 and Table 1.8). They hold 37 per cent of the region's

renewable water resources, 52 per cent of its hydropower potential and 47 per cent of its forests but only 11 per cent of its population. They retain a disproportionate share of the region's natural capital in the form of forest and wetland timber and non-timber products, wildlife and ecosystem services. For example, 35 per cent of the Mekong River Basin lies in Lao PDR. Managing this development potential for the greatest benefits will require complex trade offs and carefully negotiated economic relations with neighbouring countries and foreign companies. The market for these products and services is primarily in neighbouring countries, the wider region and beyond.

Energy consumption per capita is around 25 times greater in Thailand and five times greater in Vietnam than in Cambodia and Lao PDR (Table 1.9). Projections on energy demand show the gap widening exponentially. For example by 2020, overall energy consumption in Lao PDR is estimated to be 759 MW, while in Vietnam it is expected to have shot up to 201 million MW (ASEAN 2003). In Lao PDR and Cambodia, fuel wood is the primary source of energy for most people and demand will increase before other forms of power are available. The energy relationships in the region are complex and reflect the increasing interdependence of the national economies with their shared natural systems. For example, Vietnam plans to invest in transmission lines to purchase about 100-400 MW of electricity every year from China. Currently, it exports electricity to Cambodia, which is in the earliest stages of developing its hydropower resources. In 2003 the Lao Government approved six hydropower schemes to be built and operated by a Vietnamese state run consortium, the first for US\$232 million.¹ A year earlier, Vietnam had agreed to import 1,000 MW each year from Lao PDR between 2006 and 2010. The planned dams are all in the Se Kong River Basin, which runs from southern Lao PDR into Cambodia and is a major tributary of the Mekong River. The 190 square kilometre reservoir behind one of the proposed dams, the Sekaman 1, includes part of the Dong Ampham National Biodiversity Conservation Area. The costs and benefits for the three countries affected by such arrangements are not fully assessed, including those associated with ecosystem services and impacts, which remain unaccounted for.

Protected areas, if receiving adequate investment and management, will play an increasingly important role in revitalising and maintaining critical resources and ecosystem services throughout the region. Already Thailand, the leading economy in the lower Mekong region, has set aside 97,200 km² in protected areas which is close to half the total in the four countries in terms of geographic area – and the plans to expand that system reflect a growing realisation of its economic importance and significance for national wellbeing.

Table 1.9: Energy consumption

	Cambodia	Lao PDR	Thailand	Vietnam
Fuelwood consumption (% of total energy consumption)	84	89	17	39
Energy Consumption (kW hours/person)	20	98	1448	286

Sources: FAO-RWEDP 2002; UNDP 2000.

1.6 A new protected area language

There are two ways of looking at protected areas – one, as areas of natural resources under siege from development sectors and local communities or two, as productive units of the economy, integrated and maintained by it. In the lower Mekong countries, governments considered protected areas as unproductive in economic terms and PA managers adopted a siege mentality taking on the role of nature's policemen. Those attitudes are changing. Yet, the question remains – how is the shift achieved in

¹ The Sekaman 3 dam (210 MW); Se Kong 4 (310 MW), Se Kong 5 (200 MW), Se Pian-Se Nam Noi (340 MW), the Sekaman 1 (300 MW) and Sekaman 4 (55 MW).

practice from PAs as **conservation assets** to be protected from the economy, to PAs as **economic assets** carefully conserved for the development benefits they provide.

One strategy for that shift underlies all others. For protected areas to be recognised as essential development strategies, PA managers need to adopt the language and approach of the two dominant fields of development reform the four countries are promoting:

1. Reform of public administration and governance
2. Reform to the economic system

These two fields of reform are intimately linked and reinforce each other. They are the overriding preoccupation of all four governments and receive the greatest political attention and budgetary support. There is a critical opportunity for protected areas to be seen as an important force for demonstrating and driving this primary government agenda and consequently to receiving a greater share of the public purse.

1.6.1 Prerequisites for applying the new PA language

Acquiring and using the new language requires of PA agencies:

1. a reorientation of the kind of information which they generate;
2. a much greater use of budgetary cycles and submissions as a vehicle for change;
3. active engagement in key government reform platforms; and,
4. formal working relationships with each of the principle development sectors.

PA agencies need to cultivate a new constituency among the main organisations and individuals shaping and determining government policy, development and budgetary priorities. They should use the annual and five year budgetary cycles to promote and advocate a greater share of the cake. And they need to ensure that they are sitting around the tables where government reforms are being discussed and implemented.

1.7 PAs as “engines” of good governance.

There are three key areas in which the four governments are seeking to change the way decisions are made and plans and programs carried out.

1. Decentralisation
2. “Democratisation”
3. The rule of law

In practice the directions the reform are taking include:

Decentralisation

- Devolution of planning responsibilities to local government
- Devolution of budget management and revenue raising
- Devolution to the private sector and increasing use of economic incentives to shape behaviour

Democratisation

- Increasing opportunity for stakeholder and community involvement
- Increasing mechanisms for cross sector working links and links between regions (although this remains a challenge)

Rule of law

- Better defined and enforced frameworks of laws and regulations – leading, for example, to greater definition of rights over the use of land and resources

All these directions for reform are receiving the highest priority from governments. They all have great significance for protected areas in terms of how they are managed and the contribution they can make to the reform process. PA managers need to be proactive in promoting themselves in terms of these top priority fields of government reform, and not remain passive bystanders. **PAs should be seen as “engines” of good governance.** They need to be highly visible as adding significantly to the momentum of the reform process and to showing how it should be done.

1.8 PAs as “engines” for economic reform

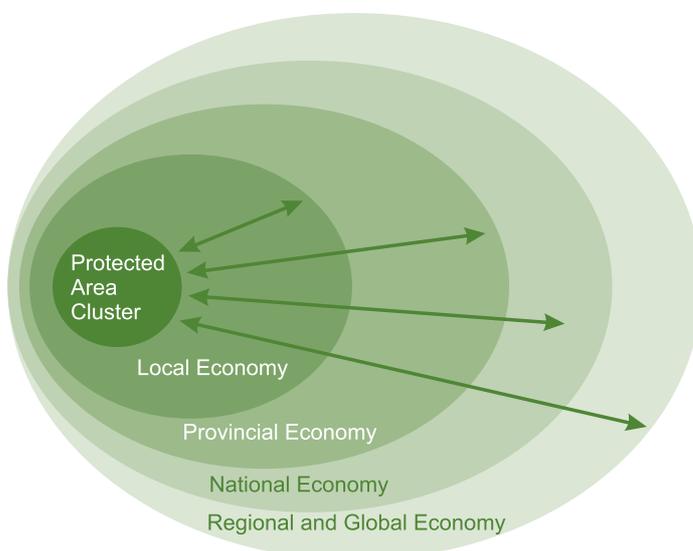
Similarly PA planners need to build on the momentum of government commitment and use the economic reform process to shift themselves into the mainstream of development planning.

An important way to begin this change in perspective is to see protected areas as having zones of economic influence. **Each PA has a development footprint** (Figure 1.7). Interesting findings of the review are that the size of a protected area is not always directly correlated to the size of its economic footprint. But when PAs are managed in clusters across a landscape, it increases the size and significance of the collective footprint allowing for specialization, sharing and exchange to promote development functions.

The review explored ways for economic and protected area planners to better understand and expand these zones of development influence and to having them recognised in local and national development planning and in national accounts.

The overriding principle to be applied in managing and expanding a PA development footprint is that **users pay for maintenance of the benefits they receive.** It is not merely “the user pays” principle, which is applied for example in Vietnam’s Natural Resources Tax. It is essential to link directly in the minds of users - the use of the natural resource or service with the need for and cost of its maintenance. In Vietnam, collected natural resources taxes go directly to consolidated revenue, now mostly at provincial level. The link between use and conservation is lost.

Figure 1.7: The protected areas development footprint



In summary, key steps in managing the PA development footprint include:

1. Defining the economic actors and activities connected to protected area resources and services
2. Identifying the PA development benefits they receive
3. Valuing those benefits, and
4. Working with sectors to reflect the benefits in their policies, budgets and staffing.

1.9 Defining the protected area development footprint

To take those steps in managing and enhancing the development footprints of each protected area within a national system, PA managers need a framework of assessment which helps identify benefits flowing from the area, existing or potential users, and development values. The benefits that protected areas contribute to the development process can be broadly classified in three categories: products, services, and natural attribute values.

1. *Products* are those economically valuable things either extracted from a protected area by people who go there, or which move out of the area and are used or harvested in another location, such as migratory fish.
There are very many products obtained from protected areas. Common examples are non-timber forest products (NTFPs, e.g. rattan, malva nuts, resin), timber, and aquatic products. Products from protected areas are relatively easy to value in economic terms, though completely quantifying all their contributions to the economy might be difficult, particularly when they are used for subsistence purposes or are bartered.
2. *Services* are economically valuable functions a protected area provides.
Examples of services provided by protected areas are water supply, regulation of seasonal water flows, removal of pollutants from water, and carbon sinks. Services depend on particular characteristics of the protected area, such as forest cover, and aquatic plant and animal communities. The realisation of the benefit of services provided by a protected area might be direct or indirect. A direct benefit might be the area's function in removing and storing carbon from the atmosphere. On the other hand, if a forested catchment in a protected area maintains dry season flow in a river and thereby allows year-round water transport in another region far away, this is an indirect benefit. Services from protected areas are sometimes difficult to quantify in economic terms but there is a range of methods which has been developed for the purpose (ICEM 2003f; Carew-Reid 2002).
3. *Natural attribute values* refer to the opportunity provided by the unique site specific characteristics of a protected area to carry out certain human activities which may have direct or indirect economic value. These attributes mainly relate to biological features such as endangered species and rare plant communities, geo-morphological features such as spectacular landscapes or to a special location, such as proximity to an educational facility.
Examples of the benefits derived from natural attribute values of protected areas include ecotourism, recreational activities, education, research, and sites of religious or spiritual value. Not all natural attribute benefits are easily quantified in economic terms, but contribute none the less in major ways to the development process, for example, by helping to maintain the physical and mental health of a population – a function of PAs which is becoming increasingly important in the lower Mekong countries. Many natural resource economists categorise natural attribute values as protected area services as explained in another PAD Review Report (ICEM 2003f). Yet, the PAD fields studies (ICEM 2003g) suggest that, in practice, protected area managers in the region tend to distinguish between the biophysical attributes of an area, and the goods and services it provides.

Protected areas bring other benefits linked to these three which are important to people but are not generally seen as contributing to development. A prime example is “existence value”, which means the value that people place on simply knowing that a particular place or species exists - even though they may

not plan to go there to enjoy it at first hand. Economists have developed techniques for quantifying existence values in financial terms, which can be surprisingly large. To some extent existence value underlies the willingness of people in developed countries to contribute to conservation activities in developing countries. Existence value can become important in development terms as a protected area attracts international recognition for its natural attributes.

The analogy of industrial estates, which manufacture products and provide services is useful in reorientating how PA managers and economists think about protected areas. Each protected area supports a series of production units or businesses. The natural attribute values of protected areas can be compared to the special features and site advances of an industrial estate, where the economic activities which are undertaken depend for their profitability on the particular range of special attributes of the location. Continued profitability for any business within an industrial estate, will depend on the wise management of resources and processing systems on which it depends and in nurturing and building its markets. Good management and maintenance of the overall estate is another critical factor in maintaining market share. In the same way, protected areas and their “production units” need to be maintained if they are to continue servicing and producing for development, and increasingly PA managers will need to reach out and establish markets for their area.

In many locations within the lower Mekong region, the benefits provided by protected areas are essential to various facets of development in the locality, for example to a fishing community, a rattan factory or to a fruit tree orchard through pollination services. Loss or degradation of the protected area will reduce or remove these benefits. Maintenance of protected areas as functioning ecosystems with their conservation values intact will ensure that important contributions to development are maintained.

In summary, the economic benefits of businesses or industrial estates cannot be realised unless there is ongoing investment in capital plant and maintenance. Similarly, the development benefits of protected areas will not continue to be realised without adequate investment in establishment and management.

The matrix in Table 1.10 provides a broad overview of the way in which protected areas provide benefits to development. A more detailed version of this matrix should be prepared for every protected area either individually or in clusters, so that specific existing or potential contributions are identified against specific users.

Table 1.10: The PA development footprint matrix

	Agriculture	Flood Control	Urban & Industrial Water Supply	Trade	Transport	Poverty Reduction	Tourism	Health & Nutrition	Education & Research	Energy	Finance	Culture	Forestry	International cooperation
Protected area products	X			X		X	X	X		X	X	X	X	X
Protected area services	X	X	X		X	X	X	X		X	X		X	X
Protected area natural attributes						X	X	X	X		X	X		X

The broad classes of “products”, “services” and “natural attributes” provide a framework for grouping similar benefits of protected areas. They provide general headings for follow-up work on development contributions and for giving them economic value. They help to avoid the confusion which often arises when analysing quite different activities, such as harvesting resin, water supply functions, and ecotourism activities, all as benefits of protected areas.

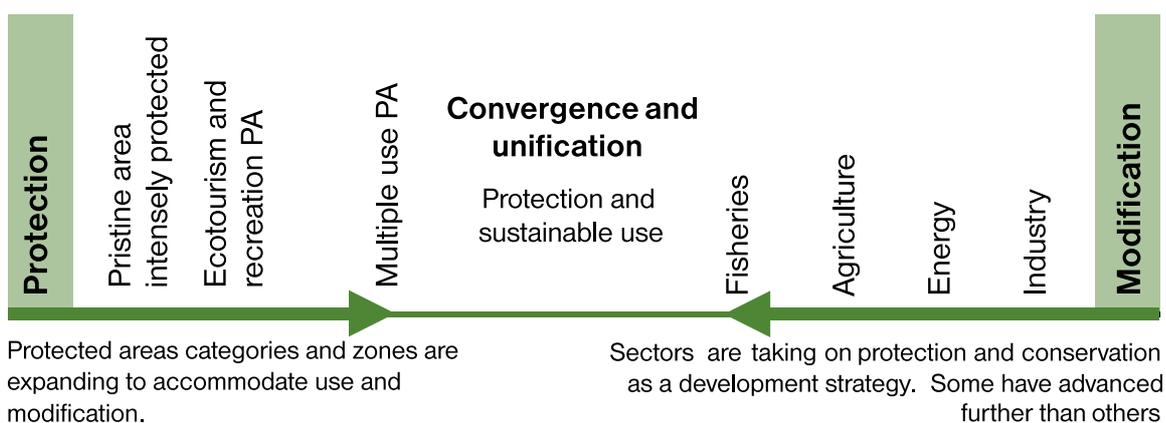
The matrix as a whole provides a starting point for introducing a range of sectoral agencies to the idea that protected areas support development in their sector. In addition, the “goods and services” and “industrial estate” analogies put the benefits of protected areas into terms that are familiar to non-conservation agencies. These analogies then provide fertile ground for extending the discussion to the need for investment in establishment and maintenance of protected areas, and for incorporating protected area contributions into local, national and regional accounting.

1.10 The development continuum

Finally, in shifting protected areas into mainstream development thinking, they should be viewed in terms of their place along a development continuum. The principal theme of the PAD Review is that protected areas need to be woven into the fabric of the overall development landscape. They are one tool – albeit the most important one – in managing natural resources so that conservation becomes a central strategy of development. The goal of protected areas is to keep the natural systems they cover in a natural state because that is their most productive use for human wellbeing – ie it brings the best development outcomes. In most cases “natural state” means as close to the original ecosystem and species make up as possible. Outside protected areas, and moving across a landscape, one encounters varying intensities of use and modification to the natural state. The benefits of conservation and many of the principles underlying protected area management still apply.

The notion of transition is helpful in understanding protected areas within a landscape. Institutional and administrative imperatives require them to be managed separately as a distinct form of tenure. In practice, protected areas fall at various places along a continuum with total protection at one end and complete modification of the natural state on the other (Figure 1.8). The central business district of Bangkok, for example, will fall at one extreme of the development continuum. At the other would fall the Thung Yai-Huai Kha Khaeng World Heritage Site in the Western Forest Complex of Thailand. Both situations are contributing to development – one through almost complete modification and the other through a high level of protection of the natural state.

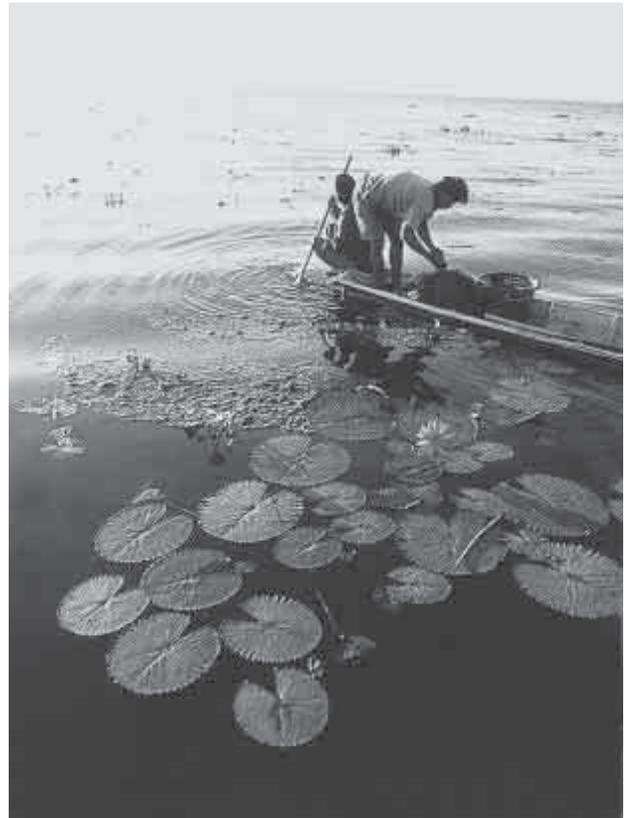
Figure 1.8: The development continuum



Other protected areas allow various uses of their natural assets and partial modification of their natural state. Similarly, as sectors take on conservation and sustainable use practices, they move along the continuum. Over the past decade in the lower Mekong region a convergence has begun bringing together protected area planning and management approaches with those used in the development sectors. Following collapses in fresh water and coastal fish stocks, the fisheries sector, for example, is exploring the establishment of networks of habitat sanctuaries and regimes of protection throughout the

aquatic system. Forestry has gone further by placing much of the remaining natural forest under protection and attempting to introduce forest conservation and restoration throughout the landscape. Hydropower and many arms of industry still have a long way to go before seriously recognising the conservation basis of their productivity. While there will always be a development need for highly modified, intensively used areas, all sectors should aim to progressively shift along the continuum to take on protection and conservation as a matter of long term economic survival and competitiveness. Similarly, there are some geographic areas which contribute the maximum development benefits if kept in a natural state without modification and with minimal use. Yet, increasingly, forms of protected areas are needed across the landscape which allow for a range of sustainable uses and partial modification, on a seasonal or permanent basis. The culling of wildlife populations, fire regimes, and management of forest surrounding reservoirs, for example, all might involve some modification to the original natural systems, but which also include high levels of protection. Use and protection can be entirely compatible.

The transition to convergence on the development continuum requires innovation in policy and practice. There are essential ingredients to making progress. The PAD Review is a step in identifying those ingredients and to giving direction to the reform process. The sector by sector analyses in this report and the synthesis of strategies in Chapter 10 are concerned with approaches and models which governments of the region need to follow on a cooperative basis to use sustainably and protect shared natural systems.





Part 2: Protected areas and development

2 Poverty reduction and protected areas

2.1 Introduction

A persisting problem in nature conservation is that the burdens of conservation are disproportionately shouldered by those who can least cope with them - the poor. Because the poor prevail in areas rich in biodiversity and relatively pristine habitats—both as cause and consequence of their poverty—they have disproportionate responsibilities toward the conservation of nature. The landscapes among which they live provide essential goods and services for local, national and international interests. But because nature's provisions are generally considered as "free goods", poor communities' contributions to their maintenance go unrecognised and financially uncompensated.

Perhaps nowhere else is this dilemma more evident than in protected area conservation. The chapters of this report show clearly how protected areas provide a range of goods and services that are vital to water resources, energy, agriculture, forestry, fisheries, industry and the service sector. But rarely are resources from these sectors re-invested in the maintenance of protected areas or in the affected local communities which are asked to surrender large areas of habitation, cultivation and natural resource use for conservation. Protected areas also play a key role in global biodiversity conservation and eco-system health. In these fields funds to local communities have been more forthcoming, particularly through Integrated Conservation and Development Projects (ICDPs), but they have been inadequate and are in decline in the Lower Mekong region.

Communities living in and around protected areas often struggle to secure access to the land and natural resources inside protected areas for basic sustenance. When protected areas are able to generate revenues, through tourism for example, communities seldom receive significant benefits. Protected area managers need to better understand their links with poor communities and the potential for improved livelihoods through conservation. Once the goods and services of protected areas are financially recognised, protected areas could become a magnet for investment targeted at poor communities. Potentially, protected areas have an important role in reducing poverty in the Lower Mekong region and in providing a foundation for a more equitable distribution of the costs and benefits of nature conservation.

This chapter begins by situating poverty and protected area conservation within international debates on poverty and environment and poverty in the Lower Mekong region. It describes the relationship between protected areas and poverty, particularly through their co-location and the distribution of costs and benefits. The chapter concludes with strategies for incorporating poverty concerns into protected area management.

2.2 Links between poverty and the environment

2.2.1 *The poverty-environment debate*

Tracing the links between protected areas and poverty is part of a larger international debate on poverty and environment. The debate is complex because the



concepts of both “poverty” and “the environment” are multi-dimensional and they interact within a seemingly infinite variety of local contexts. The debate is also controversial and emotionally charged, particularly because of its political implications concerning changes in practices and lifestyles.

One of the less ambiguous points arising from the debate is that the poor suffer environmental degradation most. An inter-agency paper prepared for the 2002 World Summit on Sustainable Development emphasised three key dimensions of poverty related to environmental conditions:

- **Livelihoods** – poor people tend to be most dependent on the environment and the direct use of natural resources, and therefore are the most severely affected when the environment is degraded or their access to natural resources is otherwise limited or denied;
- **Health** – poor people suffer most when water, land and the air is polluted;
- **Vulnerability** – the poor are most often exposed to environmental hazards and environment-related conflict, and are least capable of coping when they occur.

(DFID, European Commission, World Bank & UNDP 2002)

Environmental degradation also impacts on the urban poor and other poor populations at a distance from protected areas. Environmental hazards are among the main causes of ill-health, injury and premature death among the urban poor (Satterthwaite undated). Losses to national economies resulting from the direct costs and preventative expenditures of environmental degradation tend to hurt the poor most (IUCN-Pakistan 2002). Consequently, effective conservation and environmental management has far reaching implications for the poor.

The four countries in the Lower Mekong region have recognised the links between poverty and environment. Lao PDR considers “conservation of natural resources” among the three pillars of its strategic approach to poverty alleviation, along with economic growth and social/cultural development (GoL 2001). Vietnam’s Comprehensive Growth and Poverty Reduction Strategy Paper (2002) identifies “environmental sustainability and protection” as one of twelve key target areas for poverty reduction. Thailand’s Ninth National Economic and Social Development Plan for 2002-2006 emphasises that “sound natural resource conservation practices are important for building a strong social foundation as well as sustainable poverty reduction”. The Cambodian interim-PRSP argues that “there is a strong correlation between sound natural resource management and poverty reduction”. However, the link between conservation and poverty is not simple. In many cases, conservation has further impoverished and limited opportunities for poor communities and conversely, poverty reduction programs have undermined conservation.

2.2.2 Poverty reduction in the Lower Mekong region

Impressive strides in poverty reduction have been made in the Lower Mekong region over the past few decades, especially in Thailand and Vietnam. According to government statistics, poverty rates reduced from 32.6 per cent (1988) to 11.6 per cent (1996) in Thailand (Ninth Plan), from 58 per cent (1993) to 37 per cent (1998) in Vietnam (CPRGS, 2002), and from 45 per cent (1992-93) to 38.6 per cent (1997-98) in the Lao PDR (GoL 2001). No comparable early estimates are available for Cambodia. But even so, poverty rates remain high and ranking on the Human Development Index (HDI) remains low in Cambodia, the Lao PDR and Vietnam (Table 2.1).

Table 2.1: UNDP poverty rates and HDI ranking for 2002

Country	Poverty rate	HDI ranking (of 173 countries)
Lao PDR	39%	143
Cambodia	43%	130
Vietnam	27%	109
Thailand	14%	73

Source: UNDP, *Human Development Report 2002*

The four countries continue to make poverty reduction a top priority giving it prominence in their respective national socio-economic development plans and strategies. The three main goals in the Lao PDR's Development Vision to 2020 are to reduce poverty by half by 2005, eradicate poverty by 2010, and graduate from the status of Least-Development Country by 2020. The Cambodian government's Policy Framework Paper and "Triangle Strategy" both emphasise poverty alleviation. The main objectives in Vietnam's current Five-Year Action Plan 2001-2005 include eliminating hunger and reducing the number of poor households. Even in Thailand, government, donors and academics have argued that poverty is re-emerging as one of the nation's most serious problems (World Bank 2001). Accordingly, poverty reduction has been given high priority in Thailand's Ninth National Socio-Economic Development Plan for 2002-2006.

The goals for poverty reduction are usually stated in tandem with strong economic growth, which is preferably rapid, sustained and equitable. However, that linkage raises questions concerning the nature of poverty and how it can be addressed through economic growth. This debate goes well beyond the focus of this chapter, but there are important emerging poverty related issues in the Lower Mekong region that are of critical relevant to protected areas.

Social and economic inequality has been increasing, especially in Thailand and Vietnam where economic growth has been strongest. A key area of difference has been between the outer-lying rural provinces and the provinces in close proximity to economic centres and industrial zones. The four regions in Vietnam considered as remote, isolated and mountainous areas account for 64 per cent of the nation's poverty (Government of the Socialist Republic of Vietnam 2002). In Thailand, 17 of its 76 provinces account for two thirds of the nation's poverty and 4 provinces account for one quarter (World Bank 2001). Most of these provinces are in the north-east and north regions. Ninety per cent of the poor in Cambodia live in rural areas, compared to 2.3 per cent in Phnom Penh and 7.2 per cent in other urban areas (Royal Government of Cambodia 2000). The growth in consumption rate in the rural areas of the Lao PDR was a little more than half of what it was in urban areas (GoL 2001).

Vulnerability and powerlessness among poor communities is becoming an increasing concern, risking recent gains made in poverty reduction. The impacts of the 1998 regional financial crisis on Thailand, during which time both poverty rates and inequality increased, and successive years of mass flooding in Cambodia and Vietnam have provided harsh reminders of the vulnerability of large segments of the population. In Vietnam, many rural communities just above the poverty line are "highly vulnerable to negative shocks, such as natural disasters, job loss, sickness and highly volatile agricultural prices" (Government of the Socialist Republic of Vietnam 2002). Governments are looking at developing effective safety nets, decentralisation and local empowerment to address issues of vulnerability and powerlessness.

More often than not, the burden of poverty rests on ethnic minority groups which concentrate in isolated mountainous regions where most protected areas are located. In Vietnam, ethnic minority groups represent 14 per cent of the population, but 29 per cent of the poor. Protected areas impact significantly on the livelihoods of many ethnic minority groups and other poor communities in remote areas.

2.3 Links between poverty and protected areas

The most obvious relationship between poverty and protected areas is that they are located in the same place, emphasising the need to integrate policies for both if they are to support and not negate one another. The co-location also draws attention to the complex relationship between poor communities and protected areas.

2.3.1 Co-location of protected areas and poor communities

The PAD Review found that most protected areas in the Lower Mekong countries lie entirely within or overlap significantly with regions of “high” poverty. Table 2.2 shows that 44 per cent of protected areas lie inside regions of “high” poverty and another 39 per cent in regions of “medium” poverty. Over 80 per cent of protected areas are located in areas of “medium” and “high” poverty.

Table 2.2: Poverty and protected areas

National protected area systems	Poverty level *			
	Low	Medium	High	Total**
Cambodia	13%	41%	46%	100%
Lao PDR	18%	51%	30%	100%
Thailand	27%	28%	46%	100%
Vietnam	15%	34%	52%	100%
Average	18%	39%	44%	

* Based on UNEP poverty criteria measured at district and provincial levels (UNEP, 2002)

** Errors due to rounding

The correlation is particularly significant for the larger and more important protected areas. In Vietnam, the eight most highly ranked protected areas in consideration for World Heritage listing are located mostly or entirely within “high” poverty areas. In Cambodia, the larger existing and proposed protected areas feature prominently in the poorer north-east and north-west provinces (Map 2.1).

Individual exceptions tend to occur where protected areas are close to major urban centres or regions of industrial development. But even those areas are generally associated with poorer socio-economic groups, such as the poor communities around the protected areas in the Eastern Forests Complex relatively close to Bangkok and the industrial centre in Rayon Province in Thailand.

A key reason for the high quality of biodiversity and natural habitat in these areas is also a reason for the high rates of poverty. Their distance from urban centres and difficult market access has kept them out of reach of commercial interests and other modern developments. Remoteness, which has been good for the environment, has clearly been a cause of poverty, creating an uncertain tension between poverty reduction and environment conservation. But this is only one side of the story.

Another side is that these remote areas, rich in natural resources, are also the refuge of displaced communities and a “last resort” employer for some of the poorest and most powerless people (Sunderlin et al. forthcoming). Often they have been forced to move higher up mountains, deeper into forests, or

closer to sandy shorelines because of upheavals resulting from development in the lowlands, such as overpopulation, exploitation of new economic zones, and forced resettlement schemes for development projects (e.g., hydropower dams). Indeed, high levels of immigration have been noted in areas adjacent to the South-West Cluster protected areas in Cambodia (ICEM 2003 a and g). In Vietnam, migratory trends indicate significant population shifts from densely populated areas into “frontier” lands, such as natural forests (ICEM 2003c). Exploitation of these “New Economic Zones” has meant wealth for some, but it has also meant displacement for others and disruption in traditional uses of land and natural resources, particularly for upland ethnic minority groups (Huynh Thu Ba 1999). In these cases, remoteness and association with protected areas is the consequence of poverty and powerlessness. The advent of modern development has been the problem and remote areas have been the solution, albeit a sometimes temporary or inadequate one.

The situation is complex. The good standing of the environment in protected areas can be linked to both the causes and the consequences of poverty in local communities. It has represented both problems and solutions to their immediate and long-term living conditions. Poverty reduction strategies will need to address these communities at both levels by supporting the stabilising and nurturing aspects of protected areas while promoting possibilities for economic advancement where available.

2.3.2 Valuation of protected areas for poor communities

The real value of protected areas to local communities needs to be recognised and better understood. These values are often overlooked or underestimated because they are not accounted for in formal economies. Field studies by the PAD Review valued the direct benefits that local communities derive from protected areas and demonstrated their special importance to poor communities (ICEM 2003g). These values increase when the direct benefits, indirect benefits, future options and existential values of protected areas are considered together.

In Cambodia, for example, 85 per cent of households living in and adjacent to Ream National Park depend on park resources for their basic subsistence and income to a net value of US\$ 1.24 million per year, an average of US\$233/year for each household. Median household income in the region was US\$316 and only US\$200 for one third of households. Non-timber forest product (NTFP) collected from Nam Et and Phou Loei National Biodiversity Conservation Areas (NBCA) in the Lao PDR were valued at 2.7 million kip (US\$250) for households living outside the NBCA, 5.4 million kip (US\$500) for those on the border, and almost 7.3 million kip (US\$677) for those inside. Data on median household income in the locality was unavailable, but the per capita GDP for Houaphan province was approximately US\$180 (ICEM 2003g).

In Thailand, however, forest products collected from Khao Chamao-Khao Wong National Park generated a total of 265,000 Baht/year (US\$6,163), which is only a small portion of 277 million Baht, which is the estimated annual income for all households living around the park. Fisheries contributed an average of US\$323/year per household. The field studies in Vietnam found a declining importance of forest products from Phong Dien Nature Reserve from 50-60 per cent (1991) of total per capital income to 4-5 per cent (2000). The decline was inversely related to increases in agricultural production (ICEM 2003g). Broadly speaking, the results suggest that the direct benefits of protected areas are especially important for the poorer communities, as in the Lao PDR and Cambodia, but decline in importance with economic advancement, as in Vietnam and Thailand.

In addition, the field studies found that protected areas provide important indirect benefits to local livelihoods through important environmental and ecological services. These include human habitation, wildlife habitat, erosion control, recycling of soil nutrients, micro-climactic stabilisation, and hydrological services such as providing reliable water for irrigation, preventing sedimentation in reservoirs, regulating water supply, maintaining ground water and water quality, and mitigating against impacts of floods.

Around aquatic protected areas, their functions include maintaining fish stocks, regulating water salinity, protecting coastlines, and providing river navigation and travel.

The total value of protected areas is even more significant when future options and existential values are included. Values documented in the field studies included conservation of internationally important wildlife species, agro-biodiversity values, development of tourism and recreational activities, future water resources and energy development, and the application of wild species and genetic resources for a range of uses, such as village and commercial domestication and use in pharmaceutical and other industries (ICEM 2003e,f and g).

Despite the range of values provided by protected areas, the field studies also suggested that poverty remains a key issue around protected areas and is still deep in Cambodia and the Lao PDR. In Cambodia, “the incidence of rural poverty is extremely high around the South-West Cluster protected areas, including lack of such basic amenities as water, food and adequate housing” (ADB 1999 cited in ICEM 2003g). Huoaphan Province in Lao PDR, which is home to 88 per cent of the territory for Nam Et and Phou Loie NBCAs, “has been identified as the poorest province in the country with a poverty rate of 75 per cent” and a per capita GDP estimated at 56 per cent of the national level (UNDP 2001 cited in ICEM 2003g). The vast majority of communities living in and around these two protected areas “have insufficient access to the basic food and non-food items deemed necessary for a minimum standard of living, a low cash income, and suffer high infant mortality rates, poor availability of medical care, education, social services and other essential infrastructure” (ICEM 2003g). In Vietnam, the per capita GDP around Phong Dien Nature Reserve was significantly lower than the national average. In Thailand, the provinces in the Eastern Region had a high per capita income, but Chanthanaburi province, where Khao Chamao and Khao Wong National Parks are located, had one of the lowest incomes among them.

2.4 Costs of protected areas for the poor

The previous section demonstrated benefits obtained from natural systems within a “protected area”. A protected area is a form of tenure and special management regime. More often than not, PA management has attempted to exclude local communities from use and management of the natural resources within it, reflecting a “closed door” approach to conservation. Laws prohibit extraction and use of protected areas resources in all four countries of the Lower Mekong region, which tends to create conflict and uncertainty with conservation and communities the losers.

2.4.1 Prohibitions on collecting

In the past 50 years rapid depletion of natural habitat and species diversity has made necessary strong measures to control extraction from protected areas but they have tended to be legislated as blanket restrictions. In Vietnam, for example, collecting prohibitions in protected areas fail to distinguish between low and high-impact harvesting or between local and outside uses. Ethnic minorities and other poor groups are especially affected by such blanket restrictions (McElwee forthcoming).

Given the scale of local harvesting and its importance to basic livelihoods, these restrictions are generally impractical. Forest guards and protected area managers lack the financial and human resources necessary to enforce them, and they distract from efforts to control extraction for trade and outside use. Often managers turn a blind eye to subsistence harvesting



because of sympathies with the plight of local communities. The disparity between policy and practice creates confusion over resource-use rights and land tenure. Locals have little incentive to harvest on a sustainable basis or to contribute to managing the resource base wisely. Instead, the uncertainty creates perverse incentives for them to harvest as much as possible before others do. Extraction methods become more careless and destructive because harvesters work as quickly as possible to escape forest guards.

A middle ground is needed between strict approaches to conservation and human use of protected areas. Many types of NTFPs can be extracted without significant impact on the species or the resource base, and collective management agreements can ensure their sustainable harvest. This can also apply to species of unthreatened wildlife, typically wild boars, some species of ungulates, or various small animals. Allowing local communities to hunt these species could be devised as a trade-off for not hunting endangered species and would permit forest rangers to concentrate their efforts on the latter. Also, rarely is attention given to ways that human activity can promote biodiversity (for example, harvesting invasive species) and create favourable conditions for wildlife (for example, feeding areas created as a result of cultivation).

2.4.2 *Relocation outside protected areas*

Regularly in the Lower Mekong region, situations arise where the impacts of human settlements severely compromise conservation objectives. Governments have responded by relocating entire communities. However, these policies tend to be applied simplistically, with inadequate compensation, and without due consideration of alternatives.

Relocation schemes frequently fail to carefully consider the impacts on the communities involved, long term feasibility and the environmental consequences. Biodiversity and socio-economic surveys to assess, justify and explain the reasons for the move are often lacking. Consequently, unexpected impacts arise. Communities are frequently relocated into buffer zones where the increased population intensifies pressure on natural resources in and outside the protected area. When relocation becomes necessary, compensation packages typically fall far short of the real costs on resettled households and fail to account for losses of production systems, social networks and the full costs of moving and re-establishment.



In some cases relocation schemes have been inconsistent with other developments being pursued within a protected area. For example, during the same period that 50 households were being prepared for relocation out of Ba Be National Park in Vietnam, a car-accessible road was being constructed around the lake in the heart of the core zone. One villager was quoted as saying that the Park Management Board “doesn’t allow us to turn a stone, yet they blow out the whole sides of mountains”.²

Because of its severity, relocation is costly for PA managers and for the affected communities and should be considered only as a last resort. More attention needs to be given to alternatives and compromises. For example, based on a biodiversity and socio-economic survey, the management of Cat Tien National Park in the south of Vietnam was able to avoid the relocation of 8000 households by redrawing the boundaries of the protected area. This was done without compromising conservation objectives, such as

² Claudia Zingerli, personal communication.

protection of the Javan rhino. Now park management is able to concentrate on those few communities whose settlement divides the rhino's natural range.³

2.4.3 *Limited investment from government and donors*

Another drawback facing communities living in and around protected areas is the opportunity costs of maintaining the protected area. Notably, governments and international donors may limit investment near protected areas due to possible conflicts with environment conservation. For example, the World Bank's US\$123 million Community-Based Rural Infrastructure Project for 540 of the poorest communes in Vietnam excluded communes inside the core and buffer zones of protected areas for environmental reasons (ICEM 2003c).

The solutions to such situations require increased and concentrated investment in special support and adjustment programs otherwise the costs of conservation are shouldered most by those who can least afford them.

2.5 Benefits of protected areas for the poor

This section explores further *how* protected areas can enhance the flow of benefits to poor communities living in and around them, especially compared to intensive cultivation through agriculture, forestry and aquaculture. In part the strategy needs to help poor communities better secure subsistence uses for basic livelihoods and to capture existing market opportunities. As important, the strategy must develop effective transfer payment schemes which recognise in financial terms the contributions of poor communities to the conservation of protected areas.

2.5.1 *Securing sustainable livelihoods*

Important reasons for conserving natural habitats are the diversity of products they provide to rural households, their latent availability as "fall back options" in times of stress, and their common access. These conservation functions are especially important to the poorest and most vulnerable people, whose primary concern is basic sustenance and who tend to profit least from intensive cultivation and other commercial development of natural resources.

2.5.2 *Diversity of products*

Natural habitats provide a diverse and comprehensive package of benefits in a way incomparable to agriculture, forestry or aquaculture. They are important for the wide variety of products needed to support livelihoods. For example, forest products in Southeast Asia contribute to:

... food security in the form of staples, or, more frequently, nutritional supplements, such as snacks and side dishes, and buffers against seasonal and emergency shortages; health care in the form of ingredients in traditional medicines (for which substitutes may not be available or affordable); raw materials for building and implements for household use or for use in support of other economic activities – agriculture, fishing, hunting or small-scale processing and manufacturing enterprises; and, finally, income and employment from the collection, trade or processing and manufacture of non-timber forest products (DeBeer and McDermott 1996).

Most communities around terrestrial protected areas are primarily agrarian. But the wide variety of products from forests serves as an essential support, as well as providing a range of livelihood options to make ends meet and diversify risk. Wetlands and other natural aquatic environments serve similar functions, as discussed in the chapters on fisheries and water resources in this report.

³ A case study of the Cat Tien National Park experience is presented on the PAD Review CD-ROM.

2.5.2.1 *Natural safety nets and fall back options*

Natural habitats have a vital function as “natural safety nets” and in providing “fall back options”. They enable households to bridge periods of seasonal food shortage, provide alternative foods when crops are lost to natural disasters or fail for other reasons, and offer a ready source of cash income in times of crisis and emergency, such as sudden illness or death. This point deserves special emphasis because of its importance to the poorest communities.

2.5.2.2 *Common access*

Typically, the poor have common access to the benefits of natural habitats, though traditional tenure arrangements vary considerably among local communities. However, a common dilemma in converting land into agriculture, forestry and aquaculture is that benefits tend to be channelled toward economically better off households with more land, labour, capital, skills, knowledge, experience, risk tolerance and political influence. Even when agricultural land is allocated to poor households, it may be sold or otherwise absorbed into larger landholdings by more powerful neighbours, as occurred around the South-West Cluster Protected Areas in Cambodia in 1979, when “villagers were allocated equal portions of land, although due to a shortage of draft animals much of this land was abandoned to those who had the resources to cultivate it” (ICEM 2003g). In Vietnam, many ethnic minority groups sold and lost allocated land to lowland immigrants for these and other reasons.

Some analysts consider forestry as having “anti-poor characteristics” because it favours intensive inputs in capital, technology and skills; large economies of scale; and specialised consumer markets (Sunderlin et al. forthcoming). Experiences with commercialisation of NTFPs in Vietnam showed promising results for domesticators, but not for the poor who depended on the common fallow lands that were being converted into privatised NTFP domestication plots (Morris et al. 2002). The PAD Review field study of Tam Giang and Cau Hai protected areas in Vietnam describes how the development of aquaculture for shrimp farming has created risks for lagoon conservation and the poor people who depended on them, for example, by concentrating ownership of the area, eliminating fish breeding habitat and undermining capture fisheries (ICEM 2003g).

Natural habitats tend to promote common accessibility, which is especially important for poor stakeholders that lack resources to invest in intensive cultivation. For example, when a poor community in Lao PDR ranked options for cultivating frogs, they preferred managing natural breeding grounds to frog domestication (Box 2.1). Their reasons were that domestication favoured wealthier households that could afford the investment costs, easily acquire technical expertise, tolerate risk, and employ labour. Among the benefits of managing natural breeding grounds was an equitable share of benefits.



Box 2.1. Community Analysis of Frog Management Options

In southern areas of the Lao PDR, frogs and fish are the most valuable non-timber forest products harvested from the wild for rural household subsistence and the most important source of protein in the diets of the Lao people (Clendon 2000). Yet their availability in recent years is the most rapidly declining of food resources. Over-exploitation of frogs is one of the direct causes leading to the reduction of wild frog populations and in turn increasing risks of food insecurity of local people.

A Department of Forestry and IUCN project considered a range of alternatives for conserving frog populations and securing food supply. In a survey of community views it was found that domestication of frogs was considered not appropriate because of the risks of introducing new frog species in the environment, relatively high investment costs and lack of equitable benefits for all households. The community felt that natural frog management was a more realistic option to be tested, as shown in the following table:

Management Option	Advantages	Disadvantages	Feasible?
Domestication: <i>Raising Frogs</i>	<ul style="list-style-type: none"> Potential high production of frogs for sale and consumption 	<ul style="list-style-type: none"> Requires new technical expertise/ training Unknown risks of introduced frog species High & regular inputs e.g. must purchase processed food Uncertainty of recovery funds/ small market 	No
Semi domestication: <i>Captive frog breeding</i>	<ul style="list-style-type: none"> Catch & raise wild frogs in egg in family fish pond areas Small investment of netting area 	<ul style="list-style-type: none"> Low productivity Only wealthier families have fish ponds/ few benefit Labour to forage frog food Hard to stop frogs escaping 	Not sure
Resource Conservation and Management: <i>Seasonal harvesting, Protection area for breeding, rules and regulations</i>	<ul style="list-style-type: none"> Low costs for signs Natural breeding process to enhance frog populations No inputs required Equitable sharing of benefits 	<ul style="list-style-type: none"> Adjacent villagers not abide by rules 	Yes

Source: Deschaineaux 2001

Although converting natural habitat into agriculture, forestry or aquaculture may have a higher economic value; it may bring fewer benefits to the poor, where key concerns are livelihood security and access to the resource base. As local economies strengthen, these types of direct benefits from natural habitats may lose significance (Arnold 2001). But for many poor communities, this level of development is a long way off and—if world trends in poverty are any indication—may be elusive. In the meantime, natural habitats remain vitally important and one of the most serious threats facing these communities is the dwindling quantity and quality of the natural resource base, giving protected areas a special and increasing significance for the poor.

2.5.3 Market opportunities

Awareness has been increasing about the potential of protected areas as tourism destinations. Tourism, along with emerging markets for NTFPs, present two of the most important market opportunities for generating revenues from protected areas. The following section assesses protected areas as revenue-generating mechanisms through transfer payments. However, market options bring a mixed bag of

opportunities and threats to local communities that will have to be managed appropriately if they are to benefit the poor.

2.5.3.1 *Tourism*

Chapter 8 on tourism shows how protected areas in the region have generated significant revenues from tourism and concludes that the potential value has yet to be fully realised. But the recurring challenge is to direct benefits towards the poor and minimise the negative impacts of tourism. The PAD Review field studies found examples of tourism development which have generated few benefits for the poor, exacerbated local inequity, precipitated conflict and degraded the eco-systems upon which poor communities depend (ICEM 2003g). Yet, a number of strategies can be employed to bring equitable outcomes, particularly through direct payments into effectively managed community or protected area funds, as discussed later in the chapter. The point to be made here is that tourism development alone is unlikely to benefit the poor living in and around protected areas, without assistance and a financial mechanism to ensure that it contributes positively to the socio-economic development of local communities.

2.5.3.2 *NTFP Commercialisation*

Commercialisation of NTFPs has held great promise for the ICDP movement by giving poor communities economic incentives to conserve forests, or by providing income alternatives to natural forest extraction through NTFP domestication. But, as with tourism, NTFP commercialisation alone is unlikely to benefit the poor. NTFP commercialisation has the potential to further entrench extractors in poverty (especially when led into debt cycles with traders), NTFP domestication to break down common tenure regimes essential to the poor, and improved NTFP processing to disenfranchise women as technology becomes more sophisticated, labour returns increase and processing is centralised (Neumann & Hirsch 2000).

Specific mechanisms to redress existing inequities are needed if NTFP commercialisation is the work for the poor, for example, by empowering local decision making structures and providing for benefit-sharing. The establishment of a marketing group and community fund for the collection of bitter bamboo shoots in an NTFP Project in Lao PDR proved effective for securing a higher market price for the local community and generating communal benefits, such as an improved water system, land for agriculture and livestock, loans to farmers and a new school (Box 2.2).

Tourism and NTFP extraction will not be possible for all protected areas, depending on access, attractions, natural products, and specific conservation objectives. But where they are feasible and if appropriately planned and managed, they can provide key economic opportunities for poor communities. Although there are some doubts about integrating biodiversity conservation with NTFP commercialisation, as discussed in the chapter on forestry, more testing is needed to assess the conditions under which this can continue within protected areas.



Box 2.2: Marketing group and community fund for bitter bamboo shoots

In the village of Nam Pheng, Oudomxai, villagers used to be very poor and could not produce enough rice to feed the community all year round. In the dry season they collected off-season bamboo shoots for sale, but the income was never enough. The IUCN/NTFP project assisted them in analysing their problems (Soydara 2000).

In a series of meetings, the community gradually realised that they could improve their sales if they would team up and sell for a fixed price, in a fixed place, not measured per bundle but measured per kilo. The community continued to discuss this idea until every family agreed to join the village selling group. The results were above all expectations. In five months, the village sold more than 50 tons of shoots and earned 50 million kip (on average 1 million per family), at least four times more than the year before. The community also gained 5 million kip in a village development fund, setting aside 100 kip for every kilo sold (US\$1 was 2,500 kip in the first half of 1998). As a result, the community started to be very interested in monitoring and managing its bamboo forests.

Between 1998 and 2000 the group fund accumulated 17,000,000 kip through sales of bitter bamboo and later also cardamom. It was decided that funds from 1998-99 would be spent on improving the village's water system and for providing land for development of agriculture and livestock. In 2000, 15 families received loans from the fund for a variety of purposes, both agricultural and non-agricultural. Examples of items bought included generators, hand tractors and house building materials. In May of 2000, the development fund was put towards the building of a new school and this was made possible through the provision of extra materials from the IUCN-NTFP project.

Source: Nurse and Soydara 2002

2.5.4 Transfer payments for goods and services

Increasingly, environmental transfer payments are being used as a mechanism to target poor land holders and resource users who live in and around protected areas. The rationale is that without tangible benefits poor communities are likely to be unwilling—or economically unable—to conserve protected area biodiversity. Transfer payment mechanisms are designed to ensure that the public or private sector beneficiaries of protected area goods and services pay for their use; with a proportion of the revenue “transferred” to the local communities who bear the opportunity costs of conserving them. Transfer payments can be a key mechanism for financially recognising the contributions of local communities in protected area conservation and developing a more equitable distribution of its costs and benefits.

The concept of transfer payments incorporates a wide range of mechanisms and vehicles for payment. They can be broadly differentiated according to whether implemented through commercial markets or require some degree of public or other intervention, as well as between those that remunerate poor communities directly and those that contribute indirectly to socio-economic development or poverty alleviation activities. Five broad categories of environmental transfer payments relating to protected areas can be defined as:

- **Direct transfer of income:** Ensuring that direct income from the marketing or sale of biodiversity products accrues at the local level (such as through tourism or NTFP markets, as discussed earlier).
- **Fiscal instruments:** Using subsidies or other fiscal instruments to support credit, technologies, training, prices or markets that will encourage biodiversity conserving activities or stimulate a shift away from biodiversity degrading activities.
- **Payments for environmental services:** Many upland and mountain communities manage landscapes

that provide environmental services to outside beneficiaries, but without sharing in the benefits of those services. The services include clean and abundant water supplies from watersheds, biodiversity protection, and stocks of carbon that alleviate global warming.

- **Revenue sharing:** Allocating or reallocating a portion of charges, fees or taxes raised from biodiversity-dependent sectors of the economy to poor communities around protected areas.
- **Targeted reallocation of public and donor budgets:** Earmarking government or donor funds for poor communities around protected areas.

In the Lower Mekong region there is as yet very little use of environmental transfer payments that are targeted specifically to poor communities, although transfer payments are increasingly being used to fund broader protected area management.

2.5.4.1 Fiscal instruments

There are many possibilities for using fiscal instruments as a means to target poor communities around protected areas. These include the provision of subsidies and lower tax rates for credit for sustainable resource use activities and enterprises, clean or sustainable technologies and production processes, biodiversity-based products and land uses, and alternatives to biodiversity-degrading products and livelihoods.

Several examples exist in the region where fiscal instruments target biodiversity conservation among poor communities. Vietnam allows exemption from land tax for the poorest communes, including many located around protected areas. For more than a decade Vietnam has also operated a user pays system through its Natural Resource Tax, which now goes directly to provincial level. Lao PDR has reduced land taxes for reforestation and stabilised land use, and exemptions on turnover tax for forestation activities.

2.5.4.2 Payment for environmental services

Payments to communities, resource users or land holders for the provision of environmental services can take various forms. Services include the provision of biodiversity, watershed management and carbon sequestration, with payments from either public or private sector beneficiaries, such as hydropower providers, polluting industries, bio-prospecting firms and water users.

Several examples of the application of payments for environmental services exist within the region. In Mae Chaem watershed in northern Thailand, CARE International has helped to broker agreements between the Royal Forest Department and Forest Conservation Committees in approximately one hundred villages. These agreements involve recognition of local land rights on state forest land by the Royal Forest Department in exchange for abandoning shifting cultivation for sedentary agriculture and respecting mutually agreed forest boundaries. In Vietnam, Forest Protection contracts currently cover about 1.6 million ha, paying nearly 250,000 local households an annual fee to maintain and protect areas of forest. Opportunities to use the emerging global market for carbon sequestration services to negotiate payments for community agro-forestry and reforestation around protected areas are currently under investigation in both Cambodia and Vietnam. In the Lao PDR, an innovative system of payment for watershed catchment protection services is being piloted in two of the country's protected areas. Phou Khao Khouay NBCA currently receives 1 per cent of the gross revenues of power exports from a downstream hydropower dam, and the proposed Nam Theun 2 hydropower project will provide over US\$1 million a year for the management of the Nakai-Nam Theun NBCA.

2.5.4.3 Revenue sharing

In many parts of the world, protected area revenues are shared directly with local communities, either as cash payments to individuals or as contributions to more general socio-economic development activities in buffer zones. That kind of arrangement is beginning to emerge in the region. In Cat Tien National Park in

Vietnam, for example, a trust fund is under development that earmarks 1 per cent of park entry fees for expenditure on community development activities in the buffer zone and a National Conservation Fund being planned will provide financial support to local activities which help to meet protected area conservation objectives.

2.5.4.4 Targeted allocation of public and donor budgets

Throughout the region, central and local government authorities make budget allocations to communities around protected areas. In many cases, the allocations target activities that are related to biodiversity conservation and poverty alleviation. In some cases these expenditures are channelled through PA authorities. Yok Don National Park in Vietnam, for example, is in the process of finalising a Buffer Zone Investment Plan that will support biodiversity conservation among poor communities adjacent to the park and supplement expenditures already made by line agencies.

Perhaps the most common form of the transfer of donor and government funds to poor communities around protected areas is through ICDPs. Although there are no experiences of the direct sharing of protected area revenues with surrounding communities, these projects present many examples of investment in alternative income generating activities in protected area core and buffer zones. Typically they include activities such as the promotion of local participation in protected area tourism, improved agriculture, and handicrafts production.

In Lao PDR, external financing provides a major source of support to the state budget, and also forms an important component of funding to biodiversity conservation. Currently a total of 62 ongoing donor-supported projects and programs deal specifically with biodiversity conservation, running between 1993-2003. Together they are worth US\$150 million (out of a total of 383 projects and programs worth US\$947 million), with an average expenditure of US\$16.9 million a year. Expenditures on forests and protected areas comprise just over a quarter of this amount, almost all of which include components dealing with poor communities living in these areas of high biodiversity. These funds are important because they represent an attempt to share the costs of global biodiversity conservation and eco-system health between wealthy and poor nations (i.e., wealthy nations financially compensate poor nations for direct and opportunity costs). However, they have been inadequate and current trends show a steep downward trend in donor investments in biodiversity conservation generally and protected area projects specifically. After having risen steadily throughout the 1990s, total donor commitments to biodiversity conservation have fallen from US\$35.6 million in 2000 to US\$14.3 million in 2003, while the share of protected area funding has dropped every year from 89 per cent in 1996 to only 7 per cent by 2003 (Emerton et al. 2002).

2.6 Future directions

If protected areas are to benefit the poor, then local communities will need to be more involved in their use, management and development. This will require innovation and support at policy and field levels.

2.6.1 Strategies to support the poor in protected area management

2.6.1.1 Provide a legal basis for sustainable extraction inside protected areas

Current legislation of the four countries in the region generally prohibits all forms of extraction from protected areas, as exemplified by Decision 164 in Lao PDR and Decision 8 in Vietnam. Without a legal framework for extraction, local communities have little incentive to invest in natural resource management and protected areas managers will be discouraged from experimenting with locally appropriate solutions for sustainable resource use and NTFP commercialisation. Restrictions tend to be over-generalised and applied unnecessarily to various aspects of local use. They are standardised at national levels without flexibility to adapt them to local circumstances and the specific conservation objectives of individual PAs.

Legislation for community forestry has been more successful, but applying its principles to protected areas is still slow in coming. Laws for community forestry being developed in Thailand and Cambodia outline management frameworks and user rights for local communities. Thailand was on its way to set a new standard for local use of protected areas with its proposed Community Forestry Bill, but the bill has stalled because of concerns over the effects of extraction on protected areas (ICEM 2003d). In 2002, Prime Minister Samdech Hun Sen of Cambodia issued a decision requiring the Ministry of Environment (MOE) to designate 10 to 30 per cent of each protected area for collaborative management with local communities (ICEM 2003a). This decision will take some years to put into practice but a number of pilots have already begun. It will need to be carefully applied if key conservation assets are not to be lost, but offers an important opportunity to increase community benefits from and support for protected areas in the country. In Vietnam, support for community forestry exists, but it is scattered and confused among various pieces of legislation and does not apply to protected areas (Scott 2001). These initiatives need to be reinforced and monitored for wider application throughout the region.

2.6.1.2 Jointly develop PA management plans and zoning schemes to bring optimum benefits to local communities

Most protected areas lack management plans specially tailored to meet conservation objectives in ways best suited to local conditions and community needs.

Joint management and collaborative approaches generally are essential components of effective PA management. Joint management is a partnership in which government agencies, local communities and resource users, NGOs and other stakeholders agree on the responsibilities, authorities, rights and duties they each have for the management of a specific area or set of resources. Other terms used for the same process are collaborative, co-, participatory and multi-stakeholder management. The joint agreements need to be given an institutional, policy and procedural setting within authorised PA management plans.

Joint management processes should involve zoning, boundary demarcation, and definition of restrictions and controls on resource use, reaching joint agreements and arrangements for community monitoring and enforcement. Zoning schemes are notably weak in the region, particularly for zones corresponding to IUCN categories V (Protected Landscapes/Seascapes) and VI (Managed Resource Use Areas), which allow more flexibility in local uses. Zoning with communities helps protected area managers focus their conservation efforts where they are most needed.

2.6.2 Capacity-building and awareness raising for involving local people

2.6.2.1 Build capacity and raise awareness among protected area managers for involving local people in PA management

Many protected area managers support greater involvement of local communities and villages as guardians for forests and aquatic resources, but emphasis is more on their role in protection than management of use (Inthavong and Berkmuller 1999). Generally, awareness of options and a sense of how they might apply to local situations is limited.

There is a need to broaden understanding among PA authorities of the different ways that local communities can be involved in protected area management and what this requires in terms of staff time, resources and skills. Regional exchanges and training programs are needed for protected area managers on the potential roles of local communities and the possibilities for benefit sharing, so that appropriate skills are developed to initiate and manage the structures and processes.

2.6.2.2 Support local communities in developing skills and knowledge for collaborating in PA management

PA authorities have found that communities in Kirirom National Park in Cambodia have been reluctant to take on responsibilities for managing the designated community forestry zone on the western park boundary. The challenge of determining levels of sustainable use and then enforcing agreed controls was daunting and involved new skills and approaches. Leaders and representatives from poor PA communities also need capacity building and support in developing effective management regimes for natural resources. It cannot be assumed that local communities will automatically manage the natural resource base well. Although many have strong indigenous traditions of natural resource management and an intimate knowledge of the local environment, they will also need support in addressing new issues and emerging threats.

Capacity building will be necessary to assist local leaders participate in management structures, in facilitating local agreements on regimes of protection and use, in monitoring and enforcement and in a range of maintenance and rehabilitation activities. Their involvement will risk becoming token-participation if inadequate attention is given to equipping them with appropriate tools and training. Special attention should be given to nurturing the skills and confidence in local communities to take on new roles in decision-making and benefit-sharing from the protected area.

2.6.3 Testing PA poverty reduction strategies as a basis for policy innovation

2.6.3.1 Demonstrate and pilot models to test poverty reduction strategies for protected areas

Despite the restrictive legal context, local authorities and protected area managers in the region have proven to be open to testing initiatives for sustainable harvesting where they address resource use conflicts with local communities, as in the Thai government's Six Pilot Parks Project (ICEM 2003d) and the DOF-IUCN NTFP Project in Lao PDR at Xe Ban Nouan NBCA.

Pilot projects could begin in areas with low conservation risk to test collaborative management structures, planning procedures and joint management agreements. Indeed, these experiments could provide the necessary grounds for justifying changes in policy. For example, piloting models for transfer payments will be needed to test their feasibility and effectiveness and to define appropriate approaches for different situations.

2.6.3.2 Define a poverty reduction action plan suited to each protected area

Every protected area and its associated local communities is unique. The possibilities for supporting poor communities will vary from one protected area to another. Protected areas established primarily to conserve floral biodiversity, megafauna, endemic species, habitat, watersheds, geographical features, or cultural and historical values each involve their own set of opportunities and constraints. Their conservation objectives along with local differences need to be reflected in the policies and practices for managing the protected area. Each protected area or group of PAs within their shared landscape will require a tailor made poverty reduction action plan built into their overall management plans.

A "context-driven approach" to protected area management that is able to combine elements from a range of theoretical positions and local circumstances allows greater flexibility to incorporate various elements of traditional management and local ecological knowledge with the authority, expertise and resources of the State (Baird and Dearden forthcoming) (Box 2.3).

2.6.4 Special adjustment programs for PA communities

2.6.4.1 Introduce special adjustment programs for the poor associated with every conservation initiative that affects local communities

There is no doubt that protected area establishment and operation can cause serious focussed hurt and local community dislocation. While systems of joint management and benefit sharing evolve, special support programs are needed which help communities adjust to new natural resource tenure arrangements. Whenever a government makes a decision for a national or wider community good (in this case, a decision to establish or extend a protected area), it is essential that focussed subsidy programs run parallel to minimise and overcome negative local impacts.

Box 2.3. A “context-driven approach” for tenure arrangements within PAs

A mix of tenure arrangements have been proposed for management of natural resources inside Virachey National Park in Cambodia which are supported by the state authority and based on local traditions, local ecological knowledge and feasibility (Baird and Dearden forthcoming). For example, the Brao ethnic groups living in and around the Park have a highly effective tradition of private tenure for dipterocarp resin trees. Swidden farmers will cultivate around these trees if other villagers are tapping them and the Brao people have been known to chase away loggers to protect them. Conversely, malva nuts and fish stocks are under open and common access regimes. But only recently have lucrative commercial opportunities led to destructive harvesting of malva trees and depletion of fish stocks. The Brao people lack capacity to enforce harvesting regulations and as a result also participate in unsustainable harvesting practices because they know that if they do not, the next person will.

Based on this situation, a preferred mix of tenure arrangements for natural resource management has been proposed, which provides a spectrum of joint management arrangements that range from recognition of traditional management regimes to the mutually reinforcing involvement of both the state authority and local people. Current legislation impedes opportunities to establish such optimal combinations.

Resource	Swidden	Resin	Malva nuts	Wildlife	Fish
Current Management	Common resource	Private	Open access	Common resource/open access	Common resource/open access
Monetary value	Low	Medium	High	Medium/high	Medium
Excludability	High	High	None	Partial	Moderate
Current effectiveness	High	High	Low	Low	Moderate
Proposed management direction	As is, with access to ancestral lands	As is	Change to common resource	Increase cooperative villager-State co-management	Increase cooperative villager-State co-management

Source: Baird and Dearden forthcoming

How these are delivered will vary from country to country but they will have a number of common elements—from direct grants to the range of technical supports provided on a coordinated basis by relevant government sectors. To date the practice has been to provide these kinds of supports through integrated conservation and development projects. They can run for a set period and phase out. Governments are familiar with special adjustment policies and programs when decisions require major

shifts in the way a sector functions, in the case of marginal and uneconomic industrial sectors that are important for employment reasons, for example.

The key point is that conservation decisions should not and need not leave local communities worse off. In the long term, if appropriately managed, protected areas can leave communities better off—but there may be a transition when government must provide focussed and well coordinated support programs and subsidies.

In summary, over 18 per cent of combined national territory of Cambodia, Lao PDR, Thailand and Vietnam is inside protected areas – and expected to increase during the next five years to over 21 per cent of the region. Protected areas are a key conservation and development strategy of the four governments and provide a critical opportunity for exploring and understanding innovative approaches to poverty reduction through conservation.

The PAD Review found that protected areas contribute significantly to maintaining productivity in natural resource based economic sectors. Once those benefits are recognised, protected areas have the potential to attract revenues and investment to the remote areas where poverty is concentrated. This potential flow of payments for services should be shaped to conserve the natural systems that provide the benefits and target local communities. In most cases these benefits have not been recognised and, instead, are treated as free goods. Developments which proceed on this basis, whether tourism, commercial agriculture or hydropower, for example, have seldom been in the best interests of local communities - both they and the affected protected areas have suffered.

As a first step, the conflicts and uncertainties over local use of land and resources inside and around protected areas need to be resolved through national policy reform. These conflicts are harming poor communities and conservation. Protected areas have an important role in supporting poor communities for whom modern development is still a long way off or elusive. For communities that suffer hardship because of conservation priorities, financial mechanisms are needed to compensate them adequately. In the short term, structural adjustment programs may be necessary. In the long run, transfer payments will likely be the most cost-effective and equitable manner for recognising the opportunity costs of poor communities and ensuring effective conservation of protected areas.

Protected areas can work for poor communities. They can contribute to securing livelihoods for some of the poorest and most vulnerable populations, generate market opportunities for the more economically able, and attract revenues to remote and ethnic minority areas through transfer payments. Their potential to do so will depend on realising a more equitable sharing of the costs and benefits of protected area conservation.





3 Freshwater fisheries and protected areas

“Fish have a fundamental role in the economic, social, and cultural aspects of human life. The importance of fish resources in the Mekong Basin is not only determined by the values of aquatic diversity, the economic values of fisheries, fish processing, trade and the values of fish as a food source, but also the influence of fish on lifestyles, beliefs, religious rites and social interaction adds intrinsic values to fisheries activities” (Chhuon Kim Chhea undated).

3.1 Status and trends in freshwater fisheries

3.1.1 Importance of the catch

The freshwater capture fishery in the lower Mekong River Basin⁴ is one of the most important commercial and subsistence activities in the region (Hill and Hill 1994) with an estimated 2 million tonnes of fish and other aquatic animals consumed annually (Sverdrup-Jensen 2002). Fish products are the major source of animal protein in the diet of the population, together with rice forming the basis for food security for the 60 million people living in the lower Mekong Basin (LMB).⁵

Total consumption and the proportion of animal protein derived from aquatic organisms varies depending on the location of particular communities within the catchments. Average annual fish consumption ranges from between 10 kg and 30 kg per capita in mountainous areas to 70 kg per capita in the Great Lake Tonle Sap in Cambodia. The overall average for the region is 36 kg per capita (Sverdrup-Jensen 2002). A similar variation is found in the proportion of total animal protein coming from fish. For example, in Lao PDR fish as a percentage of total animal protein consumed may vary from only ten per cent among hill tribes to 90 per cent among the population in the lowlands (FAO 1997). While, in the north-eastern mountainous region of Thailand fish comprised about 50 per cent of the animal protein intake (Hill and Hill 1994). These figures do not include consumption of aquatic protein from sources other than fish which are very significant, especially for isolated poor communities.

For many families, aquatic animals constitute a source of animal protein and other nutrients that they cannot afford to replace from other sources. Small fish, consumed fresh or as dried or fermented products provide the most important source of calcium in the diet of a very large part of the population of the region (MRC 2001). Similarly, fishing provides a source of employment and cash income that would be very difficult to replace. For example, in Cambodia, which has a relatively well developed commercial freshwater fishery, 47 per cent of the total catch is taken by family fishers.



Of the fish consumed in the region, 1.5 million tonnes originates from catches in natural water-bodies and 240,000 tonnes from catches in reservoirs.⁶ Although the Mekong and its major tributaries make up an

⁴ The material in this regional review relies largely on information on freshwater fisheries in the Lower Mekong Basin and thus does not include large parts of Thailand and Vietnam. The main reason for this is that in the last few years the Mekong River Commission's Fisheries Program has begun to produce some in-depth information about the significance of these fisheries. The significance of, and issues affecting, the fisheries in other parts of the LMB countries are probably substantially similar to those in the LMB.

⁵ MRC Press Release No.1/00 8/2/00: <http://www.mrcmekong.org/media/press2000/press001.htm> 25/05/02

⁶ This is almost certainly an under-estimate, see for example, van Zalinge (2000).

important part of the fishery, many people in the lower basin do not have access to these water bodies but utilise local sources of fish such as streams, swamps, ponds and rice fields, all of which are connected to the Mekong by water flows and fish migrations (Meusch 1996).

The total value of the catch each year is about US\$1,200 million (Sverdrup-Jensen 2002). However such estimates are misleading in terms of the economic importance of freshwater fisheries to the region. Catch values are commonly based on initial sale prices, and prices can increase substantially along the marketing chain, while the very substantial subsistence portion of the catch is very difficult to identify or value.

It is at the poorer end of the social spectrum that the freshwater fisheries assume their greatest significance in terms of nutrition, employment and social stability. For example, in Lao PDR most rural families fish primarily as a subsistence activity, but it is most important for the poorer households (Smith et al. 2000). Fishing is likely to remain a vital source of livelihood for the poorest of the poor even while others benefit from development and move on to other economic activities. This is consistent with the results of studies in Cambodia which have shown a tendency for people displaced from other forms of livelihood to move into fishing as a survival strategy (Schouten in press). It is also consistent with experience world wide in marine fisheries, which are well known to attract those displaced from other forms of subsistence livelihood. During the 1990's, in the South West of Cambodia, poor communities dependent on timber and other forest products shifted into fisheries as access to forests was restricted by concessions and as forest products within Ream National Park were exhausted and illegal exploitation better controlled. The pressure on the park was transferred from the terrestrial to the aquatic (in this case marine) systems (ICEM 2003g).

This role of capture fisheries in poverty alleviation has growing significance for fisheries policy makers and protected area managers, particularly in Lao PDR and Cambodia with their comparatively high population growth rates. As population growth outpaces growth in alternative job opportunities among the largely rural population, the increase in the number of people depending on fishing for their livelihoods is going to put greater pressure on the resource, and thereby increase the importance of the contribution of protected areas to the sector.

3.1.2 Decline in fish stocks in the region?

Continued upward adjustment of the estimates of total fish catch in the region (as research attention is focussed on fisheries and fish consumption) are in danger of being interpreted as suggesting increasing or at least stable catch levels. The situation is far from clear. There are conflicting reports on the sustainability of the current catch levels, though there are persistent reports from all countries of declines in yields. By 1996, it was believed that Thailand and Vietnam had reached or exceeded their maximum sustainable yield (MSY) for freshwater fisheries (ADB 1996).⁷ The greater part of both of these countries lies outside the Lower Mekong River Basin. On the other hand, a recent report by Sverdrup-Jensen (2002) suggested that the MSY may not yet have been reached in the freshwater fisheries of the region, and found no good evidence for declines in the catch. Schouten (in press) on the other hand sees strong indications suggesting that the aquatic resources of the basin are over-exploited.

Indeed, there have been persistent reports of declines (e.g. Roberts 1993; Doulman 1994; Mekong Secretariat 1995; Meusch 1996; Claridge 1996), particularly from researchers working with fishing communities. At least in the Lao part of the basin there are a number of aspects of the situation which suggest that a real and probably significant decline has occurred (Claridge et al. 1997). These are:

⁷ The concept of MSY has its limitations as an indicator of fisheries sustainability and, of course, in no way reflects the level of biological diversity. Yet, it does provide a useful interim indicator of the status of fish stocks.

- the widespread nature of reports of decline, coming from many parts of the Lao portion of the Mekong basin;
- local people often provide details such as the species which have declined, the extent of the decline, and the time period over which the decline has occurred;
- some types of fishing gear have been abandoned due to decline in target fish species; and
- there is consistency from village to village in the description of the decline.

Cambodian and Lao delegations to an MRC meeting in 1995 both reported declines in fish catches and suggested environmental degradation as one of the causes. The Commission Secretariat was of the opinion that these declines might have been explained by the degradation of habitats for feeding and spawning, overfishing, deforestation, environmental degradation, and increased population pressure but pointed out that the information available, as well as the understanding of the fish stocks, was too limited to allow for precise conclusions (Mekong Secretariat 1995).

The persistent uncertainty concerning the state of fish stocks points to the need for more information on the fisheries and a precautionary approach to fisheries management. An important component of a precautionary strategy is the effective conservation of networks of protected areas shown to contribute to fisheries productivity.

3.1.3 Aquaculture – a distraction from maintaining wild fish stocks

Total aquaculture production in the Lower Mekong region is estimated at 260,000 tonnes per year (excluding farmed brackish water prawns), with “farm gate” value of about US\$270 million. Most aquaculture production comes from small-scale operations run by rural households, and this activity is expanding throughout the Basin. The Mekong Delta has the largest area of aquaculture and freshwater production is above 170,000 tonnes. North-eastern Thailand is the second largest area for aquaculture production, with an annual output in the range of 65,000 tonnes (Sverdrup-Jensen 2002).

It is widely believed that the Mekong Basin has considerable potential for increasing freshwater aquaculture production and in fact much government (and some foreign aid) effort has been directed at developing this sector. However, a constant annual increase in aquaculture production of 10-11 per cent would be necessary just to supply the increased demand represented by the region’s annual population growth of two per cent (MRC 2001a). Most important, the loss of production in the wild fishery from various impacts (discussed later) will not be offset to any significant extent by increased aquaculture production.

The attention given to developing the aquaculture sector (frequently at the expense of resources to maintain and protect capture fisheries) is driven by a fisheries / industry sectoral approach, with little regard for food security or poverty alleviation. This emphasis on aquaculture to the exclusion of management of wild fish stocks is well illustrated in the Lao Government’s presentation to the Third UN Conference on the Least Developed Countries in 2001 (GoL 2001). All references to fisheries development related to aquaculture and in discussions of food security issues no mention was made of wild capture fisheries.

3.1.4 Threats to fisheries in the Lower Mekong Basin

The main threats to the fish resources in the Mekong Basin are:

- deforestation leading to changes in hydrological flows and deterioration in water quality (Box 4.1, Chapter 4 discusses deforestation and hydrology); and
- construction of dams which block fish migrations and change water flows and water quality.

In the last 35 years, more than 30 major dams have been built across tributaries of the lower Mekong and an additional 20,000 small dams and weirs, particularly in Thailand (Schouten in press). In the late 1990s, the Lao government had a backlog of many hundreds of small irrigation projects awaiting funding which may eventually add to this impact on fisheries. Small-scale irrigation projects are typically planned and implemented with no consideration given to impacts they might have on aquatic ecosystems or fisheries. It is entirely possible that the cumulative impact of these many small dams may be significantly greater than that of a few large dams.

Protected areas tend to be favoured sites for hydropower dams (Chapter 5). Many PAs are in upper catchments where rugged terrain with relatively few people provides suitable dam and reservoir sites. Dams have impacts on protected area values as well as on downstream fisheries, but impact assessment of large-scale dams in the region is generally well below international best practice. A study of all available pre-impoundment assessments of the impact on fisheries of the larger dam projects in the four MRC countries found that of 46 dam projects few assessments were carried out and only one could be considered a “modern era” Environmental Impact Assessment (EIA) study. In most cases baseline studies of fish populations had been “far too short, cursory and incomplete to provide an accurate and reliable baseline” (MRC 1997).

There are two further problems with impact assessments in the region, particularly in relation to large dams. First, there has been no attempt to consider cumulative impacts of additional large dams. Typically each development is considered in isolation. Second, impact assessments are frequently limited in their spatial scope, not considering impacts well downstream of the immediate development. The combined effect of these two shortcomings has led to degradation of the aquatic environment, with serious consequences for fisheries. Despite repeated warnings that “the Mekong River is an integrated system such that the impacts from developments in one area may be felt throughout the entire system, and rational economic-cum-environmental development planning must take this into account” there has been no systematic and coordinated action to improve the planning process (Tucker 1996).

To a large extent deforestation and dam construction threats can be sourced to a lack of cross-sectoral planning across critical geographic areas, combined with a general lack of recognition of the importance of freshwater fisheries. Little regard is given to the possibility that what may be an opportunity for one sector may constitute a threat to another. If not properly positioned and designed development activities in catchment areas can decimate aquatic resources. Rural communities are left the poorer (as pointed out in Chapter 2), with negative implications for the overall economy (MRC 1999).

Indeed the general lack of recognition by national governments of the significance of fisheries at the local and national levels, and the tendency to focus management resources on aquaculture are among the most significant threats to freshwater fisheries in the region.

Other significant threats to capture fisheries include:

- alteration of aquatic habitats such as destruction of spawning grounds or dry season refuges by habitat alteration (for example, by stream bed blasting, dredging, removal of rapids, and sedimentation resulting from removal or alteration of vegetation);
- alteration of floodplain habitat, such as reclamation of floodplain wetlands, clearing of flooded forest, diversion of flood flows, and channelling of streams;
- local changes in the quantity and quality of water available for important fish habitats, changes in the timing of water flows, and pollution from agriculture and urban development;
- over harvesting;
- use of destructive fishing practices such as explosives, (for example, in Cambodia during the period 1993 to 1997, there were approximately 8,000 incidents annually of use of explosives for fishing in the

deep pools between Kratie and the Lao PDR border, even though these are protected areas where all fishing is banned (Chea and Sean 2000)), electro-fishing, use of fish poisons, and emptying of wetlands to catch all fish (Claridge 1996);

- lack of management capacity among government agencies and relevant communities and NGOs;
- lack of law enforcement, stemming from a variety of causes ranging from lack of manpower, training and equipment to entrenched corruption; and
- displacement of native species by introduced species (Schouten in press; Sverdrup-Jensen 2002).

Already these threats are degrading fisheries throughout the region. Examples from north-eastern Thailand and southern Lao PDR well illustrate the risks facing fisheries in the four countries and demonstrate the transboundary nature of the impacts.

Example 1. Changes in discharge, water temperature, sunlight penetration and increased erosion resulting from deforestation and forest degradation in northern and north-eastern Thailand have contributed to changes in aquatic habitats and consequently to impacts on aquatic life. There have been major industrial pollution incidents in NE Thailand, seriously affecting the aquatic hydrology. In the Mun/Chi catchment the majority of streams are classified as water quality classes 4 or 5 (the lowest quality) with only some reaching class 3 (Schouten in press).

Example 2. Downstream of the Nam Song diversion weir in Lao PDR, 20 trans-boundary migrant fish species disappeared from the fish catch. This case is significant because it illustrates how a diversion weir on a third tier tributary of the Mekong can severely affect trans-boundary fish stocks (Schouten in press).

Example 3. Before construction of the Pak Mun dam in NE Thailand, 265 fish species were recorded in the catchment area. After construction, only 96 species could be located upstream of the dam. This loss of 169 fish species resulted from the dam and associated developments in the catchment. A further 51 species have significantly declined in abundance since completion of the dam, of which 17 depend on rapids for spawning and are long-distance, trans-boundary migrants.

Example 4. Migrating fish species disappeared from the upstream fish catches after completion of the Nam Ngum dam in Lao PDR

3.2 The critical role of protected areas in freshwater fisheries

The failure to recognise the full significance of the freshwater capture fisheries has meant that there has been a corresponding lack of attention given to the contribution of protected areas as an essential management strategy in the fishery sector. A range of protected area types contributes to the fisheries sector in important ways.

Protected areas established primarily for biodiversity conservation contribute to fisheries productivity through the maintenance of hydrological functions and contain many rivers and streams that are important fish habitat.

3.2.1 Maintenance of the hydrological system through protected areas

The extensive forests contained within protected areas in the region make a very significant contribution to development through their influence on hydrological factors such as maximum flood heights, dry season flows, water quality, and annual rainfall. These benefits are critical to fisheries sector productivity. They are important to many other sectors as



discussed in other chapters of this report, especially the maintenance of water resources, and of a wide range of ecosystem services and products to agriculture, transport, hydropower, industry and urban settlements. The threats to the hydrological system in the region include forest loss and land use changes and emphasise the need for an effective protected areas network managed with hydrological functions in mind.

Box 3.1: Impacts of sediment on aquatic ecosystems

A part of the sediment released into water bodies by erosion will remain in suspension, while the rest will be deposited. Both forms of sediment can have significant impacts on aquatic life.

Suspended sediment affects aquatic life by:

- abrading and damaging fish gills, increasing risk of infection and disease;
- scouring of peri phyton (plants attached to rocks) from the stream;
- causing shifts in fish community toward more sediment-tolerant species (including introduced carp);
- reducing feeding efficiency of species which depend on sight for feeding;
- reducing light penetration causing reduction in plankton and aquatic plant growth;
- reducing filtering efficiency of zooplankton in lakes and estuaries;
- adversely impacting aquatic insects which are near the base of the food chain; and
- increasing stream temperature through absorption of heat into sediment particles, reducing the amount of dissolved oxygen in the water, and possibly also confusing migration patterns in any species which respond to seasonal temperature changes.

Suspended solids can also have detrimental impacts on reproductive success, though the effects vary from species to species. Turbidity can affect spawning time, place of spawning, and spawning behaviour. It can also affect juvenile freshwater and warm water fishes at sub-lethal levels by reducing sight feeding distance, disrupting activity and respiratory patterns, and/or changing migration and orientation responses (Wilber 1983).

However it would not be safe to assume that any land use change leading to an increase in total suspended solids (TSS) would necessarily have significant detrimental effects on fish stocks. TSS concentrations in the Mekong mainstream are ten times higher in the wet season than in the dry (Schouten in press) suggesting that the aquatic biota is somewhat adapted to extreme changes in sediment load. However very large increases in sediment can have very detrimental impacts - as has been demonstrated by the impacts of commencement of operation of the Theun-Hinboun (Lao PDR) and Yali Falls (Vietnam) hydropower schemes.

Conversely, changes in land use significantly reducing the TSS and nutrient loadings can have negative effects on the ecology and thus on fisheries. The discharge of the Mekong waters forms a nutrient-rich plume supporting high primary production and related high fisheries catches in the Mekong Delta and along the south coast of Vietnam. Reduction in the volume or concentration of this discharge would be likely to have significant negative impacts.

Deposited sediment affects aquatic life by:

- physically smothering the benthic aquatic insect community which forms an important part of the food chain;
- reducing survival rates for fish eggs or even causing total smothering of eggs;
- destruction of fish spawning areas;
- "imbedding" of stream bottom reduces fish and macro-invertebrate habitat value;
- depleting dissolved oxygen levels in lakes or streams by increasing sediment oxygen demand; and
- smothering freshwater mussels or impeding their feeding processes.

Sedimentation is also affecting smaller wetlands on the edges of the floodplains and in the foothills of the mountains bordering the catchment (e.g. Numa Shams and Mahfuzuddin Ahmed 1996).

3.2.2 *Threats to the hydrological system*

Many resource managers assume that there is a clear and straight forward link between loss of forest cover and hydrological impacts such as increased flood heights, reduced dry season flows, reduction in water quality and lower annual rainfall. For example, a Mekong watershed forestry strategy and action plan states that:

“The ongoing losses in forest cover in the Lower Mekong River Basin (LMB) over the past decades and the emerging adverse trends in the watershed are issues of international concern. Widespread deforestation is causing increasing water runoff, soil erosion, siltation in rivers and wetlands, increasing rates of occurrence and severity of floods, landslides and droughts, loss of biodiversity, fisheries depletion, and damage to agricultural and irrigation systems. These impacts are often transboundary in nature, especially affecting downstream areas. The physical and natural resources of the LMB watersheds provide goods and services to communities, including: protecting water sources; minimising the risk of floods by attenuating run-off, protecting urban environment and infrastructure (premises and transport facilities) (ARCADIS Euroconsult 1999).”

Yet, the relationship between forest cover and watershed hydrology is not as clear or direct as is normally supposed. While a great deal of anecdotal material suggests such linkages (e.g. floods in Thailand 1988, China 1998, and Vietnam 1999 were all widely reported as being the result of excessive logging - and large-scale poorly managed logging had in fact occurred in watersheds in those countries), there is considerable scientific debate as to the exact nature of the hydrological effects of alteration of forest cover. This debate has been thoroughly canvassed in recent literature reviews by Aylward (in press) and Calder (2000) (Box 3.2).

While logging per se may or may not have significant impacts on water flows and water quality, the land uses following logging in the region have definitely led to adverse hydrological impacts. Logging requires a network of roads and tracks into the forest area. Others then use these roads to carry out activities, which typically include illegal logging of remaining trees, charcoal-making, and clearing for agriculture. This sequence has been observed throughout the region in upland forests and in the flooded and other riverine forests bordering the Mekong and its main tributaries.

Forests eventually converted to some form of agriculture can be classified as undergoing disturbances of high intensity with potentially important effects on stream flow and sedimentation (de Graaf 2000). However, it is not only the sedimentation effects of the post-clearing land uses that impact water quality. Such impacts also result from pesticide and fertiliser run-off from agriculture, industrial pollutants, and leachate from mining tailings, for example.

3.2.3 *Loss of forests in the region – protected areas a last resort?*

The health of the region's forests is linked through a variety of pathways to the welfare of the fisheries sector including the hydrological benefits. Despite their substantial contribution to development, over the last five decades the forests of the region have been significantly degraded in terms of both area and quality as detailed in Chapter 6 on forests. Between 1960 and 2003, extensive logging and deforestation expanded from northern and north-eastern Thailand (1960s to late 1980s) and the western highland regions of Vietnam (1980s to mid 1990s) to Lao PDR (mid-1980s to present) and Cambodia (mid-1980s to present).

Present forest cover is about 40 per cent of the region,⁸ down from 56 per cent in 1970, though the loss of forest quality has been significantly higher than the loss of forest area. Causes of forest loss or

⁸ Forest cover in the Chinese part of the Mekong Basin is 38 per cent (Xinhua News Agency, Beijing 21/2/01, quoted in BBC Summary of World Broadcasts, 28/2/01).

deterioration include commercial logging (legal and illegal); slash and burn cultivation; land encroachment for settlement, farming or infrastructure development; and wood cutting for fuel (Sverdrup-Jensen 2002).

Box 3.2: Effects of logging on hydrology

Clearing or degrading large areas of forest cover is likely to result in some or all of the following impacts but the extent, and sometimes the direction, of the impact depends on local variables:

- increased erosion, tending to rise dramatically when the leaf litter layer is removed or destroyed, and/or there is repeated disturbance of the soil (e.g. by burning, frequent weeding, or overgrazing);
- increases in sedimentation rates, resulting from changes in vegetative cover and land use;
- nutrient and chemical outflows generally increase;
- overall water yield is generally inversely related to forest cover (i.e. more cover results in less outflow) - contrary to popular belief and extensive anecdotal reports;
- seasonal flows may increase or decrease, depending on various factors specific to each situation, but, in the case of deep soils, dry season flows diminish more rapidly with forest disturbance;
- groundwater recharge may increase or decrease, generally in a similar fashion to seasonal flows;
- peak flow (i.e. immediate flood height) may increase (sometimes dramatically) under certain conditions, including where the forest clearing or subsequent land use reduces infiltration, e.g. urban settlement, mining, extensive road construction, poor cultivation practices (including some shifting cultivation), frequent burning or overgrazing; and
- local precipitation is probably not significantly affected by changes in forest cover, at least up to a scale of 10 sq. km. though above this, and certainly at large scales such as the whole Mekong catchment, there may be a reduction in the amount of rainfall as a result of reduction in forest cover.

Source: Alward *in press* and Bruijnzeel *in press*

As a result of these factors, protected areas now represent the most secure form of forest protection in the four lower Mekong countries and in general contain the least disturbed forests in the region. The extent of forest protection provided by protected areas is substantially greater than is suggested by the 18 per cent of the region under some form of protected area status. The majority of these protected areas are in the upper catchments of the river systems, and constitute more than 50 per cent of the area of forested upper catchment - and are thus responsible for a significant percentage of the hydrological benefits that forests provide to development in the region.

3.2.4 Development benefits from maintaining the freshwater system

The maintenance of forest cover in protected areas can provide the following benefits to freshwater systems:

- protection from erosion;
- protection from increased sedimentation and its associated impacts;
- maintenance of nutrient levels in water bodies;
- in certain circumstances, protection from dramatic increases in flood heights (peak flows);
- in certain circumstances, protection of dry season flows;
- in certain circumstances, maintenance of ground water recharge; and
- maintenance of rainfall levels where large areas of forest are involved.

3.3 Fisheries sector protected areas

A variety of reserve types have been established throughout the region for fisheries-associated reasons. These are almost the only protected areas that occur on the region's flood plains and they contribute directly to the maintenance of the productivity of the aquatic environment.

In Lao PDR, the Luang Prabang protected areas are traditional approaches to fisheries management. Community fisheries reserves have been established recently with the support of NGOs, generally working with government agencies. For example, between 1993 and 1997, 59 Fish Conservation Zones were set up in 59 Lao villages. Again these were largely associated with deep pools in the Mekong mainstream (Baird et al. 1998).

In Cambodia, in 1989, Fisheries Reserve Areas where all fishing is prohibited were established by the Ministry of Agriculture over all deep pools along the Mekong in Sambor District (Kratie Province) and Stung Treng Province (Chea and Sean 2000). Similar Reserve Areas were established in the deeper parts of the Great Lake. Also, there is a long tradition of community-established protected areas, such as those in Luang Prabang Province in Lao PDR (Sjorsley 2000). In the latter case 37 per cent of villages have a conservation zone near the village - mainly associated with deep pools within the river.

Cambodia (and formerly Thailand) adopted a system of "fishing lots" which are a form of fisheries-oriented protected area. The fishing lots in Cambodia have existed since the latter half of the 19th Century. The system has both spatial dimensions and habitat and resource protection measures. Each lot has a set of specific rules and regulations for management including the conditions under which local communities have fishing access to the lot and how the flooded forest is to be protected.

There are five types of fishing lot located in the Great Lake and the major flood plains of the Mekong and the Bassac River system, along the Tonle Sap and Mekong Rivers downstream of the lake, and in the upper Cambodian section of the Mekong in Kampong Cham and Kratie Provinces. The system is potentially highly effective and, is regarded by some specialists as a good example of "best practice" for the region (Coates 2001).

The effectiveness of this system (the fishery appears not to have been seriously reduced in more than 125 years of operation) has been eroded in recent years by extensive and deep-seated corruption in the management of the lots and associated community access areas. This has created an overlaid informal system of capture fishery management that is undermining the sustainability of the fish stocks. The informal system exists because of inadequacies in fisheries policies and regulations, lack of transparency in resource management institutions, lack of monitoring and accountability, and problems with capacity and political will in law enforcement agencies (Ly et al. 2000).

In the face of growing criticism of the mismanagement of the fishing lot system and growing inequities, the Cambodian government recently drew back from further developing this approach to protection of fish stocks and habitat. The government cancelled 53 per cent of the lots in the Great Lake to make them available for community fisheries, theoretically under a system of community management. Yet, neither the Fisheries Department nor the local communities had the capacity to take on these new responsibilities, leaving a management vacuum in many areas.



3.4 Key factors in fish productivity requiring protection

Several factors account for the significance of the freshwater fishery in the Lower Mekong Basin and protected areas have an essential role in their maintenance. These are:

- the patterns of migration among the fish populations in the Basin,
- the regular extensive flooding of the floodplain and
- annual recharging of floodplain wetlands, and certain other key habitats (including deep pools and rapids).

These factors provide essential support for the high fisheries productivity in the region and constitute the most sensitive aspects of that productivity. If their condition deteriorates then fish productivity will decline.



3.4.1 The significance for fish migrations

The separation of major fish life stage habitats in time and space forces all Mekong fish to migrate, and virtually all migrations involve some time on the floodplain. Some species migrate only small distances between permanent and seasonal water-bodies on the floodplain (e.g. snakeheads, gouramis and *Clarias* species of catfish). These constitute about 40 per cent of the total catch. Other species migrate long distances from dry-season pool habitats within river channels to flood-season feeding habitats on the floodplain. This group includes most of the carp (*Cyprinids*) and river catfishes (*Pangasids*). Most economically important fish in the Mekong are highly migratory, with some migrations stretching over 500-1,000 km and often crossing national borders. These long distance migrants form about 60 per cent of the total catch (Sverdrup-Jensen 2002; MRC 2001a; van Zalinge 2000).

While there is this broad level of knowledge of migration patterns, there is only limited knowledge of the ecology of the aquatic environment in the basin. Basic information on the life cycles of most fish species in the Mekong Basin is also lacking. Most knowledge of fish migrations in the region is derived from studies carried out on the Mekong mainstream, though more recently there has been some research into fish migrations in the major tributaries. Though fishers consistently report (and rely on) fish migrations even in the very highest tributary streams, these remain virtually unstudied, and their ecological and economic significance is unquantified. Similarly, there has been no quantitative analysis of the likely impacts of stream and river flow alteration on migration and thus on fish production.

Once again, the precautionary principle needs to be applied, with regimes of protection including fixed protected areas in critical locations along the migration routes and zones for seasonal closures managed collaboratively with fishers and local communities.

3.4.2 The protection of key habitats

These migrations provide the link between important fish habitats, all of which are necessary to the maintenance of the high fisheries productivity. For example, the huge fish production in Tonle Sap cannot be sustained if the spawning grounds at Stung Treng, some 500 km upstream from the Lake, are not protected (MRC 1999).

Most fish species depend on different habitats at different stages in their life and at different seasons of the year. During the flood season most Mekong species take advantage of the floodplains for feeding, breeding and rearing their young. Outside the flood season fish stay in dry-season refuge habitats, mainly in permanent lakes and pools or within river channels. Certain stretches of the Mekong and its tributaries contain deep pools, which are particularly important as dry season refuges (Sverdrup-Jensen 2002). Others rely on rapids for important stages in their life cycles. These critical habitats are briefly discussed below.

3.4.2.1 Floodplains⁹

While the connection between fisheries productivity and the flooded forests in Cambodia and the far south of Lao PDR has long been suspected, it is only recently that the importance of other (and much more extensive) floodplain habitats of the Mekong system have been recognised. It is now clear that one of the key aspects of the fish stocks in the Basin is their dependence on the cycle of flooding and drying of vast floodplain areas (MRC 2001).

Floodplains cover approximately 700,000 sq km (about 11 per cent of the total area of the LMB) (Sverdrup-Jensen 2002). The annual flooding of the basin generates the biotic production of the wetlands by transferring millions of tons of nutrient-laden, suspended and dissolved solids. Flooding also releases nutrients from vegetation and inundated organic debris. This leads to blooms of plankton, macro-vegetation and insect larvae which are available to fish migrating to the inundated areas for spawning or feeding. After spawning the flooded habitat serves as a nursery area for fish fry, and as the flood waters recede most fish return to the rivers and recharge the fish stocks there.

Research on the *dai* fishery in the Tonle Sap downstream of the Great Lake shows that the level of fish stocks in any year is highly dependent on the flood height (and therefore, critically, the extent of inundation of the floodplain) in that year (Schouten in press). This relationship will hold true for all of the floodplain areas throughout the basin - if the flooded area is reduced, there will be a corresponding reduction in the fish production.

Similarly, different habitats in the floodplain (e.g. flooded forest and flooded grassland) have different levels of productivity and are important to different fish species. Alteration, reduction or removal of floodplain habitats will affect the overall productivity of the aquatic ecosystem.

Surveys carried out under the MRC Fisheries Program indicate that the productivity in a flood plain, which is typically flooded 4 - 6 months per year, is more than double that of a permanent lake of the same area. It is also several times higher than the productivity per area in the most productive marine areas of the world. It is the periodical shift between flooded and dry conditions which is particularly beneficial (MRC Annual Report 1999) and it is this alternation that is at risk if the annual cycle is changed by upstream engineering works that obstruct water flow.

3.4.2.2 Deep Holes

Deep holes in the mainstream of the Mekong would appear to be the primary rearing and dry season refuge for large catfish and carp (Hill and Hill 1994). Such deep holes are also known to occur in the major tributaries.

Because of the huge increases in water flow during the height of the floods, these deep holes are effectively self-cleaning, despite the large volumes of sediment that must pass through them each year. However any change in total flow, and particularly the rate of flow, will be likely to undermine this scouring mechanism, so that the holes can be expected to silt up fairly rapidly.



⁹ Floodplains are low lying alluvial lands bordering rivers that have been constructed by sedimentation from the movement of the river and its meanders over the area, and by the widespread deposition of sediment over the plain when the river is flowing outside its banks. Floodplains are typically frequently inundated, with strong flood flows over the area, and indeed part of the function of the floodplain is to store and carry floodwaters during times of flood (Hollis 1993).

Many deep holes in the Mekong mainstream are already under legal or community protected status of some kind.

3.4.2.3 *Rapids*

Rapids are very important to the health of a river - out of all proportion to their physical extent. They perform several vital roles: oxygenation of water, and of organic matter carried into the rapids which is also physically broken up, allowing its entry into the food chains of higher organisms. Rapids also provide enormous surface area for growth of attached plants and associated insects and other invertebrates, as well as spawning and feeding grounds for many fish species. Of all river channel habitats rapids probably have the highest primary production and biodiversity (Roberts 1993).

Large complex rapids occur frequently on the mainstream of the Mekong and its tributaries, though the total extent of this habitat is quite small. These rapids support a diverse assemblage of fish species, some of which are specifically adapted to life in this habitat. Rapids are spawning habitats and refuges for the young of a range of species, many of which spend the remainder of their lives in other wetland types (Schouten in press; Hubbel 1999).

Very few of the rapids in the Mekong mainstream or major tributaries are protected and even where they are within some form of protected area they are not given special management attention.

3.5 *Future directions*

The wild freshwater fish stocks and their habitats in the lower Mekong should be the focus of a systematic and coordinated strategy of rehabilitation and protection if productivity in the sector is to be maintained. A network of multiple-use protected areas in upper catchment, floodplain and mainstream environments needs to be a central part of the fisheries sector development strategy. Already, the sector has done more than any other to promote the use of protected areas in helping safeguard its resource base. Now it needs to extend this protection regime as part of an ecosystem approach to the management of fish stocks.

3.5.1 *A regional action plan for fisheries protection*

A regional action plan for protecting fish resources and productivity in the Lower Mekong Basin is needed, which recognises that the future of fisheries is closely tied to sustainable water resource and forestry management within the context of a network of existing and new protected areas. It would also recognise that the sector is at serious risk unless hydropower, irrigation and flood control infrastructure is designed, built and operated so as to avoid and minimise damage to fisheries. There are two key concerns: the control of destructive activities, in particular destruction of vegetation; and the renewal and protection of critical fish habitat. Protected areas can be a vehicle for bringing a collaborative cross sectoral management approach to specified geographic areas and resources.

An extension of the fisheries sector protected area system to take in representative and important samples of critical fisheries habitats is an important part of the effective management of wild fish stocks. In certain key sites, which can be clearly defined, multiple-use protected areas are the most practical form of tenure to involve users and government in collaborative protection regimes. Emphasis should be given to the floodplains, and riverine habitats such as deep holes and rapids.

The action plan would be prepared under the umbrella of the MRC with analysis of its implications for the Greater Mekong Basin, but with the primary purpose of helping shape the Basin Development Plan due for completion by 2005.

The action plan would include:

- Guidelines on the kinds of fisheries environment to be covered by protected areas.
- A listing and mapping of existing fish sanctuaries and other protected areas contributing to the fisheries sector.
- Criteria for the selection of high priority fisheries related protected areas.
- Identification of an initial list of additional sites which should receive the highest priority for protection due to their regional significance.
- Definition of the different categories of protected areas to be applied in the fisheries sector and basic management guidelines for each category.
- Guidelines for the identification, establishment and management of protection zones within fishing concession areas and lots.
- Details of a system of protection financing based on the beneficiary pays principle.
- Correction of the imbalance between resources directed to aquatic production and those directed to protection and management of wild fish stocks.

The action plan process would involve a number of steps including the identification of important locations and economic values for the fisheries sector.

3.5.2 *Survey of critical fisheries habitat and values*

As a first step in preparing the regional action plan, a survey should be undertaken to:

- identify habitats and values within existing protected areas which contribute to fisheries productivity;
- identify areas of significance for fisheries that are not under protection regimes but should be so;
- set priorities for action in terms of the protection, rehabilitation and more effective management of critical areas; and,
- make recommendations for adjustments to the existing protected areas systems including where appropriate their extension to cover critical areas currently unprotected and mismanaged.



3.5.3 *Valuation of protected areas contribution to fisheries*

Protected area contributions to fisheries are better understood in ecological terms than as development or economic values. This needs to change if fisheries agencies are to justify and receive a greater share of national budget (consistent with the real contribution of the sector to the national economy and to food security) to fulfil and expand their protection management functions. A study is needed to determine the economic value of services and products provided to the fisheries sector by natural systems within protected areas. A network of sites within the basin should be subject to rapid assessment as the basis for estimating values for individual protected areas and for wider landscapes or catchments in which a number of protected areas are located. Cases of upland, floodplain and mainstream protected areas need to be included in the study in addition to critical fisheries habitats not represented within existing protected areas.

Valuation is only a first step to reorientating sector budgets and budget submissions and in determining appropriate systems of economic instruments within the sector so that concessions, fees and other charges begin to reflect the cost of protection functions.



4 Water and protected areas

This chapter explores the relationship between protected areas, water resources and economic development in the Lower Mekong region. It examines the crucial role of PAs in protecting hydrological functions that benefit a range of economic sectors, and describes major threats compromising the ability of PAs to continue to provide these services. A regional planning approach is proposed to rehabilitate and maintain the PA contribution to water resources management. This approach includes the development and implementation of a regional action plan to be reflected in the Basin Development Plan process, and especially the definition of a regional network of protected areas with water management functions.

Economic instruments have a key role in achieving the objectives of this plan, and need to be tested through a number of pilot projects.

4.1 Water resource services provided by protected areas

A strong theme throughout this report is that protected areas and the ecological functions they maintain are an essential element of water management and economic development (ICEM 2003 f and g). These functions contribute to development through:

- water storage and natural flood regulation functions;
- water supply functions (e.g. irrigation, drinking water supply and hydropower);
- instream and estuarine fishing;
- flushing of pollutants;
- transportation and navigation;
- recreational use of water (including tourism); and,
- microclimate impacts on surroundings.

The various river systems in the four countries, including the Mekong River system which links them, and all their associated ecological functions, are the central influence in natural resource management strategies affecting energy production, agriculture, forestry, fisheries, biodiversity conservation, transport, public health and water supply.

The Mekong River itself (as a major water resource) is essential to economic activity in the countries it connects. For example, proposals for hydropower development in Lao PDR, large-scale inter-basin water transfers for irrigated agriculture in Thailand, and rebuilding of the agricultural sector and aquaculture development in Cambodia, depend on the availability of secure, and high quality, water resources.

Vietnam, like its neighbours, bases its plans for increased agricultural production and industrial growth on assumptions of increasing quantities of accessible and clean water available. The government aims to increase irrigated land from the current 3.5 to 10-12 million hectares by the year 2010. That target will involve an increase in consumption to 65 billion cubic metres of irrigation water. In addition, 6-8 billion cubic metres of water will be needed for domestic uses, while 15 billion cubic metres will be required for the industrial sector (ADB, 2000). Those estimates represent an 80



per cent increase over the total level of water consumption in 1990. Vietnam's development strategy combined with rapid population growth, rising real incomes and expectations of improved living standards, will place great pressures on the country's water resources.

Despite increasing demands on natural services which provide water, only a small proportion of the region's rivers and wetlands are protected, and economic development strategies are having profound effects on the capacity of these areas to continue to provide development benefits. Upper watersheds are better covered by protected areas.

4.2 Watershed management and protected areas

During the last ten years, unprecedented attention has been given to establishing and extending PAs, which now cover more than 18 per cent of the Region, mostly in upland areas. Usually PAs have not been established or managed primarily to protect water resources or to safeguard the related ecological processes which foster high quality, secure water supplies and water resource services. Forest and biodiversity conservation has been the main driving force for the expansion of national PA systems. Even so, PAs of various types are the most significant, and in most areas the only form of land and coastal tenure protecting and maintaining water resources and associated natural systems.

Thailand in particular has a long history of watershed protection. It has classified about 26 per cent of the country as "head watershed areas" with 17.86 and 8.3 per cent designated as watershed class 1 and 2 respectively. Watershed class 1 is protected or conservation forest with the main management strategy the establishment of national parks, wildlife sanctuaries and head watershed protected areas over most of the area and rehabilitation programs for degraded watershed areas (ICEM 2003d).

Yet, generally in the region PA coverage, budgets and management have not been adequate to the task. Comprehensive protection regimes beyond current levels will be required to achieve the national and regional development objectives dependent on water resources and services.

4.3 Regional threats and obstacles to water resources protection

Water services provided by watersheds are valuable to downstream users. However, upstream communities are not compensated for region wide development benefits they help provide through sustainable land use practices. Consequently, the tendency has been for upstream users to convert forested watersheds to other uses that provide them more immediate and direct benefits but that degrade natural systems and adversely affect the environmental services the catchments provide. In these situations both upstream and downstream users lose in the long term. The development threats to hydro-physical functions and institutional obstacles to their protection relate to:

- poor integration of protection effort at national level;
- user pays principles not applied;
- modification of water cycle and water balance;
- sedimentation;
- salinity;
- pollution affecting water quality; and
- poor integration of protection at regional level.

Without better protection, and appropriate sharing of the costs of managing PAs, especially with downstream beneficiaries, development will continue to reduce water quality and security of water supply.

4.3.1 *Integration of protection at national level*

In general, water management agencies have lacked the authority to achieve collaborative and coordinated protection strategies across sectors. Important initiatives are being taken to bring a more systematic approach to development control, for example, through the river basin planning framework being put in place in Thailand and the river basin planning organisations being piloted under the Water Law in Vietnam. That law provides for the creation of a National Committee on Water Resources and River Basin Organisations in major basins, and the coordination of water management and administration. It also provides a mechanism for planning, using and protecting water resources by licensing water uses and granting permits for wastewater discharges as well as the means to monitor, evaluate and enforce the law. There is an opportunity for protected areas to be recognised in national and provincial planning mechanisms within the water sector (ICEM 2003c). But, significant institutional obstacles remain to applying comprehensive regimes of protection across all sectors including reinforcing the key role of PAs in maintaining the quality and availability of water resources.

4.3.2 *Application of user pays principle*

Also, governments have found it difficult to cover the cost of actively managing the water resources and hydrological functions found in PAs, because these functions and services have typically been provided to users as free goods. Whilst the benefits of the services have accrued to many sectors, there has been no requirement on the beneficiaries to pay for the upkeep of the areas protecting these functions. Taxes and charges where they exist, for example the Vietnam Natural Resources Tax, go to consolidated revenue rather than be linked directly with maintenance of the resource base. The new water permitting system in Vietnam could be used to harness revenue for protected areas by using tools such as transfer payments for water-user charges from downstream irrigation systems to support upstream watershed protection activities in protected areas. Also, under the Natural Resource Tax, pilot levies on downstream hydropower and industrial users could financially support the protected areas to safeguard the watershed and catchment areas on which they depend, but these strategies have not been tried (ICEM 2003c).

4.3.3 *Modification of water cycle and water balance*

Major infrastructure works to control floods or store water for dry season agriculture create significant impacts on the natural hydrological cycle of the Mekong region water resource systems. In addition increasing levels of abstraction are altering flow patterns. For example, although surface water may be abundant during the wet season, it is becoming increasingly scarce in the dry season due to greater municipal and industrial demands, which tend to be relatively constant all year round.

Draining of wetlands, clearing of mangroves, and replanting of catchments with exotic species also substantially interfere with the water cycle and water balance. Changes to flow regimes will also affect water temperature with effects on organic and inorganic processes influencing water chemistry.

4.3.4 *Sedimentation*

Sedimentation due to erosion of topsoil, resulting from land clearing, is another major threat to the integrity of water resources in the region. For example, sedimentation can shorten the effective life of reservoirs used for irrigation and hydropower by 10 to 50 years. Sedimentation is also associated with raising river beds, leading to increased flooding during high flow periods and destruction or disruption to water engineering infrastructure.

In the case of coastal sedimentation, present rates of sedimentation in some locations are causing shorelines to expand at 50-100 m per year, especially in estuarine areas with the consequent alteration of entire coastal hydrological regimes.

4.3.5 *Salinity*

Salinity is an expanding problem in the region resulting from vegetation clearance and irrigation schemes, particularly in areas where evaporation exceeds rainfall for significant parts of the year (Hirsch and Cheong 1996). Salinisation is occurring in NE Thailand where deforestation has resulted in rising water tables, a situation exacerbated by the presence of underlying salt domes. Saline intrusion occurs in the Mekong Delta during the dry season, as insufficient fresh water flows out to prevent the ingress of tidal seawater. The salinity of river water is sometimes as high as that of seawater (ADB 2000). Salt intrusion in coastal areas throughout Vietnam is becoming a significant issue. The salinity of water in all major rivers exceeds the standards for crops in the low flow season for up to 30-40 km from their mouths. Increasing water abstractions bring salinity intrusion further inland.

4.3.6 *Pollution affecting water quality*

Water quality is deteriorating as catchment and river bank erosion (caused largely by deforestation) increase sedimentation loads, municipal and industrial waste discharges pollute both rivers and groundwater, and conversion of wetlands to agricultural lands releases acid sulphate into rural water supplies. Agricultural intensification is accompanied by higher levels of pesticide and fertiliser use, polluting water available to downstream users (Badenoch 1999).

4.3.7 *Integration of protection at regional level*

The protection of water resource systems for equitable and sustainable use by the countries sharing them, is one of the most complex natural resource issues facing the Mekong region. For example, in 1986, China began construction of eight hydropower dams and two reservoirs on the upper Mekong in Yunnan. The first, at Manwan was finished in 1993, the second, at Dachaoshan will be completed in 2001, and the third, the Xiaowan project, is scheduled for completion in 2012 and will be China's largest hydropower scheme after the Three Gorges project on the Yangtze River (Chen Liang 2002). How do the upstream-downstream countries engage and cooperate to protect shared natural systems in such situations?

While national administrative and management arrangements evolve, international forums have a special role to play. The Mekong River Commission brings together the four countries of the Lower Mekong River Basin, with China and Myanmar as observers. The current MRC Basin Development Planning process has the promise of providing a framework for sustainable use and protection for the MRC members and to influence the actions of its two northern neighbours. Also, the strategic planning for the Greater Mekong River Basin promoted by the Asian Development Bank has promise of reinforcing and expanding the MRC cooperative approaches. But, as yet little attention has been given to the systematic use of protected areas as a primary vehicle for water resource protection, and only tentative efforts at transboundary PA management have been made (Chapter 9). The following section outlines a regional approach based on the rehabilitation and establishment of PAs as a critical development strategy for the water resources sector.

4.4 *Economic instruments to achieve water resource protection*

Economic instruments are an essential part of the mix of policy tools that should be used in implementing an action plan or water resource protection. They operate by establishing markets for environmental services, in this case the ecosystem and hydrological services provided by PAs that support development via the water resource system.

The main advantage of economic instruments is that they give greater scope for resource users to respond to environmental policies or targets, and allow the activities to achieve the targets at lower overall cost. Economic efficiency and environmental protection are thus complementary objectives.

The design and function of markets for environmental services depends on the specification of property rights and institutional arrangements to support them. In practice, economic instruments have never been used on their own as a management mechanism. They have always been accompanied by direct regulations of one form or another. A review of the different types of economic instruments is provided in the accompanying PAD Review report on global lessons (ICEM 2003f).

4.4.1 Examples of applying economic instruments

A relevant example of the application of economic instruments relates to the role of terrestrial PAs in protecting the ecosystem functions which control sedimentation and protect water quality. Those functions have economic value because maintaining water quality is important in protecting downstream fisheries, irrigated agriculture and water drawn by local people for drinking, washing and other purposes. One economic instrument that can be used to protect these functions would be the application of a system of charges (based on the concept of user pays). The rationale for such charges would be to cover the protection and management costs involved in maintaining these ecosystem functions.

With water pricing schemes for irrigators under consideration in several of the Lower Mekong countries, a component of the price charged for abstractions of water could be dedicated to management of PAs protecting the resource.

Another application of economic instruments is in controlling potentially damaging impacts of upstream activities on PAs that could otherwise restrict them from supplying environmental services via the water resource system to support economic development within the region. Relevant impacts may relate to pollution caused by upstream activities, such as industries, town sewerage works or agricultural production.

The policy choice is how to operate the 'market' for allowable pollutant discharges; i.e. whether to set the price of allowable discharges (for example by imposing an effluent discharge fee) and let the quantities discharged adjust; or whether to set the target "quantity" (e.g. a maximum allowable total discharge load), and introduce a system of tradeable discharge permits, and let their prices adjust. If pollutant charges are used, the higher the charge, the greater is the economic inducement for polluters to cut back discharges. Alternatively, if tradeable permits are used, the market for permits will reach an equilibrium price and the total discharge limit will be met at the minimum overall cost of abatement.

An important consideration in the design and use of economic instruments is defining the geographic boundaries of the scheme. The scheme may be developed and implemented at a local scale, national scale, designated river basins or sub-basins, or on a multi-country scale.

At the multi-country scale, transboundary or regional institutional arrangements are required for charging schemes or placing caps on particular functions of the water resources system; for example, pollutant discharges, allowable rates of water extraction, diversions for inter-basin transfers, and maintenance of minimum flows for environmental protection purposes.

General criteria for the application of economic instruments in the context of water resource systems are described in Box 4.1, while Box 4.2 documents operational criteria to be taken into account in the actual design of economic instruments. They indicate that an integrated approach is required to water resource management, in which PAs play an important role.

Box 4.1: Criteria for applying economic instruments

Criteria in italics are essential. Some 'critical mass' of the remaining factors should also be present; absence of more than a few greatly increases risk.

Ecological

- The watershed providing hydrological services to key water users has been identified as a conservation priority.
- A water-based finance mechanism is compatible with the overall strategy identified in the conservation management plan.

Hydrological

- *The watershed provides verifiable hydrological services of measurable economic value.*
- *Watershed protection and its effect on the hydrological services provided can be monitored.*
- Water services (flow regulation, quality, etc.) are well defined. Single and controllable sources of pollution or environmental degradation lead to a clear cause and effect between forest management and water services.
- Small scale watersheds where users can readily see the connection between sustainable forest management and the provision of watershed services.

Usage Demands

- *A relatively dense population or industrial presence capable of paying for water services.*
- Users can be convinced that a valuable service is being provided by forested watershed.
- *The economic activity linked to the ecosystem service is relatively important.*
- Users are confident that funds raised for improving watershed management is maintaining or enhancing the watershed and the quality of water services.
- Users are confident that the source will remain reliable.

Land Use/ Provision of Water Services

- *Sustainable management practices compatible with the provision of water services is made economically competitive with alternative more environmentally harmful land uses.*
- Substitutes for water service are expensive or unavailable.
- The economic service provided by the watershed is scarce or declining or the demand is increasing.

Legal/Regulatory Framework

- *Property rights and land tenure are well defined. Those who provide water services through sustainable forest management practices are able to receive compensation.*
- Additional funds raised through water rate increases do not go into general revenue, and can be set aside to address targeted threats.

Political Context

- Political stability, with transparent legal, economic and administrative institutions.
- *Solution must be deemed equitable.* If relatively poor users are required to make additional payments that are perceived to benefit rich landowners, or if relatively affluent water users are not required to make extra payments, the water fee will be unfeasible, or unsustainable.

Institutional Arrangements

- *Transaction costs of initiating and implementing deals must not exceed long-term benefits.*
- *Institutional arrangements that reduce uncertainties, promote collaboration, and enable enforcement of agreements so that those who provide water services will receive compensation.*
- Institution or agency that administers the watershed should be situated within the watershed itself.

Box 4.2: Criteria for the design of economic instruments

Criteria to be taken into account in designing and applying instruments include:

Effectiveness

The success of an instrument in achieving management objectives such as efficiency and in meeting environmental standards.

Efficiency gains

Efficiency gains are measured in relation to the savings in scarce resources and in costs associated with such resources.

Ongoing incentives

Ongoing incentives refer to the stimulus that is provided for activities to improve their technologies and management practices and reduce their costs.

Equity aspects

Equity considerations require that the benefits of environmental management are spread across the community and that no single group in the community should bear a disproportionate share of the costs.

Community acceptance

The community may not fully understand the primary purpose of introducing economic instruments. Such systems are often viewed as new ways for governments to raise more revenue or as attempts to “sell the environment”. To avoid these perceptions the introduction of any major changes in pricing or allocations of water resource user rights must be preceded by a program of extensive community consultation and education.

Administrative feasibility and cost

Any system must be administratively feasible in terms of management and costs of operation.

4.5 Future directions

4.5.1 *Prepare an action plan for rehabilitation and maintenance of water resources*

The ability of PAs to safeguard the natural hydrological processes that protect the Mekong water resource system is being severely compromised. Greater levels of protection are needed to ensure that these processes can continue to support current economic activity and proposed development. Achieving this goal will involve the development of a regional action plan for the rehabilitation and maintenance of the water resource system as part of the Basin Development Plan and the development strategies for the Greater Mekong Region.

The plan would set out overarching policies and operating principles, priority actions, institutional arrangements, implementation mechanisms and monitoring procedures. Operating principles would seek to ensure sustainability and integrity of the natural systems, and consistency, equity and efficiency in their uses.



There are three basic ingredients necessary for the success of such an action plan to protect water resources and hydrological functions:

1. a systems approach
2. a regional perspective
3. a PA network approach defined according to bioregions with a primary goal of protecting the water resource system services.

4.5.1.1 A systems approach to protection and management

A natural systems perspective in defining and implementing management strategies is essential to provide a comprehensive view of human-ecosystem interactions and in determining the responses which are sensitive to local conditions (Badenoch 2002).

An example of a systems approach to water resource management is given in Table 4.1, which shows water resources management in the context of the water cycle.

Viewed from such a perspective, the links between upstream and downstream processes can be clearly seen. For example, water resource managers have traditionally responded to predicted increases in demand for water supply by construction of dams and water storages. A systems approach shows that increasing supply capacity through more infrastructure will have upstream impacts on catchments, and downstream impacts in generating increased levels of polluted wastewater which will need treatment, or pollute downstream water bodies and receiving waters.

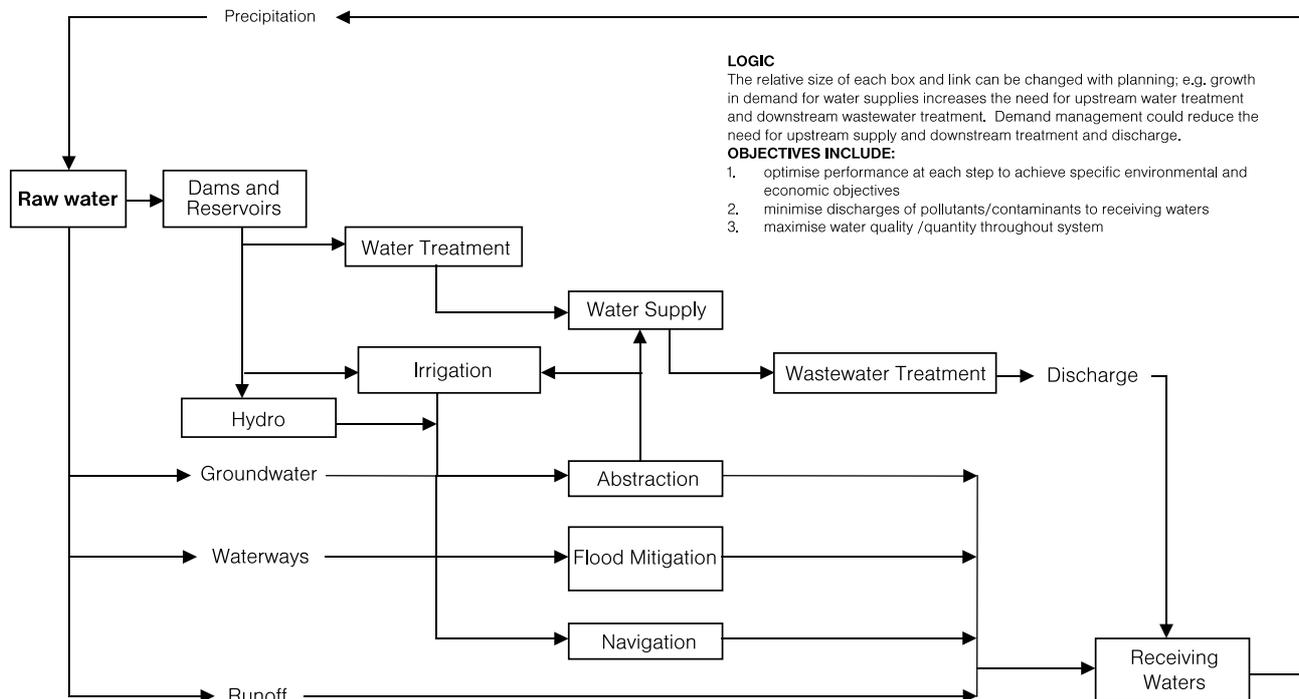
In this case, planners are adopting a supply-side approach. However, other management approaches are possible. Governments may seek to use demand side measures such as introducing tradeable water use permits, user charges, water auctions and other economic instruments to influence (reduce) water demand and thus avoid the upstream and downstream implications of supply side approaches.

In the case of the Mekong river system, a systems perspective can be used to highlight the relationship between the role of protected areas in the provision of water services, demand for such services, and threats to the continuous provision of this supply (Table 4.2). Managers can then look to supply side or demand side measures, to manage water resources better.

Supply side management involves managing development impacts. Some supply side measures are being attempted in the region, for example, Vietnam's logging ban and replanting of catchments, Thailand's logging ban and reforestation and Cambodia's proposed water resource management legislation (ICEM 2003a, c and d).

Demand side management of the nature and extent of use of the water resource system involves a range of mechanisms such as water pricing, water conservation and reduced consumption, and pollution control measures.



Table 4.1: A systems view of water resource management

4.5.1.2 A regional perspective on protection

The maintenance of basic watershed services in the Mekong region cannot be assured by any single nation because most major watersheds cross national borders. In addition, the impacts of national policies and economic activities in sectors such as trade, energy production, forestry and agriculture also cross national boundaries.

Most national natural resource policies and actions have regional implications whether they concern exploitation or protection. Countries need to adopt a regional perspective to their national protected area systems in managing shared water resources if services to local subsistence, and sectoral and national economic activity are to be conserved and enhanced.

Most clusters of protected areas have local, national and international development benefits. Those natural products and services need to be understood, promoted and effectively managed on a collaborative basis so that a community's contribution in conserving development benefits are rewarded.

Table 4.2 also shows the upstream and downstream impacts of particular actions of linked countries; and the fundamental intra-regional relationships within the system. Protecting and managing that system on a regional basis is essential to achieving national development goals.

4.5.1.3 A PA network approach to emphasise water resources protection

For much of the last 100 years, the protection of biological diversity has been the principal means of maintaining biophysical processes such as the water cycle, cycling of nutrients, and climate control. These are critical secondary functions of PAs with high biodiversity values. Given the development pressures and needs in the region, protected areas are also required which have the primary purpose of managing hydrological functions. This might involve the reclassification of some existing PAs or the definition of special zones within them, in addition to establishing new special purpose PAs.

In the four countries of the region, the classification of protected areas is narrowly drawn. A broader range of categories is needed which allow for a variety of primary management objectives. In this case the IUCN category VI (Box 4.3), which covers areas protected for sustainable use provides a more accurate description of most protected areas in the region which do not acknowledge the use of services and products as a management objective.

Box 4.3 Definition of IUCN Category VI

IUCN Category VI Managed Resource Protected Area: Protected Areas Managed Mainly for the Sustainable Use of Natural Ecosystems.

Areas containing predominantly unmodified natural systems managed to ensure long-term protection and maintenance of biological diversity, while providing at the same time a sustainable flow of natural products and services to meet community needs

Source: IUCN 1994

Agencies and sectors involved in economic development and water resource management should view PAs as a means of protecting hydrological functions for continued provision of water quality and quantity in meeting their development objectives.

Table 4.2: The Mekong water resource system

Supply of hydrological and ecosystem functions	Major threats to supply of services	Demand for hydrological and ecosystem functions
HEADWATERS Water collection and harvesting	Land clearing Water impoundments Water harvesting Flow modification	Hydro, subsistence livelihoods, water harvesting
CATCHMENTS, TRIBUTARIES Water collection and harvesting, Water management, flood control	Deforestation, effects on water tables, flow modifications, alteration of water table and water balance	Hydro energy, Navigation, biomass, land clearing, settlement, cash cropping
MAIN RIVER SEGMENTS Flushing, nutrient replacement	Sedimentation, modification of water cycle and balance, effects on water tables, effluent discharge, pollution.	Commercial navigation, industrial and domestic abstraction, tourism, fisheries/ Biomass, waste disposal
DIVERSION / RECHARGE AREAS	Pollution, modification of water cycle, sedimentation	Upstream and down stream fisheries, biomass Recharge
WETLANDS Water management, flood control, Surface water control	Sedimentation, acid sulphate soils, water pollution, effects on water tables	Aquaculture, cropping, grazing, subsistence products
LAGOONS/ ESTUARIES Sediment and nutrient discharge Flushing	Canalisation, sedimentation, saline intrusion, water pollution, loss of mangroves, acid sulphate soils, modification of water cycle and balance	Aquaculture, cropping, subsistence products, waste disposal river margins and deltaic cropping, rice, fisheries, aquaculture,
MEKONG SYSTEM Ground water Regulation, climate modification, flood management, surface runoff	Pollution, soil erosion, alteration of water temp etc from flow modification, sedimentation, poor intranational coordination, poor international cooperation	Regional economic development, abstraction, domestic industrial, agriculture, (irrigated) agriculture.

From a policy and institutional point of view, the water sector will need to adopt protected areas as a key development strategy by emphasising and promoting their water system management functions. The water sector needs to work with protected area authorities in defining a PA network throughout the region aimed specifically at the rehabilitation and maintenance of water resource systems. This would involve greater investment in existing protected areas and the establishment of new ones where water systems are not adequately protected. A useful demonstration of this approach is being pursued in the water catchment areas surrounding Sydney, Australia (Box 4.4). Thailand, with almost 200 watershed management units of its Ministry of Natural Resources and Environment throughout the country and the system of PAs covering key watersheds already has a sound institutional basis for such a national network.

Box 4.4: Special protected areas in Sydney's water catchments

Special protected areas comprise about 370,000 hectares of land surrounding the water storages and lands containing the Sydney Catchment Authority's canals and pipelines. The Special Areas protect water supply by acting as a buffer zone, helping to stop nutrients and other substances that could affect the quality of water entering the storages. The Sydney Catchment Authority and the National Parks and Wildlife Service jointly manage the Special Areas, in accordance with a Special Areas Strategic Plan of Management. Public access to parts of the Special Areas is restricted to protect safe, clean water, large areas of bushland and plant and animal habitats, and threatened plants and animal species, and preserve evidence of Aboriginal occupation dating back many thousands of years and evidence of early European exploration and settlement.

The Sydney Catchment Authority and the National Parks and Wildlife Service have the following goals for managing these special areas.

High quality raw water in the water storages: A fundamental strategy is the maintenance of high quality raw water in the catchment streams and storages. The supply of high quality raw water to downstream users requires less treatment in the treatment plants thus reducing both costs and potential health risks from increased chemical usage.

Ecosystem integrity and health throughout the Special Areas: The ecological systems of the Special Areas provide a range of functions crucial to the maintenance of high water quality. These ecosystems are complex, dynamic and self-sustaining networks which have existed for millions of years with minimal human interference. A range of threats to the ecosystems of the Special Areas now exist requiring active management intervention and controls.

Environmental quality in the Outer Catchment Areas is improved and adverse impacts on the water storages of the Special Areas minimised: The ecosystems in the Special Areas are closely linked to the ecology and environmental quality of the surrounding catchment areas. Some of the catchment lands outside the Special Areas are subject to intensive land use, and are severely degraded with deleterious impacts on the water entering the Special Areas and on ecosystem health. Hazardous inputs to the Special Areas are of special concern as they represent unacceptable health risks to the community.

Access to the Special Areas is consistent with the primary requirement to protect water quality and ecological integrity: The public will be able to have confidence that the form and extent of any access, including recreational access, to the Special Areas is governed by the need to protect water quality and ecological integrity as overriding considerations.

The natural, spiritual, and cultural values of the Special Areas are conserved and protected: The Special Areas contain archaeological sites; geological heritage; links with indigenous identity; cultural sites; landscapes and vistas; and their protection as part of the unspoilt natural ecosystems is essential.

The community is well informed and supports the principles by which the natural resource is

managed: The managing authorities must make decisions in the context of long-term safeguards and for the community as a whole, rather than for short-term benefits or for the interests of some members of the community but not others. A variety of measures are used to ensure that the community will know how competing considerations have been weighed and will have the opportunity to contribute to these decisions.

The management system for the Special Areas is rigorous, accountable and open to regular public

scrutiny: A split in responsibilities and accountabilities between agencies is a potential risk in the management of water supply. Systems and safeguards are required to ensure the effectiveness of each of the responsible agencies in a joint arrangement in securing high quality water and ecological integrity for the long term in the Special Areas.

Source: Adapted from Sydney Catchment Authority 2002

4.5.1.4 *The action plan coverage*

An action plan for integrating PAs with water resource development in the Lower Mekong region should identify:

1. The specific products and services provided by individual and groups of protected areas in safeguarding water resource systems.
2. The sectors and other users benefiting from those services and products.
3. The development and economic value of those services.
4. Priorities for action in terms of rehabilitation and maintenance of existing protected areas to maintain their water management functions.
5. The critical parts of the water resource system not effectively covered by regimes of protection and where new PAs are needed.
6. An initial regional network of protected areas, and the aspects of the local, national and regional water resource system each cluster of PAs within the network is seeking to protect.
7. The regimes of protection needed outside and linking protected areas to better safeguard hydrological functions and the priority locations where actions are needed.
8. The legal and economic instruments to be applied in implementing the action plan.
9. The monitoring procedures and institutional responsibilities associated with the action plan.
10. A program of activity over a 3-5 year period and its budgetary requirements.

A plan for protection of water resources would need to be implemented through actions at the regional, sub-regional, national and local levels. Some priority actions are discussed below, and shown in Table 4.3.

4.5.2 *Identify priority bioregions and define a regional PA network*

There are a number of key initial steps to be taken at regional level. These include defining:

1. The Mekong water resource system in terms of geographic planning units based on water cycle functions (Table 4.2).
2. A natural systems basis for regional analysis according to bioregions.



3. Existing levels of protection in each bioregion, and identifying those sub-regions in greatest need of protection.
4. Criteria to prioritise the bioregions in greatest need of protection.
5. Appropriate options for protection of priority bioregions.
6. A framework of broad management guidelines applying to the highest priority bioregions.
7. Appropriate economic instruments to promote the required type and level of protection in priority bioregions (e.g. levies, environmental offset schemes, tradeable permits, and user pay schemes).

This work needs to proceed as part of the MRC Basin Development Plan process and as a contribution to strategic planning for the Greater Mekong Basin. It would lay the foundation of information and analysis of options for drafting the action plan for consideration and adoption by member states as a component or supplementary agreement to the BDP.

Table 4.3: A regional planning framework

PLANNING UNIT	FUNCTION	ACTIONS	EXAMPLES OF POSSIBLE TOOLS	TYPE OF PROTECTION
REGIONAL	To strengthen the framework for regional cooperation on cross-border water resource use and protection through a regional network of PAs.	To be managed by MRC. Members states to agree to principles.	A Mekong Conservation Fund.	MRC Basin Development Plan, international conservation agreements, principles and guidelines e.g. for water quality and protection throughout the system
BIOREGIONAL	To implement a framework for establishing, maintaining and resourcing a network of PAs designed to protect water resources and hydrological services	MRC to identify and map regional planning units e.g. bioregions, watersheds etc. and facilitate inter-country collaborative arrangements in vulnerable areas identified as being gaps in protection framework	Regional caps on water resource development, credit schemes between bioregions	Bioregional PA systems, Special protected areas such as PAs for water resource conservation to manage flooding, droughts, water regime modification.
NATIONAL	1. To implement regional and sub-regional PA planning and management within national legislation. 2. To broaden stakeholder representation to ensure equity considerations are met.	Individual countries to identify appropriate PA strategies to protect their parts of the catchments or in conjunction with others and implement their national protection and rehabilitation programs	Bilateral strategic agreements on export of water resources, and transboundary cooperative management of special PAs	Cross-boundary PAs, including biosphere reserves, peace parks etc.
LOCAL	1. To help government agencies be more responsive to local interests, especially ethnic minority groups, and ensure equity considerations are met. 2. Establishing and protecting local PA systems.	Implement local protection schemes e.g. through biosphere reserves.	Inter country agreements and transfer payments	Multiple use reserves, e.g. biosphere reserves, community conservation areas, local wetland reserves

(Column 2 adapted from Ratner 2000)

4.5.2.1 *Definition of bioregions*

The aim of planning at the sub-regional level is to establish a natural system basis for integrated watershed planning and management emphasising networks of PAs.

It involves dividing the Mekong River water resource system in terms of a number of major water related bioregions, then assessing the existing and required level of protection of water resources and related services in each region. Where gaps are identified, it would be necessary to increase the levels of protection.

Various systems of biogeographical regions for the Mekong have been proposed, which together could provide the basis for such a planning process (for example Hirsch 1996; Baltzer et al. 2001). Criteria would be needed to identify the bioregions which are highest priority for protection and where further protection investment is required. Criteria would include, for example:

- Current level of protection.
- Level of threats and urgency for action.
- Importance in the water cycle and in the provision of development benefits.
- Type and fragility of ecosystem.
- Local community dependence on the services of the area.

4.5.2.2 *Defining bioregions at the sub-national level*

The prime responsibility for implementing an action plan to link PAs and water resources must rest with the participating governments. Table 4.3 indicates some of the roles for national level involvement in an integrated planning framework. Already, Vietnam and Thailand have identified various sub-national regions as the basis for development planning including river basins. Cambodia and Vietnam used a biodiversity region approach as part of the National Biodiversity Action Plan process in defining priorities for conservation within their borders. Lao PDR used a bio-geographic region approach when setting up a representative national protected area system. Each country has the basis for setting priorities for protection through definition of appropriate sub-national bioregions and has made this a priority in their national biodiversity action plans. National scale implementation would include:

1. Adoption of an appropriate framework of sub-national bioregions consistent with those used at the Mekong regional level.
2. Defining priority-setting criteria for selection of regions most in need of protection.
3. Grouping protected areas within each region according to shared watersheds or catchments.
4. Defining priority-setting criteria for selection of PA clusters most in need of protection.
5. Identifying transboundary situations requiring priority protection.
6. Defining specific management guidelines applying to each bioregion.
7. Defining legal and economic instruments to ensure users of PA water system services pay for those benefits.

4.5.2.3 *Applying bioregional management guidelines through local level planning and action*

Decentralisation is a priority in each of the Lower Mekong countries. Provinces, districts and communes are becoming increasingly important in natural resource planning and management. Greater authority is being given to local governments and to



protected area managers with strong central policies promoting collaborative forms of management with local communities. Structures such as Provincial Conservation Forums, PA management committees, local catchment boards, community conservation areas and community forests are being established. These collaborative structures and mechanisms with local communities are essential for effective management of the protected areas and for generating a shared sense of stewardship over use of local water resource systems.

Management guidelines defined in action plans for wider bioregions will need to be worked through and expressed as specific zoning and management prescriptions within joint agreements at local level and individual PA management plans.

4.5.3 Assess economic values of the hydrological functions of protected areas

As part of the preparatory work for the action plan, valuation studies should be undertaken for the highest priority bioregions, with an attempt made to assess the development values according to each watershed within a bioregion. These valuations of PA hydrological functions need to feed into the Basin Development Plan and catchment wide water management strategies.

The valuation studies should have a strong demonstration and training objectives with a view to promoting application of the approach on a systematic basis through the action plan. Once valuations have been carried out, cost recovery from users can be undertaken to account for the service provision (for example, for domestic, industrial and irrigation uses) and the water resource itself with a proportion of revenues channeled back to PA management.

4.5.4 Pilot and demonstrate the user pays approach and economic instruments

A number of pilot projects are needed to test the user pays approach in which groups and individuals benefiting from protected area hydrological services invest in their management and maintenance. Three main groups of users should be treated differently in targeting economic instruments:

- Local communities and subsistence uses
- Private sector commercial operations
- Government operations

Special attention would need to be given to concession holders in fisheries, forestry and agriculture, industrial facilities, energy facilities, and irrigation and water supply systems.

At least one pilot project in the four countries would provide the necessary guidance for the preparation of regional guidelines, and support to governments for more systematic application of the user pays approach. The national PAD Review reports for each country identify appropriate clusters of PAs which share a development landscape as the focus for the pilot and demonstration projects. In Vietnam the hydropower facilities and industries downriver from the Na Hang Nature Reserve, Hoang Lien Son-Sapa National Park, and Muong Nhe Nature Reserve have been proposed (ICEM 2003c). In Cambodia, the South-west cluster of National Parks which provide a wide range of water resource services to sectors and surrounding communities is a proposed target bioregion (ICEM 2003a). The Western Forest Complex of 17 protected areas in Thailand also has critical water resource management functions not recognised in national accounts. That is a proposed target for



demonstrating valuation and user pays approaches (ICEM 2003d). And in Lao PDR, the Nakai-Nam Theun and Nam Kading National Protected Areas and the Phou Khao Khouay NPA are part of two landscapes which have complex water management arrangements including hydropower levies, and would be suitable as demonstration areas (ICEM 2003b).

The pilots would allow for the testing and study of water user permits and charges. Permits for all users of surface water (both domestic and industrial) would help to ensure that those who use water are those who pay for it. This could benefit protected areas that provide catchment areas for water users, provided that payments are used for that purpose. Water charges are generally introduced to recover costs of the service provision and to improve efficiency of use. They can be set to include the management of the water supply itself, thereby including PA and watershed management costs.

4.5.5 Study the regional institutional requirements for water resource protection

Eventually, the allocation of water among users in an international river basin may require arbitration, conciliation and decision making powers at the supra national level. The authority for regional arbitration does not exist in the Lower Mekong region, but the MRC is steadily gaining credibility as a forum for evaluation and conciliation among member states. Currently its most important functions relate to (1) better understanding the Mekong water resources system and using that information to propose collaborative management options; and (2) preparing policy frameworks for consideration by members which, once agreed, are for implementation through national legislation and action. At this stage no framework of penalties or incentives exist at regional level encouraging compliance with regional agreements. The PAs and water resource management action plan will need to explore options for appropriate institutional arrangements for promoting compliance.

A study is needed to identify appropriate functions, powers and responsibilities to be carried out at regional, sub-regional, national and local levels, including designating appropriate agencies with special protection roles. One option to encourage compliance to agreed regional water resource protection standards and guidelines, is the establishment of a regional conservation fund which could facilitate and promote the development of a system of economic incentives and effective PA management to maintain water resource functions (Box 4.4).

In summary, this chapter has aimed to demonstrate the crucial economic importance of PAs in the protection and maintenance of the Mekong water resource system, and the need for enhanced levels of protection of this system. It suggests that this protection should be based on the concept of rehabilitation and maintenance, involving a regional network of PAs operating to protect and maintain the hydrophysical and other ecological functions of the water system. The overall network should be developed and managed through an integrated regional action plan.

Economic instruments can play a key role in ensuring that proper financial resources are made available for the establishment and ongoing management of the PA network. A program of pilot projects and studies should be developed and trialed to gain a better understanding of how the network could be further developed. The regional plan provides the framework for applying such a concept on a wider scale, and the pilot projects explore the critical social, institutional and economic factors which need to be met to ensure the effective implementation of the plan.

Box 4.5: A Mekong Conservation Fund

The aim of a regional wide conservation fund would be to provide incentives for protection of the water system through a network of multiple use protected areas and other protection measures throughout the development landscape.

The fund operation would seek to ensure that new capital works and water resource development projects have no net adverse impact on (and indeed could enhance) the environmental functions of the Mekong water resource system. An explicit and transparent connection would be made between water resource developments and environmental costs potentially attributable to them. At the regional scale, the economic costs of potential spill over effects from countries initiating developments could be internalised via payments into the Conservation Fund. The Fund would support offsetting improvements elsewhere in the basin, which could specifically involve the establishment and/or management of PAs.

All stakeholders would need to acknowledge that protection of environmental services supplied by water resources and PAs in the Mekong is crucial to economic development, and that failure to protect the system would seriously limit regional economic growth.

Financing strategy: A number of strategies would need to be explored to capitalise and replenish the regional conservation fund. Currently in Lao PDR and Vietnam, national conservation funds are being established and the experience there of preparing funding strategies should be tapped.

One option is for all ODA supported water resource developments in the region to pay a levy, allocated to the Mekong Conservation Fund. Also, countries or organisations investing in the fund could earn pro rata credits for environmental restoration or rehabilitation projects designed to protect water resources, operating as offsets, to allow developments elsewhere in the system, provided the overall net environmental impact was neutral or beneficial. Other environmental ODA support could be directed to the fund as well.

Eligibility: PA management committees and local catchment groups (based on local community institutions in each country) as well as national governments could apply for funds to carry out restoration and conservation management work. This would provide local employment and income as well as ameliorating impacts and restoring the natural system to enhance the supply of environmental services. NGOs could help local organisations and communities apply for conservation funds.

Local community restoration groups could be granted legal status - for example, as catchment boards - and restoration areas could function as multiple use areas akin to Biosphere Reserves. They could contain a core PA (non exploitative uses, with a buffer of protective works) and a transition zone of sustainable activities. Together with the national protected area system, they would form a network of reserve PAs in the region, including cross-border PAs where needed, focussing on the maintenance of water resource systems. The approach would make PAs a critical ingredient in an integrated water resource planning and management system.

Operation: The fund could be managed through MRC or as a linked regional entity. The fund manager would evaluate proposals against a range of ecological, and socio-economic criteria and outcomes. The manager could also use a suite of economic instruments as incentives as part of the fund operation. Disincentives could also be applied. For example, if one country wanted to establish an inter-basin transfer scheme, ameliorative funds could go to another country, and proponents would pay a levy relative to impacts upstream and downstream.



5 Energy and protected areas

5.1 Introduction

The energy sector in the lower Mekong is split into a rural, biomass-based sector and an urbanised and industrialised sector undergoing a rapid process of electrification. Use of biomass-based energy sources represent over 85 per cent of energy consumption in Lao PDR and Cambodia, whose populations are over 85 per cent rural and have more resource dependent economies, with GDPs per capita of approximately US\$1400 (at purchasing power parity in 1999). Use of biomass energy sources is lower in Vietnam and Thailand at around 65 and 24 per cent. They are more industrialised, have much larger urban populations and per capita GDPs of US\$1,860 and US\$6,132 respectively (FAO 1994; PRESSEA 2000; UNDP 2001). In all four countries use of biomass fuels is highest in poor communities living in or adjacent to protected areas. Generally, they are harvested above sustainable levels.

Vietnam and Thailand drive much of the regional demand for hydropower. Lao PDR and Cambodia have greater undeveloped potential hydropower resources, and regard this capacity as a significant potential future source of foreign exchange.

A growing number of hydropower facilities existing, under construction, or in planning, are in or are downstream from PAs – 12 schemes affecting 18 National Parks and Nature Reserves are in Vietnam alone (ICEM 2003c). These facilities are affected by upstream land use and management practices that impact the flow of water and sedimentation levels, and that have implications for the functioning and lifespan of the dams. In some cases, hydropower reservoirs or dams are sited within PAs, with consequent impacts for aquatic and terrestrial habitat and species within the PAs. Also some hydropower facilities have important impacts on downstream PAs, particularly in terms of disruption of normal hydrological function for lakes or marine areas and the livelihoods of local populations. Historically, hydropower facilities have provided few if any benefits to local areas or populations – many of which remain rural and off-grid.

There is no overall policy or strategy in the region to assess and control cumulative impacts of hydropower development, including those on PAs. Traditional EIAs are undertaken in designing hydropower projects, however, these are limited to mitigation on a site-by-site basis. No assessments are undertaken of the services provided by PAs and the costs and mechanisms for their maintenance. Given the upstream/downstream interrelationships inherent in a basin the size and complexity of the Mekong, the consequences of ad hoc development of hydropower are potentially far-reaching.

A better understanding of ecosystem services of watersheds, both for hydropower facilities and for local populations, and also of the consequences of hydropower development on those services, can provide a basis for developing appropriate compensation mechanisms in which levies on hydropower facilities can begin to support the establishment and more effective management of PAs.

This chapter begins with an overview of the regional energy sector, examining the context, status and trends. In a discussion of the nature of the hydropower-PA relationship, it identifies the types of problems and issues that are likely to occur and continue to occur if agreement on



guidelines and strategies are not reached. Consideration is given to the technical, policy and institutional responses that are needed to confront these issues. Drawing on recent advancements in the field, particularly the work of the World Commission on Dams (WCD), the methods that could be employed to arrive at a more effective integration of PAs and hydropower development in the broader planning context are proposed. Conclusions provide initial direction on proactive strategies for the countries in the region.

5.2 The types and uses of energy in the region

Hydropower is the source of most current or expected future sources of electricity in Cambodia, Lao PDR and Vietnam, and is regarded as the driving force of economic growth. It is the most abundant energy resource in the region.

However, over half of current energy consumption is from fuelwood and other traditional sources. Most fuelwood consumption occurs in the poorer countries, Lao PDR and Cambodia, where it ranges between 80 and 90 per cent, and is close to 100 per cent of energy consumption in rural areas. In contrast, fuelwood and charcoal is around 37 per cent and 17 per cent of primary energy consumption in Vietnam and Thailand (FAO-RWEDP 2002; UNDP 2001), which also have greater reliance on foreign sources of energy. Yet, even in Thailand, fuelwood and charcoal remain the principal cooking fuel in rural and urban areas (PRESSEA 2000). In all four countries, the use of wood energy is still increasing (though not as rapidly as fossil fuels) leading to severe shortages.

The wood energy and hydropower sub-sectors receive significant services and products from protected areas. Those benefits can be maintained when resources are sustainably harvested, and when hydropower development is undertaken in the context of a comprehensive assessment and planning process in which all interests have been included and considered. Sustaining and enhancing benefits will require the development of mechanisms of compensation for trade-offs, and for maintaining ecosystem services needed by the sector.

Over half of energy needs in the four countries is derived from petroleum products but these are for the most part imported, and expensive to transport to the inland and upland areas of the region. Economic and policy objectives are to reduce oil dependence.

Fuelwood is harvested above sustainable levels, impacting on protected areas, which are located in the regions of high remaining forest cover. Regionally, forest cover ranges between 17 and 58 per cent of national territory, but the proportion of undisturbed original forest is much lower (1.9 to 10 per cent) (WRI 2002; UN FAO 2002) (Chapter 6). Reducing traditional fuel consumption to sustainable levels will require methods for rural populations to benefit from resource conservation, and alternative sources of income.

In contrast, existing hydropower projects only exploit five per cent of potential hydropower development for the Lower Mekong. In the 1970s, plans were made to construct seven mainstream dams on the Mekong river and 180 along its tributaries, based on technical feasibility considerations. At that time, the potential capacity was estimated at 37,000 MW. Following the Asian economic downturn in 1997, 14,000 to 18,000 MW was considered more likely. Even this level of development does not appear feasible given social and economic constraints as well as related environmental concerns. Plans for the mainstream dams were subsequently dropped in the lower Mekong countries, while plans for the tributary dams were



reduced, in part because of the economic downturn and lack of financing, and in part because of conflicts and increasing controversy regarding potential environmental and livelihood impacts (Öjendal et al. 2002). Still, they make up a very significant and growing part of the energy sector in the region.

5.3 Relationships between the Lower Mekong countries

The countries sharing the Lower Mekong Basin are economically, politically and geographically diverse, but are all facing rapid changes that are creating a trend towards regional integration based on their interdependencies. A key variation is in their degree of economic dependency on natural resources, which underlies trade relationships. Lao PDR and Cambodia export resources including hydropower and timber to Thailand and Vietnam and derive over half of their GDP from agriculture. This does not include the value of subsistence farming practiced by a majority of the Lao and Cambodian populations. They also have extensive PA systems, which support the subsistence economy and nature tourism, a growing source of revenue. For example, the Ream National Park in Cambodia supports the subsistence needs for 84 per cent of households in or adjacent to its borders. In Lao PDR, non-timber forest products provide the equivalent of 20 per cent of GDP and approximately 40 per cent of income to 800,000 rural families, who also obtain approximately 50 per cent of their protein from fish and other aquatic fauna (ICEM 2003a and b).

Vietnam and Thailand have a much more restricted availability of water but a higher demand to satisfy much larger populations and mounting power, irrigation, industrial and domestic uses. Up to 60 per cent of Vietnam's water resources flow in from other countries, which places it in a particularly vulnerable position with rapidly rising demand. In Thailand, planned water projects are for water abstraction rather than additional hydropower (ICEM 2003c and d) and that has the potential to affect access of downstream users in Cambodia and Vietnam.

Although both Vietnam and Thailand derive greater shares of their GDP from industrial and service sectors, Vietnam has a higher percentage of its population below the poverty line (27 per cent) than Thailand (13.1 per cent). In Lao PDR and Cambodia rates are in the vicinity of 40 per cent. Vietnam has a slightly higher urban population and is considered to have a higher level of human development than both Lao PDR and Cambodia (UNDP 2001). Compared with Thailand, conditions in these three countries may be attributed in part to the shared history of conflict, which led to massive population displacements, as well as to breakdowns in both traditional and government systems of regulating resource use and ownership. Vietnam also shares with Lao PDR a more centralised and top-down system of planning, while Thailand and Cambodia are more market oriented.

Land degradation, the alteration of hydrological conditions and increased downstream sedimentation rates are often thought to be associated with shifting cultivation in the uplands and reduced fallow periods associated with population displacements. Yet, many of these displacements have occurred as a result of allocating large areas to logging concessions (including sites for planned hydropower projects). In Cambodia for example, 63 per cent of forest land was under forest concession prior to the moratorium on logging in 2002. This often led to the exclusion of local communities from traditionally used areas and resources' – if not to their displacement – creating insecurity in tenure and low incentive for stewardship of natural resources.

The trend towards industrialisation and urbanisation, combined with an increasing population, is expected to increase regional demand for electricity by a factor of between four and eight over the next 30 years.



In Vietnam, for example, power consumption is expected to increase by 15 per cent annually over the 2001-2005 period.

The most extensive hydropower development has occurred in Vietnam where in 1999 it accounted for 52 per cent of electricity generation. Vietnam also has the highest expected future demand from hydropower with 27 schemes to be constructed by 2010. Even so, its need to import electricity from neighbouring countries will increase. Thailand has high future demand but limited capacity to add facilities. Instead, it is expected to increase its purchase of power from Lao PDR and China. Lao PDR and Cambodia have the highest potential for hydropower development but low present demand for it. Although both countries look to hydropower to support development, it could have significant adverse consequences given their dependence on natural resources to support livelihoods.

Most hydropower generated in Lao PDR and Cambodia is intended to help meet their needs for foreign exchange, through export to Thailand and Vietnam. For example, the two dams under construction in Cambodia are expected to generate US\$57 million a year in net benefits. The Nam Theun 2 project in Lao PDR is expected to generate around US\$100 million a year or ten per cent of GDP over its projected 25 year lifespan (Barnes 2002). All three schemes are linked to protected areas (ICEM 2003e).

The Nam Theun 2 scheme was delayed for six years by financial uncertainty and disagreement over the price to be charged for electricity on completion. This is in part related to a conflict over who should cover the cost of delivery – the investors or purchasers. It is also a result of lower than expected demand from Thailand for the electricity, and the expectation that Chinese dams under construction in the Yunnan province in the upper Mekong will provide additional sources prior to its completion, driving prices even lower (Pongern 2001). Another cause of delay of the Nam Theun project was the controversy over potential impacts of the scheme on National Biodiversity Conservation Areas and local communities.

In 1995, the lower Mekong countries negotiated a new inter-governmental agreement to underpin the Mekong River Commission and bring improved cooperation in planning and development for the lower basin. This agreement requires use of a comprehensive planning framework that enables more effective participation of affected communities, consistent with the recommendations of the WCD, and requires that downstream countries be notified about these impacts. Whether it is carried out in practice can be regarded as a test of the strength and effectiveness of the MRC and the ability to achieve such goals (Öjendal et al. 2002).

In spite of their dependence on hydropower, fundamental to the MRC agreement is the need to address key concerns about social and environmental impacts in the lower Mekong countries. Thus, sufficient water must arrive downstream, and with the proper timing, to maintain water transport, fisheries, agriculture and other energy facilities. Sustenance of the Tonle Sap system in Cambodia, for example, is critical to regional capture fisheries and for biological diversity. In return, downstream countries may not veto projects upstream, where there is some room for flexibility in long term hydropower development (Öjendal et al. 2002).

China and Myanmar have not joined the MRC which is a serious limitation to the agreement as a framework for regional conservation and development. China covers the upper half of the Mekong, and has plans to develop a series of eight mainstream dams in the upper basin area. Already two have been completed and one is under construction, and are expected to supply 17 per cent of China's electricity (Roberts 2001). Also planned is a navigation project that would permit year-round



navigation for larger boats between the Yunnan province and the South China Sea. Two of the dams would involve the construction of large reservoir projects along the mainstream of the river. China has also agreed to sell 3,000 MW a year to Thailand, which will be transmitted through Lao PDR, and which demonstrates Thailand's implicit agreement with these plans (MRC 2001).

The Chinese mainstream dams are expected to alter the flooding cycle that sustains downstream wetlands and flooded forests essential to fisheries productivity, and possibly disrupt fish migration between upper and lower parts of the basin (Roberts 2001). Also, the transport of sediment from the Central Asian Highlands, that bring nutrients to the highly productive downstream floodplains, and which ultimately form the Mekong delta, will be affected (Gordon 2002). The dams may have contributed to severe flooding that recently occurred in Cambodia, Thailand and in the Yunnan province after the release of greater than normal amounts of water from reservoirs to avoid exceeding their capacity (Gray 2002). Although not a member of the MRC, China has agreed to cooperate through the exchange of information, but the timing and content of these exchanges remains to be defined (Öjendal et al. 2002).

In 2002, the six countries of the Greater Mekong Basin agreed to "integrate the development programs in our national agendas" through a regional power distribution system which commits them to opening up an international market for electricity. Since 1992, the ADB has promoted the concept of an integrated "Greater Mekong Sub-region" to promote trade and cooperative development with a special emphasis on the power sector, communications and transport. In opening the GMS summit the Cambodian Prime Minister Hun Sen warned that the shared Mekong system was showing signs of development stress and "for the sake of our common futures, we must implement a Mekong management strategy that ensures sustainability".

The 2002 agreement created a high level committee to set up rules, protocols and a regulatory framework for regional power trade with hydropower identified as the main energy source.

The relationship between the MRC as a regional planning organisation, its Basin Development Plan process and the evolving Greater Mekong Sub-regional framework for strategic planning and development is yet to be resolved.

Other multilateral agreements, while bringing greater opportunities for integrated regional planning and cooperation, further complicate the situation. In January 2003, Vietnam, Lao PDR and Cambodia agreed to exploit hydropower potential in their seven border provinces – Kon Tum, Gia Lai and Dak Lak in Vietnam, Stung Treng and Ratanakiri in Cambodia, and Attopeu and Sekong in Lao PDR. By 2010, demand in the provinces is expected to increase by four times its current level of 403 MWh, although communities in these regions of Vietnam, Cambodia and Lao PDR vary greatly in their access to electricity (82, 34 and 15 per cent respectively) and have different power consumption demands.

5.4 Relationship between hydropower facilities and protected areas

In the Mekong region most remaining natural forests are in upland areas and are covered by protected areas (Chapter 6), the same locations with hydraulic potential for electricity production. All governments of the region recognise upland forest as important for ensuring water quality and minimum dry season flows. In Thailand and Vietnam, for example, low dry season flows, increased reservoir sedimentation, and increased severity of floods and droughts are attributed to forest loss. Both countries have imposed moratoriums on logging of natural forests and have long supported substantial national reforestation programs for degraded watersheds within and outside protected areas. Dam construction projects have often included provisions for watershed protection even though these have been difficult to enforce (ICEM 2003c and d).

Over 40 major existing and proposed hydropower projects are linked to protected areas - Table 5.1 lists some of the more significant schemes. In Vietnam, for example, some dams already completed, such as Tri An, or in the planning stages are immediately downstream from PAs and others such as the reservoirs under construction in Na Hang Nature Reserve and Bach Ma National Park are within protected area boundaries.

Several thousand smaller scale hydropower facilities operate within or close to protected areas. For example, numerous hydropower facilities use water from streams rising in Nam Et Phou Loei National Biodiversity Conservation Areas in far North-eastern Lao PDR (ICEM 2003g). A 60 kW scheme on the Nam Et River supplies nine villages and a 250 kW dam on the Nam Sat supplies Vienthong District Centre and ten villages. A medium scale scheme on the Nam Peun has a capacity of 36 kW and at least 1000 households in Houaphan Province rely on more than 850 micro hydro units on streams originating in Nam Et Phou Loei NBCA.

Having a revenue generation source, in this case hydropower, located in or below a protected area may be beneficial for conservation in financial terms, for it provides the opportunity for consistent investment by the sector over the long term. The maintenance of protected area assets and the continuing flow of benefits from them to the energy sector depends on effective management actions and funding to support their implementation.

Table 5.1: Major hydropower facilities associated with protected areas in the Lower Mekong Basin

Hydropower facility	Status	Generating Capacity	PA hosting the facility	Upstream PA	Downstream PA
Lao PDR					
Theun Hinboun	Complete	210 MW		Nakai-Nam Theun, proposed extension	Nam Kading NPA
Nam Leuk	Complete	60 MW	Phou Khao Khouay NPA		
Nam Mang	Construction halted pending approval revised EIA & EMP	35 MW	Phou Khao Khouay NPA		
Nam Theun 2	Approved	1070 MW	Nakai-Nam Biodiversity Conservation Area	Nakai-Nam Theun, proposed extension	
Sekaman 3	All approved	210 MW	Dong Ampham		
Se Kong 4		310 MW	National		
Se Kong 5		200 MW	Biodiversity Conservation		
Se Pian-Se			Area		
Nam Noi		340 MW			
Sekaman 1		300 MW			
Sekaman 4		55 MW			
Vietnam					
Hoa Binh	Complete	1920 MW		Muong Nhe NR, Hoang Lien Son-Sapa NR, Phu Canh NR, Xuan Son NP	

Yali	Complete	900 MW		Chu Mon Ray NP
Tri An	Complete	300 MW		Cat Tien NP and Biosphere Reserve
Se San 3	Approved	260 MW		Chu Mon Ray NP
Se San 2A	Approved	93 MW		Chu Mon Ray NP
Se San 4	Approved	300 MW		Chu Mon Ray NP
Ham Thuan	Under construction	300 MW		Nui Ong NR
Da Mi	Under construction	172 MW		Nui Ong NR
Son La	Approved	3600 MW		Muong Nhe NR, Hoang Lien Son-Sapa NR, Phu Canh NR, Huan Son NP
Na Hang	Under construction	342 MW	Na Hang NR	
Truoi	Under construction		Bach Ma NP	
Rao Quan	Feasibility study done	70 MW		Dakrong NR
Dong Nai 8	Proposed	212 MW		Cat Tien NP and Biosphere Reserve
Dong Nai 3	Feasibility study approved			Cat Tien NP and Biosphere Reserve
Dong Nai 4	Feasibility study approved			Cat Tien NP and Biosphere Reserve
Ea Tung	Proposed	-		Yok Don NP
Upper Sre Pok	Proposed	-		Chu Yang Sin NR
Ba Be	Proposed	-		Ba Be NP
Cambodia				
Kirirom	Under construction	12 MW	Kirirom NP	
Kamchay	Feasibility studies	120 MW	Bokor NP	
Lower Se San 2	Proposed	-		Chu Mon Ray NP
	Proposed			Virachey NP
	Proposed			Phnom Samkos WS
	Proposed			Phnom Aural WS
	Proposed			Lamphat WS
Thailand				
Pak Mun	Complete	136 MW		
Pak Mool	Complete	136 MW		
Two Western Forest Complex reservoirs	Complete		Western Forest Complex of 17 National Parks and Wildlife Sanctuaries	
All of Thailand's 17 forest complexes of protected areas include dams and reservoirs of various sizes.				

Source: ICEM 2003a,b,c and d

Note: This list is not exhaustive. It includes examples of dam projects that have a direct relationship with a PA – other hydropower projects exist that may benefit less directly from upstream PAs or contribute to cumulative impacts in downstream PAs.

5.4.1 *Impacts on PAs of hydropower projects built in or downstream from PAs*

The performance and lifespan of hydropower dams can depend on upstream land use and management practices when these *significantly* affect the flow of water and sedimentation rates at the dam site. As a general rule, they can benefit from maintenance of existing natural forest cover and practices that maintain existing flow regimes and background sedimentation rates. Whether these benefits are economically significant, and whether they also benefit from restoration of forests will depend on a more complex set of site-specific factors and how these interact. At the same time, reservoir development in or adjacent to a protected area can have a number of negative impacts including:

- Forest clearance and flooding and displacement of populations for reservoir areas that store water
- Resettlement of displaced populations, creating more pressure on remaining forested areas and fallow slash and burn agricultural areas
- Modification and/or destruction of aquatic habitat, though reservoirs can become important fishing areas

To the extent that the negatives involve livelihood issues and concern upstream populations and their interactions with PAs, as a basic principle hydropower projects should 'compensate' local ecosystems and communities by providing for reinvestment in watershed management in PAs and buffer zone areas. This compensation should be adequate to cover the costs of rehabilitating relocated communities.

5.4.2 *Impacts of upstream hydropower projects on downstream PAs*

For PAs located downstream from hydropower facilities the situation is more complex. Dams serve as barriers and disrupt the natural physical flows within a basin, which in turn lead to follow-on impacts in chemical, biological and ecological terms. Alteration of timing and flow amounts for rivers, storage of sediment and nutrients in reservoirs, blockage of migratory fish passage and a range of other direct impacts can affect rivers and even coastal areas far downstream. Flooding cycles that sustain wetlands, floodplain forests and deltas are disrupted, with direct impacts on biodiversity, fisheries and agriculture. Mangroves and near-shore marine areas can also degrade if seasonal freshwater pulses and sediment loads are affected. Such impacts undermine local livelihoods with multiplier effects and added pressures on accessible resources, particularly within PAs. For example, all dams in the Mekong Basin are likely to have combined cumulative impacts on the Tonle Sap, where annual flooding of the Mekong River is part of a cycle that sustains wetland habitat for over 500 endemic species of fish (Degen et al. 2000). They may also have impacts on coastal protected areas in the Vietnam delta, where mangroves rely on seasonal pulses of freshwater.

In the case of protected areas downstream from hydropower projects, careful planning is needed to avoid, reduce or mitigate the impacts. Financial investment can be made to reduce problems through altering the structure and hence the costs and benefits of the project, or through mitigation components that also add to project costs. The level of investment should be adequate to establish a risk and relief fund to provide for the long-term security of the ecosystem and those potentially affected. Ongoing investment from the sale of power will be required as a critical element of any mitigation program.

A special challenge for the Mekong countries is that projects have been approved in an incremental (one by one) fashion. In this situation, it is difficult to properly assess and account for the cumulative impacts of



developing a series of hydropower facilities on a river or in a basin. Longer range and integrated basin planning becomes essential, though obviously more difficult, particularly when a number of countries share the basin.

5.5 Key Challenges

Under a business as usual scenario the continued development of the hydropower potential of the Mekong Basin will replicate existing problems and opportunities, principally:

- Impacts on economies through trade in hydropower production between the poorer natural resource based countries and the richer, more developed and electricity-dependent countries.
- Impacts on livelihoods and wellbeing of communities especially the poor associated with protected areas, dependent on affected natural resources.
- Impact on other sectors, especially fisheries and agriculture.
- Cumulative impacts and continuing degradation of protected areas and important natural areas, whether upstream and downstream terrestrial or downstream coastal and marine systems and the resultant loss of ecosystem services they provide.

In the absence of inclusive stakeholder participation in a comprehensive region wide planning process, basin development tends to be dominated by the most tangible economic interests, hydropower for example, to the detriment of other sectors and livelihoods (Barrow 1998).

Such approaches largely ignore the critical issue of maintaining and enhancing a diversity of development benefits provided to many sectors and communities by protected areas and other natural systems within the basin, for example, the hydrological services of upstream PAs to downstream hydropower facilities. Ignoring these benefits results in overstating the net benefits of hydropower developments especially where they result in degradation and detrimental impacts on local communities. The key challenges here include:

Identifying ecosystem services of protected areas for both downstream hydropower facilities and local populations and allowing the total economic value of these services to be understood and taken into account.

Identifying damages caused to protected areas from upstream hydropower facilities, so they can be evaluated and the compensation principle applied in multi-sectoral planning.

Developing a system of payments or transfers to maintain and enhance those ecosystem service benefits.

Developing supporting institutional arrangements for transfer mechanisms, for example, by defining appropriate forms of rights to ecosystem services and responsibilities for providing them that are regarded as fair and that give stakeholders an incentive to collaborate.



5.6 Future directions

5.6.1 Key components of an integrated regional planning system

These methods for identifying ecosystem services and associated investments need to operate within a broader more integrated approach to planning of hydropower schemes on a regional basis including:

1. **Strategic environmental and social assessment** of potential basin-wide cumulative impacts of existing and proposed activities. The SEA would identify trade-offs and conflicting interests associated with the schemes and engage stakeholders in developing and considering the broadest possible range of options.
2. **A platform for stakeholder negotiation and conflict resolution** regarding trade-offs and appropriate compensation.
3. **Mechanisms for effectively addressing transboundary impacts** in the context of environmental and economic interdependencies among the countries involved.
4. **Establishment of a rules, protocols, and a regulatory framework for regional power trade** needed to support the use of economic instruments and transfer of payments that are adequate to ensure that environmental and social costs are reflected in the costs of electricity generated by hydropower.
5. **Methods to maintain and improve local livelihoods** in the development of large infrastructure projects and for the effective participation of marginalised groups in the decision process.

The policy principles and technical guidelines for implementing such a planning framework have been examined in various fora. The International Energy Agency (IEA) has released a series of guidelines for the development of hydropower resources (IEA 2000). Taking a broader view of the problem based on an analysis of the problems encountered with hydropower projects, the World Commission on Dams presented its final report in 2000 (WCD 2000). In a follow-up initiative a Dams and Development Project (DDP) is working under the auspices of the United Nations to facilitate further dialogue and consideration of the WCD Report. In 2001 the Chinese Ministry of Water Resources and State Environment Protection Administration joined as a partner agency further bolstering this initiative.

The lower Mekong countries should draw from the IEA and WCD guidelines and processes in defining their collaborative approach to hydropower development. Yet, neither organisation specifically addresses the policies and procedures needed to account for the provision of hydrological services by upstream areas, such as PAs, to downstream hydropower facilities. The remainder of the chapter explores this challenge in the context of the Lower Mekong region, drawing as appropriate on the larger international experience.

5.6.2 Hydropower financing to maintain PA benefits

Protected areas, as well as displaced communities and negatively affected downstream areas, receive few if any benefits from hydropower, which instead tends to benefit urban areas, industrial facilities, and outside investors, in a one-way outbound flow of revenue. This is in stark contrast to the potential benefits that effective PA management can provide to these facilities including:

- maintaining existing regular flows of water;
- maintaining minimum dry season flows;
- prolonging the lifespan of hydropower facilities by reducing the sedimentation of dams; and
- reducing or preventing diversion of water for other uses that can reduce the flow of water to hydropower facilities.

The extent to which the benefits of PAs for hydropower facilities are economically significant will depend on a range of site-specific factors and the scale of the impacts. That economic contribution will be one important factor in determining how much a hydropower project should pay for PA benefits. This is not

always clear cut. For example, whether reduced sedimentation as a result of maintaining forest cover in a PA will significantly prolong the life of a dam will depend on whether the natural background rates are high or low, the capacity of the dam to store sediment, and the size of the protected area relative to the rest of the watershed, particularly when it is degraded. A relatively small protected area in a large watershed will generally not, by itself, provide measurable hydrological services or reduction of downstream sedimentation, although it may control erosion from the specific site. High background sedimentation rates in the upper Mekong basin area in China have already brought into question the projected life of the dams regardless of upstream land use practices (Roberts 2001).

The assessment of what a hydropower project should pay for natural system management will depend on the level of benefits it receives and on the level of its negative impacts. It is important that policy, regulations and implementation distinguish clearly between maintenance of benefits received and mitigation of negative impacts. Compensation and compensatory activities aimed purely at mitigating environmental impacts or impacts on livelihoods are different from payments for environmental services – i.e. payments that improve hydrological or other conditions that in turn lower operating costs or increase production potential.

The inadequacy of investment in mitigating the negative human and environmental impacts of dams has been the root cause of the controversy in their development (WCD 2000). This remains a contentious area – i.e. how to set an appropriate level of mitigation or compensation.

On the other hand, the idea of paying for environmental services is relatively recent and remains to be widely accepted or applied. To determine the policies and detailed structure of the payment mechanism for benefits, critical issues to be resolved up front concern whether levies on hydropower facilities should be:

- based on site-specific voluntary agreements on a case by case basis or required as a matter of policy and following specified procedures and standards;
- required of all hydropower facilities for watershed services or just relate to the presence of protected areas;
- based on an analysis of PA management needs;
- a lump sum up front and/or regular payment based on the sale of electricity;
- allocated only according to a PA management plan or another planning process; and
- used in part to benefit local communities.

Responses to these policy questions will determine the most appropriate economic instruments and institutional arrangements to facilitate the user pays process.

For example, in Colombia, all hydropower facilities above a 10 MW capacity are required to pay a six per cent levy, of which half is transferred to regional watershed management authorities, and half to municipalities in which the basins of reservoirs are located. One per cent of the revenue received by municipalities is required to go to basin protection. In addition, 20 per cent of the transfer payments to the regions are pooled into a general fund that is distributed to regions that do not receive direct transfers from hydropower facilities.

This approach divides the proceeds into those directed to produce environmental services for the hydro facilities and those aimed at producing more generalised benefits for the affected municipalities (an indirect form of compensation). Also, it allows funds to be allocated towards upland conservation priorities, regardless of where they occur,



and regardless of whether or not they are upstream from a hydropower facility, and for local areas to share in their benefits rather than in just their costs. Given that all facilities depend to some extent on upstream management practices, this could make it possible to take a more proactive approach to the establishment and management of protected areas and to setting priorities in the allocation of funds.

Sharing of revenue from hydropower facilities can be used to support the establishment of PAs and create incentives for communities to collaborate in their sustainable management. However, the support and cooperation of stakeholders and the determination of priorities for allocating revenue will require an understanding of the ecosystem services that PAs provide, and their economic significance, both for hydropower facilities and for communities that depend on them. Better understanding and appreciation of the values of ecosystem services can be used to help determine the level of social and financial commitment that can be justified to protect them. The next steps are to identify appropriate management actions needed to ensure that these services continue to be provided, and that buyers know what they are getting and are willing to pay for it.

5.6.3 Policy principles

Experience from other regions suggests that hydropower schemes in the Mekong region should be developed and operated according to the following set of policy principles:

1. All hydropower facilities should pay for the ecosystem services they receive and for the ecosystem services they degrade.
2. In cases where those services are provided in part or in full by one or more protected areas, those payments should go to the rehabilitation, maintenance and enhancement of the natural systems protected.
3. All hydropower developments should lead to net benefits for local livelihoods and well being in ways that contribute to and enhance their involvement in the conservation of ecosystem services and products.

A small number of pilots are underway or planned of mechanisms through which the economic benefits of hydropower can be at least partially redirected towards protected areas, and towards creating incentives for local communities to benefit from conservation practices. For example, the Nam Leuk facility in Lao PDR pays one per cent of its revenue to the Phou Khao Khoouay NPA, as a condition of assistance provided by ADB, but also retains the authority to decide how the funds will be spent. The proposed Nam Theun 2 project has an agreement to pay US\$1 million per year for management of the Nakai-Nam Theun NPA and associated community development activities. However this represents less than 0.5 per cent of projected annual power sales and is considered low given the management needs of the effected PAs. In addition, the Nam Chat/Nam Pan Provincial Conservation Forest “Nakai-Nam Theun Extension” was recognised as suitable habitat to protect as “compensatory mitigation for habitat lost to the NT2 reservoir”, which links hydropower development directly to the creation of new PAs (ICEM 2003b). In Vietnam, a proposal is pending approval for investing US\$2 billion a year of tax revenues from the Hoa Binh hydropower facility in protection of the catchment, which contains 4 PAs, and for the Dong Nai 8 and Tri An hydropower facilities to support protection of their upstream catchment area, which contains the Cat Tien National Park (ICEM 2003c).

5.6.4 Guidelines for policy development and institutional strategies

Specific guidelines for policy development and institutional strategies in the Lower Mekong are as follows.

Negotiate a regional agreement on sustainable hydropower development: There needs to be agreement among the member countries that if some countries specialise in hydropower production and others are mainly users of power, that the pricing structures should cover all management costs, including those of

catchment protection. A situation should not develop where one or more countries undercut the others in electricity pricing by overlooking the environmental management costs. This agreement should be part of the current Greater Mekong commitment to the development of an integrated regional power grid.

Require hydropower facilities to pay for the PA benefits they receive: Where hydro schemes are established within or downstream of existing PAs, mechanisms should be in place to ensure that part of the revenue from electricity sales is allocated to environmental management of the catchment through a system of levies on hydropower production or other economic instruments. This should be negotiated and agreed as a matter of regional policy to avoid giving unfair advantages to countries or facilities that might otherwise not participate.

Include development benefits in PA site selection criteria: In terms of spatial planning, when defining appropriate locations for PAs, it is in the interests of conservation and economic development to take into account the potential development benefits that PAs can contribute to hydropower facilities and production. In other words, as in the case of water resources and tourism, the criteria for site and attribute selection for PAs should not be restricted to biodiversity conservation. The support functions for economic development sectors - of which hydro power is but one - should also be taken into account.

Emphasise off-stream locations for hydroschemes: Regarding the choice of siting for hydro power schemes, off-stream locations should be given priority, so as to minimise potentially adverse impacts on downstream PAs and associated dependent economic activities. In this way, the environmental services of downstream PAs can be sustained (or minimally impacted) thereby continuing to support other economically important functions and activities (for example, fisheries, navigation and waste assimilation).

Negotiate inter-country agreements that set limits on water withdrawals: these should define responsibility for managing flows so as to minimise potentially adverse impacts on downstream PAs, as well as to ensure minimum flows required by hydropower facilities and other dependent economic activities.

Integrate conservation and development at the national and regional as well as the local levels: Principal threats, such as development of hydropower, roads, granting of concessions for timber and access to NFTP, tend to originate at national and regional levels. These central development initiatives are often in conflict with the livelihood interests of local communities and beyond their capacity to respond to. National and regional decision-making entities need to recognise the value of PAs, provide support for local level initiatives to sustainably manage them, and work towards the resolution of conflicting policies and incentives.

Apply the precautionary principle: Given the complex relationships between land, water, and management practices, and the variability of natural processes, it may be difficult and costly to link multiple causes and effects – for example, excessive sedimentation rates can be difficult to distinguish from natural background variation associated with levels of precipitation and extreme storm events (FAO 2002). Such uncertainties need to be made explicit, along with raising awareness of what is at stake. Most important, despite doubts on the level of benefits from a service, the assumption should be that the hydropower scheme should contribute to its maintenance and enhancement.

Give priority to the maintenance of existing services that are demonstrably threatened: It will be easier to convince water users to pay to protect and restore services which are threatened than for payment to maintain services which might continue irrespective of management intervention.

Rapid appraisal methods are appropriate as the basis for decisions: Precise quantification of impacts will not always be possible and may not be necessary. A careful consideration of what information is needed to justify management actions and their costs, and to understand trade-offs among alternative courses of action can help limit costly and extensive information gathering. For the purposes of settling on levels of payment rapid appraisal and expert judgements should be sufficient.

Although complete information is generally unobtainable, there should ideally be common understanding and agreement between upstream and downstream stakeholders as to what are the most significant threats and causes of impacts, as well as awareness of uncertainty (FAO 2002). Users need to be made aware of the range of natural variability in watershed processes and that results may not appear immediately (for example, the effects of restoration in enhancing water quality), so expectations remain realistic. This implies the need to conduct site-specific assessments, so that management plans can be developed based on the best information that is obtainable with limited resources.

In summary, this chapter has examined the interface between energy development and protected areas in the Lower Mekong. The relative economic importance and potential of hydropower dominates the regional agenda. However, there is little connection between development planning and operation in this sector and others and less on the relationship with protected areas. There is potential to marry PAs and hydropower development where the PAs are upstream from hydropower facilities, or where the facilities are located in PAs. In such cases, there exists the possibility to identify and value the ecosystem, particularly the hydrological services supplied by PAs to hydropower facilities at the regional level. Compensation or payment systems can then be employed to ensure that watershed management in upland areas is consistent with that necessary to optimise hydrological conditions for power operations. Quite often in the Lower Mekong region this will involve working with less fortunate and vulnerable groups to ensure that PAs and buffer zones are also managed to produce sustainable livelihoods that avoid unnecessary environmental degradation.

In this manner, the trade in hydropower that is likely to continue and expand within the region can bring the benefits of electric power consumption in far away cities all the way to rural villages in the interior. There remains a long list of best practices concerning integrated planning that need to be embraced and practiced in the region (as set out in the IEA and WCD reports) specifically with respect to the development of water resources and hydropower projects.

The fundamental concern – most powerfully evoked by the WCD – that such projects need to address the tendency for the poor and disadvantaged, as well as the environment, to bear a disproportionate cost of development while having limited access to the benefits can often go unaddressed. A more integrated approach to planning and development, which seriously addresses upstream/downstream relationships between PAs and hydropower will be an essential part of a comprehensive and cost-effective solution.





6 Forest management and protected areas

6.1 Introduction

Protected areas are the primary means by which biodiversity is conserved in its natural setting. Production forests outside protected areas have an important linked and complementary role. Though not offering the same degree of protection, if well-managed they can enlarge the areas of habitats available, provide buffer areas around the formal PA forests and provided connections between PAs enabling the continued movement of wildlife and plants across the landscape. Maintaining much of the value of protected areas depends on how the forests outside them are managed. They can help provide economic opportunities for local people thereby reducing pressure on the PA system. Such a dual system of formal protected areas and linked regimes of protection within other forests offers a powerful means of maintaining biological diversity and optimising the development benefits that forest provides. It yields ecological goods and services (such as watershed protection) helping to sustain other sectors and non-forest land uses such as agriculture. This chapter describes the state of forest protection and management in the four countries of the lower Mekong Basin and explores ways both might be improved.

6.2 Snapshot

The countries of the lower Mekong Basin have been richly endowed with forests. These forests contain a unique and diverse range of plants and animals but this biological diversity is still poorly described and understood. Many forests are used by traditional forest-dwelling people practicing various forms of agriculture and gathering a variety of non-timber forest products such as fruits, nuts, medicinal plants and bamboo shoots. These isolated forest-dependent communities represent some of the poorer communities in each of the four lower Mekong Basin countries.

Great changes are now underway in most forests in the region. Much forest has been cleared for agriculture and food production by traditional forest dwellers and by immigrant newcomers. At the same time the rate of commercial timber harvesting has intensified, particularly over the last few decades. This industrial harvesting has provided capital for national development, but much has benefited individual concession holders and powerful individuals rather than the state or society as a whole. Considerable illegal logging has also taken place.

The dramatic reduction in the area of forests in the region and in the quality of remaining forests means that the need for conservation is widely accepted by all countries (Table 6.1). Each has long established forestry ministries or departments to manage forests and regulate logging. All countries have established formal networks of protected areas to protect biodiversity and watersheds and extending over 20 per cent of national territory in Thailand, Cambodia and Lao PDR which is high by international standards. The areas of forest in these PAs is also very high amounting to 45 per cent of the total remaining forest and set to increase to 55 per cent by 2005 when Thailand will bring 86 per cent of its natural forest within formal protected areas (Table 6.2).

The evidence of forest loss shows that the forestry regulatory structures have not worked well. Despite the best efforts of



forestry administrations and protected area managers all forests in the region have experienced a significant decline in cover although there is some recent evidence that this is now slowing. Table 6.1 shows the forest area in the region ranges from 29 to 54 per cent representing a per capita forest cover of only 0.1 ha for Vietnam up to 2.4 ha in Lao PDR. The areas of relatively undisturbed forest are much less than these estimates of overall cover because the loss of forest cover has been matched by an increase in fragmentation. This means that many forests are now present in only small patches. Areas of relatively undisturbed forest still large enough to contain most of its original biodiversity are even smaller, ranging from only two per cent in Lao PDR and Vietnam to five per cent for Thailand and 10 per cent for Cambodia (Dauvergne 2001).

Table 6.1: Forest area and loss in Lower Mekong countries (2000)

	Cambodia	Lao PDR	Thailand	Vietnam
Original forest area (approximate) (in 000 sq km)	160	225	250	280
Forest area in 2000 (in 000 sq km)	93.3	125.6	147.6	98.2
% original forest area in 2000	52%	54%	29%	30%
% of original forest relatively undisturbed and large enough to contain original biodiversity	10%	2%	2%	5%
Forest area per person (ha)	0.9	2.4	0.2	0.1
Plantation area (in 000 ha)	90	54	4,920	1,711
Annual deforestation 1980-1990 (in 000 ha)	131	129	512	137
Annual deforestation 1990-2000(in 000 ha)	56	53	112	(+52)
Annual change in forest cover (1990-2000)	-0.6%	-0.4%	-0.7%	+0.5%

Source: FAO 1995 and 2001; Collins et al. 1991; Dauvergne 2001

Table 6.2: Forests and protected areas in the Lower Mekong countries

	Cambodia	Lao PDR	Thailand	Vietnam
Estimate of forest in existing and proposed PAs	40%	39%	65%	26%
Existing PAs as a % of land area	21%	21%	19%	8%

Source: FAO 2001; ICEM 2003a,b,c and d

Annual deforestation rates are high. Between 1980 and 1990 it was around 130,000 ha in Cambodia and Lao PDR and 137,000 ha in Vietnam. It was more than 512,000 ha in Thailand. It seems that somewhat less deforestation occurred in all countries in the subsequent decade between 1990 and 2000 and in Vietnam the total area of forest actually increased by 52,000 ha or 0.5 per cent. These changes represent net changes in forest cover where losses of natural forest have been accompanied by increases in plantation coverage. In 2000, the areas of plantation were comparatively small in Cambodia and Lao PDR but were 1.7 million ha in Vietnam and over 4.9 million ha in Thailand. Although the timber production from many of these plantations may be significant, few are able to supply the other goods and ecological services available from the original forests. The accuracy of some of these estimates of natural forest cover is sometimes disputed but they reflect the general patterns of deforestation in the region (FAO 2001).

The remaining natural forests in the region now fall into two broad categories:

1. those which are still unlogged; and
2. those that have been logged at some time in the past.

Most of the relatively undisturbed forests continue to exist because of their isolation, because topography has made them unprofitable to exploit or convert and, in most cases, because they are now designated as protected areas. Of the logged-over forests, many have been so degraded they will need time to recover before they can be used again for timber production.

The underlying causes of deforestation in the region have been rural poverty, insufficient arable land, limited institutional capacities in the regulatory authorities and the absence of appropriate systems of land use planning and land allocation. Although much former forest land is now occupied by agriculture a significant amount of cleared land now lies abandoned in a degraded state because of this poor land use planning. Some of this abandoned land occurs as secondary or regrowth forest and some as grassland or shrubland. The areas involved are large. Table 6.3 shows that areas of secondary forest in the four countries range from 1.4 to 9.8 million ha while the deforested areas potentially available for reforestation range up to 9.7 million ha in Vietnam. A particular problem in some of these deforested or degraded areas is that past military activities have left a legacy of unexploded ordinance. This material poses significant problems for forest managers and those wishing to rehabilitate and protect wildlife.

Table 6.3: Secondary forests and degraded lands

<i>(million ha)</i>	Cambodia	Lao PDR	Thailand	Vietnam
Secondary forest, low-medium density forest or fragments present in 1993 (1)	9.8	7.7	1.4	2.1
Land potentially available for rehabilitation (2)	2.6	8.7	2.3	9.7

Source: (1) *Mittelman 2001*; (2) *Gilmour et al. 2000*

Close to half the forest are within protected areas and there too parts have been cleared or degraded by illegal loggers or because of agricultural activities of people living within PA boundaries. The management response to these situations has ranged from relocation, most commonly in Thailand and Vietnam, and excision of the settlements from the protected areas.

Forests used for timber production have been over-exploited and damaged, perhaps in part because growing PA systems helped foster a perception that biodiversity would be safeguarded within them. On the other hand, some have viewed the PA network as a luxury contributing little to the economic development and wellbeing of communities living in and around them.

The widespread loss of both protection and production forests is now leading to unexpected and adverse consequences for people inside and outside former forest areas and for the wider economies of all countries in the region. There is evidence, for example, of erosion and worsening water quality reflecting inadequate watershed protection. Many other natural values are being lost. Overall it appears that present management regimes are not protecting the full range of natural goods and services required by society. Some of the recent responses to these changes across the countries of the Mekong region are summarised in Box 6.1.

New approaches to forest conservation are needed and new management methods that provide an integrated regime of protection and use over the entire forest landscape of the region – core forest areas within protected areas for the absolute protection of biodiversity linked with production forest areas

managed to provide, in perpetuity, a full range of goods and ecological services. That is, forest conservation requires all types of forest, irrespective of the primary management objective, to be protected and properly managed.

Box 6.1: Recent issues affecting forest policy and management in the region

Declining resource availability Most recent policy change has been prompted by the widespread recognition that forest cover in the region has declined too far. This has led to a complete ban on further logging of natural forests and restrictions on exports in Thailand and Vietnam. This means that Lao PDR and Cambodia are exporters of timber and non-timber forest products while Thailand and Vietnam are net importers. Consumption patterns and policies such as bans or limitations on further harvesting of forests in Thailand, Vietnam and in neighbouring countries such as China bring increasing pressures on forests in Lao PDR and Cambodia and in other nearby countries (e.g. Myanmar has the highest rates of clearing in SE Asia, FAO 2001). This decline in resource availability has also led to increased interest in reforestation in most countries.

Role of traditional forest dwelling people All countries now recognise the special needs of traditional forest dwelling people. This has not necessarily led to these communities being granted land rights but all governments are developing policies to improve the wellbeing of these people, including land allocation and poverty reduction programs and moves towards various types of collaborative management of forests within and outside protected areas.

Broader values of forests All countries now accept the broader values of forests and have recognised they are important for reasons other than just timber production. As a consequence, biodiversity conservation is increasingly being embedded in national forest policy. Similarly the protective role of forests is being given increased recognition. Indeed, it was the need to retain protective forests that triggered the ban on logging in Thailand in 1989 (ICEM 2003d).

Forest fires Fires are acknowledged throughout the region as potentially damaging ecological events, especially after the 1997-98 season during which major fires burned in Indonesia and Malaysia and more recent forest fires in Vietnam. The potential for damaging fires to escape from lands used by shifting cultivators is widely recognised. In some places it is not that fires have occurred that is important. Rather, it is that the fire regimes (the frequency, intensity and seasonality of these fires) have changed causing dramatic changes in the structure and composition of the forest communities. This has meant that new forms of fire management are needed to deal with the changes (ITTO 1997).

Decentralisation Decentralisation of planning and regulation of resource use is an important trend throughout the region. In some situations this has led to an apparent reduced management presence because of a lack of resources and capacity at local level. Sometimes new players have taken advantage of these vacuums in authority such as illegal loggers. More often decentralisation has led to a revitalisation of local government and new opportunities for partnerships with communities, the private sector and NGOs who are able to attract additional resources and capacity. Thus, decentralisation has been a problem as well as a significant opportunity for the Mekong countries.

Influence of international organisations International organisations (e.g. World Bank, Asian Development Bank, conservation groups) have influenced policy development in the region because of their financial leverage. Not all policy advice or recommendations has necessarily been welcomed, useful or appropriate. Nonetheless these organisations have had an important role in communicating experiences between different tropical countries and in facilitating policy change and capacity building.

6.3 Key Issues

6.3.1 *Forest loss and fragmentation*

All countries in the region have experienced dramatic losses of forest cover in recent years. At the same time, most forests are being fragmented and broken into smaller residual areas separated by agricultural and degraded landscapes. Despite the variety of goods and services forests provide and nation policy commitment across the region to preserving forests, long-term commitment to protecting particular areas of forest in specific locations is often lacking.

6.3.2 *Poor forest management practices*

Even when forests have not been removed many have been degraded by excessive harvesting and poor management practices. These practices now mean that further harvests (of timbers and also of other non-timber forest products such as fruits and medicines) are threatened in many forest areas. Further, the loss of forest integrity means the capacity of these forests to continue to supply various ecological services (e.g. stabilise hill slopes, protect watersheds, supply clean water, maintain biological diversity and maintain genetic resources) has been put at risk.

The losses in forest cover that have taken place, together with the damage caused by excessive logging, have had adverse consequences and are likely to cause more in future. At some point in every locality continued forest degradation and loss, accompanied by a loss in biodiversity, is likely to impact on rural livelihoods, lead to a decline in the productivity and sustainability of agriculture and adversely affect other land users in areas outside forests.

6.3.3 *Collaborative or community forest management*

Large numbers of people live in or near most forest areas. These communities have a vested interest in managing the resources of their lands but, in the past, have been excluded from any forest management role by concession holders or government agencies and derive little benefit from the past management practices of these organisations. Evidence is now accumulating from pilot projects in the region and elsewhere to show that improved management often results from collaborative partnerships between government agencies and local forest users or sometimes from complete devolution of management responsibility to these communities. Not surprisingly, many technical staff in forestry and conservation agencies are often sceptical about the capacity of these communities to be better managers than themselves. Hence the extent to which some or all management authority might be passed to local communities and the circumstance and manner in which this might be done will vary considerably.

6.3.4 *Sharing of costs and benefits of improved management*

Large numbers of people depend - directly and indirectly - on forests. The importance and significance of this dependency often goes unrecognised. Further, there is usually an imbalance between those who bear the cost of forest protection and management and those who obtain the benefits. Many beneficiaries are downstream and at some distance from the forest areas but few contribute in any significant way to the costs of forest conservation.

6.3.5 *Rehabilitation of already degraded areas*

There are now very large areas of degraded land once occupied by forest. They are the legacy of



unsustainable agriculture or excessive and unregulated logging. Some of this land is now grassland and some is occupied by secondary or regrowth forest. Reforestation has been carried out in some places commonly using monoculture plantations of fast-growing exotic species. While many of these plantations have been effective in re-establishing forest cover they have frequently provided only a narrow range of goods or services compared with the original forests. Further, although growth rates of some exotic plantations can be high, the value of the timbers produced are often comparatively low.

6.3.6 *Overcoming rural poverty*

Many people still living within or near forests are poor (Chapter 2). This is because they often live in remote areas with little opportunity to diversify their economic base and because they have poor access to markets or to government services such as education or health. In such situations forest clearing can be an investment in alternative, more profitable land uses. In some cases this can be successful while in others it can fail (exemplified by the large areas of degraded land in the region). Particular problems have arisen where extensive clearing occurs and little forest is retained, because many rural people obtain resources from forests that are otherwise difficult to obtain. Governments are searching for the balance between the broader benefits from forest conservation and the localised need to overcome rural poverty. The most promising lessons have come from cases where forest conservation is intimately linked with other social and economic goals in a cycle of use and maintenance.

6.4 *Analysis of issues*

6.4.1 *Forest loss and fragmentation*

Protected areas are the backbone of any forest conservation program. Yet, for PAs to work there needs to be complementary management of other forests outside the PA network.

Agricultural clearing, fires and illegal logging are perhaps the greatest threats to the continuation of forest cover across the region. Poorly regulated logging is another. There are many reasons why poor logging practices occur. Most important, concession holders are unconvinced that poor performance will result in cancellation of concessions or otherwise threaten their interests.

There is a need to identify and protect a **permanent forest estate** in the region since there is little point in investing significant resources in regulation, management or protection if subsequently forests are to be cleared. The first stage of this process must be to reach agreement amongst government planning agencies regarding future land uses, particularly in regions where significant areas of natural forests still remain. In many situations forestry is a residual land use which is left over after other land uses have been decided. A better approach would be to identify forests that should remain as forests because of their social, economic or ecological values – i.e. because of their potential to supply certain forest products into the future or because of their value in supplying other ecological services such as watershed protection. Thailand attempted to create such an estate with the establishment of its National Forest Reserve system, but over the decades the area shrank from encroachment and poor management. The government is now trying to reestablish the estate boundary through the designation of 17 forest complexes throughout the country and the piloting of joint management arrangements where communities continue to use and live within these complexes (ICEM 2003d).



Decisions to define a permanent estate should be given sufficient legal protection to prevent future clearing but also to protect forests from subsequent sub-division or fragmentation by regional highways, powerline corridors or other disturbances. A process might be established in which those proposing a change in forest cover should be required to demonstrate that the socio-economic and ecological benefits of the change exceed those gained from retention of forest. In most cases protected areas have the potential to provide adequate protection but often, effective conservation regimes are lacking for production forests.

This notion of a “permanent forest estate” must be qualified. In many countries it assumes that there are no human communities living within the forest area. This is not the case in many protected areas and production forests in the lower Mekong Basin. In practice it is difficult to exclude local communities from these lands and governments in Thailand, Cambodia and Lao PDR are now reluctant to do so. One way of resolving this dilemma, therefore, is to allow these communities to remain but to assert the primacy of sustained forest management. That is, these communities should be allowed to remain *provided* their activities do not impinge on the sustainability or viability of the main land use activity (for example, forestry, watershed management or biodiversity protection). The means by which this is accomplished will necessarily vary with each situation but will likely involve negotiations over residence, interests, use rights and conditions for forest management.

It may be difficult to include all remaining natural forest areas in the permanent forest estate, especially in regions where little natural forests remain. For example, it may be hard to be prescriptive about the permanence of small natural forest fragments or the boundaries of secondary or regrowth forests. In these landscapes, fragmentation, land ownership/tenure and changing aspirations and markets may lead to more fluid spatial patterns of forest cover. Nonetheless, even in these situations, the onus should be on those proposing to clear forests to show the social and environmental benefits of clearing outweigh those flowing from forest retention.

6.4.2 *Poor forest management practices*

Good management is required for production forests and for those included in protected areas. If well designed silvicultural systems are in place it should be possible to undertake low-intensity logging or non-timber forest product resources harvesting in production forests while retaining biological diversity and maintaining ecological processes (ITTO 1993). Under these circumstances, production forests could complement PA forests and contribute to the overall conservation of forest biodiversity (Poore and Sayer 1991). In fact, PAs which allow for zones of varying intensity of conservation and use, such as the biosphere reserve approach, could include community forest areas and sustainable managed production forests to act as buffers and habitat corridors. Given the population pressures and widespread dependency on forests, most PAs will need to support a variety of uses consistent with their primary conservation objectives.

All countries in the region have policies promoting forest conservation and sustainable forest management but the implementation of these policies has not always been successful for a variety of reasons including:

- a lack of resources or capacity to design and regulate management practices in the field;
- a lack of technical and silvicultural knowledge about the particular species or forests being managed (including regeneration needs and growth rates);
- an inability to enforce regulatory mechanisms or Codes of Practice designed to prevent over harvesting and environmental damage; and,
- a confusing and sometimes inadequate legal framework.

Of these perhaps the incapacity to regulate the current logging practices and limit the areas in which it is carried out is the most serious problem which is now leading to a decline in forest quality. These impediments are difficult to overcome - at least in the short term.

Regulation of harvesting activities by concession holders can be addressed if enough field inspectors are employed but no forest management can be successful unless some minimum silvicultural knowledge is available. One crucial piece of knowledge is the growth rate of the forest and hence the magnitude of the annual allowable cut or harvest. This requires a network across each forest of regularly monitored sample plots to establish how rapidly forests are growing and just how large a harvesting operation can be sustainable. Without these data, managers are simply unable to tell if sustainable harvests are being achieved or not. This applies as much to small community forest zones within protected areas as to the forestry concessions around them.

Another piece of key knowledge is the conditions required for regeneration of the main commercial species. Most silvicultural systems develop a harvesting operation that, simultaneously, facilitates regeneration. The choice of which method to use obviously depends on the characteristics of the species involved. Sustainability also requires that harvesting intensity and frequency should match the growth rates of the commercially attractive species.

But even modest logging activities can easily give rise to forest degradation if managers are unable to supervise what goes on in the field and regulate the way in which logging is carried out. Bad practices affecting other non-commercial species, including wildlife develop if there are insufficient trained staff to supervise operations and if these field staff have never seen "good practice". An increasingly common way of dealing with this problem is to develop guidelines or Codes of Practice to provide a benchmark against which local activities can be compared (ITTO 1990, ITTO 1993). In many forests monitoring systems are being set up to confirm that the management systems and Codes of Practice are generating ecologically sustainable management practices (ITTO 1992, Prabhu et al. 2002).



Such is the international interest in conserving forests that timber being produced from sustainably managed forests can often command a higher market price and a number of schemes are being developed to certify sustainability (Forest Stewardship Council 2002). It is unlikely these schemes will cover all timber markets but it seems likely they may come to dominate certain higher value markets such as Western Europe (ICEM 2003f).

Adequate regulatory staff are also needed to ensure the State receives agreed benefits from logging and harvesting non-timber forest products. For example, in 1996 the government in Cambodia should have received over US\$100 million from logging when, in fact, it received only US\$10.7 million (Dauvergne 2001). A similar pattern of legal concession holders and illegal loggers getting virtually all of the benefits from exploitation is all too common throughout the tropical world.

These types of problems are partly a consequence of inadequate supervision and partly due to the lack of a well-designed and supportive legal framework. There is a strong case for a unified approach for legal reform across the lower Mekong Basin in light of the linkages that exist between the policy decisions of one country and the exploitation of timber and non-timber forest products in another country .

These same problems and constraints apply to forests within protected areas. Although nominally free of logging there is no doubt that it often takes place. Adequate management of a forest devoted to biodiversity protection has many of the same challenges as managing it for timber production.

The provision of resources to establish the necessary silvicultural or management systems and data bases, employ and support field inspectors and enforce Codes of Practice all require a political

commitment from the highest levels of government. Reforms are sometimes only possible when the commercial timber volumes have been so depleted that corporate concession holders lose interest and depart. But their interest can be renewed if opportunities arise to turn lands they have degraded into plantations. Given past experience with these organisations, there is even more reason to ensure legal frameworks are in place to enforce appropriate standards if this occurs.

6.4.3 Collaborative or community forest management

Until recently traditional forest users have been ignored by most forest management agencies. Professional forest managers found it difficult to accept that poorly educated village people with little technical training could possibly undertake any management task. But evidence is accumulating from various parts of the world to suggest otherwise (Arnold 1992; Fisher 1995; Borrini-Feyerabend 1996).

Reasons why traditional forest users might be successful forest managers within and outside PAs are:

- they have traditional forest ownership/tenure claims and hence a commitment to the area;
- they have an direct self interest in sustainable forest management;
- they have traditional knowledge of the ecology of their forests;
- harvesting of all forest products and not just timbers is controlled;
- their communities have traditional social structures that are likely to be able to enforce agreed management regimes including the intensity and timing of harvesting; and
- benefits are widely shared throughout the community and not just with urban-based shareholders or concession holders.

The most successful examples of where communities have taken over responsibility for forest management are those where large industrial scale operations are absent and where most harvesting is at a relatively low intensity. This usually means these are small areas of forests that have been logged once already and are of less interest to industrial logging groups. Alternatively, they can be relatively small zones as part of larger protected areas or in surrounding buffers. In these cases management is more concerned with regulating access rights and perhaps with simple silvicultural techniques such as thinning less desired species.

A variety of community based management regimes might be adopted ranging from those where some kind of partnership between a government agency (who provide technical assistance) and the community (who coordinate activities in the field) is formed to those where the government has little involvement and the community has total management control.

Devolution of management authority does not guarantee success. For example, some “community” forest management systems have failed because powerful individuals or groups in the village have taken over and manipulated the system to benefit themselves alone. Consequently certain factors need to be clarified and resolved. These included decisions on tenure and access rights, the composition of the decision-making body within the community, the extent to which governments will provide technical services and marketing advice, and the relationships with external buyers of forest products. Communities also need financial and technical resources to enable them to achieve the jointly agreed upon objectives.

Community forest management systems may have a special role for forests surrounding protected areas since they can help protect these forests from disturbance or



clearing and stabilise agricultural usage. Likewise, communities may also have a particular role to play in the rehabilitation of degraded areas as discussed later. In both cases, joint agreements between PA authorities and communities are needed which are built into the PA management structure and plan.

6.4.4 *Sharing of costs and benefits of improved forest management*

The value of forests products such as timber, rattans, fruits, nuts or medicinal plants is self evident and recognised by local communities and by national and international markets. It is comparatively easy, therefore, to quantify the economic worth of these goods and identify those who are interested in paying for them. The value of ecological services such as the provision of clean water, stable hill slopes, nature conservation, or genetic resources such as tree seed for forest plantations is often less obvious and much more difficult to quantify. Also, it is difficult to identify the people or communities who are the beneficiaries of the supply of these services from particular forests. Many would be unaware of their usage.

There are some well known examples of attempts to quantify the values of ecological services at a large scale (e.g. Costanza et al. 1997). There are fewer examples of this being successfully carried out at a more local scale (ICEM 2003f). And yet it is important that this be done. Many people living downstream or outside forest areas who are beneficiaries of their goods and services contribute nothing to the costs of their protection and management. Further, there are those who discount those values but who can point to what they see as large opportunity costs from maintaining forests and preventing conversion to agriculture, for example. In the absence of any assessment of the total development value of goods and services provided by forests the arguments in favour of clearing can be irresistible.

The value of some services might be relatively easy to calculate. For example it should be a comparatively easy task to assess the cost and benefits of retaining or clearing forests currently protecting the watershed above a hydro-electric scheme (Chapter 5). On the other hand, it can be more complex to assess the current and potential future benefits of a particular forest for eco-tourism or for regional biodiversity protection. More work needs to be carried out to try to test methods and to identify the beneficiaries. Methods are also needed to monitor services over the longer term to ensure management is appropriate for their sustainable delivery.

Some payments can be made directly to forest owners or managers while other economic incentives to conserve forests can be more indirect. For example, the state of Amazonas in Brazil provided a subsidy to limit urban and industrial development to the capital, Manaus. As a consequence deforestation in the state has been slight. By contrast, the nearby state of Mato Grosso has fostered agriculture and provided no subsidy to concentrate development in urban areas. There, agricultural clearing and forest loss has been substantial (Filho 2001).

The magnitude of the payments needed to ensure the cost of forest management are covered or to exceed the benefits of alternative land uses will vary with location and with the type of forests. The sustainable management of tropical forests should be economically profitable (Leslie 1987). The fact that forests continue to be cleared and abandoned suggests many managers are not convinced or are not receiving all the benefits that should accrue to them from their management inputs. Transfer payments from the sale of ecosystem services could make a significant difference to such managers.

There is another side to this issue. If a particular stakeholder is paying for a service such as clean water and forest managers are unable to continue to supply it then payments should cease or compensation paid. If the cause can be attributed to damaging logging activities by a concession holder in the area, then fines for bad practices might compensate the user of the ecological service. The same principle might apply to other situations where ecological services are disrupted. The PAD Review explored the range of economic instruments which might apply in these and similar circumstances (ICEM 2003f).

6.4.5 Rehabilitation of already degraded areas

Until recently a common view was that the best that could be done on degraded lands was to attempt to restore commercial productivity to them. Little was expected from these lands in the form of future ecological services. This view is changing and there is increasing agreement that such lands can and should also make a significant contribution to regional biodiversity and provide other ecological benefits.

Secondary or regrowth forests: There are two types of degraded land. One is secondary or regrowth forests now covering large areas throughout the Mekong basin (Table 6.3). These areas are the result of heavy logging or shifting cultivation. Until recently such degraded forests have been viewed as worthless by many government agencies (although many local people have continued to use them and recognised their value). As the areas of intact forest have shrunk and the extent of these secondary forests has increased there has been a widespread re-appraisal of their worth.

Many secondary forests contain significant biological diversity and many can still supply a variety of goods such as timbers, fruits, nuts and medicinal species. In addition, many secondary forests are very useful as protectors of hillslope stability and catchments. Provided they are protected from further disturbances these forests can have an important role supplying various goods and services. With time this supply is likely to increase as their biodiversity and ecological complexity increase. This means secondary forests represent very important landscapes with a major role to play in both the provision of social as well as conservation benefits. For this reason communities working alone or in collaboration with forest management agencies may have a particular role to play in managing secondary forests. They need to be rehabilitated and managed in close collaboration with protected area authorities so that consistent and integrated protection policies and practices can be applied throughout the national forest estate.

Secondary forests vary in their composition and structure and successful management will require better information on the species they contain, the successional processes underway as well as on the size of the populations of socially and commercially valuable species. Enrichment planting within the residual forest can increase the supply of commercial species. Secondary forests can also be enriched with other plants such as medicinal plants, fruit trees or even with rare and threatened species of plants and/or animals to improve their biodiversity values.

Grasslands or shrublands: The other category of degraded former forest lands is that which is now largely occupied by grasslands or shrublands. The areas of lands in this category in the Mekong region that might be rehabilitated are large. Until recently most reforestation of such grasslands has been carried out using monoculture plantations of fast-growing, exotic species (e.g. *Eucalyptus*, *Acacia*, *Pinus* spp.). Although these are productive and are often tolerant of badly degraded or infertile sites they frequently benefit only industrial timber users such as pulpwood factories. The capacity of these plantations to supply other goods is limited and they provide only a limited range of ecological services. Further, their contribution to biodiversity protection is small. In many cases the timber prices from species used in these plantations are also low. In recent years there has been downward price trend for many of these species as more of the older plantations mature and are harvested. Plantations using these species are sometimes appropriate - in some degraded sites they may be all that can be established because of site conditions. Yet, they should not be seen as the only alternative for all degraded lands.

Another reforestation option has been to use native high-value species. This is becoming of increasing interest in Thailand and Vietnam. Although the volume increment in these plantations may be lower than for the fast-growing exotic species the value increment is likely to be greater. That is, the higher timber values may compensate for the slower growth rates. This option necessarily depends on the continued availability of native seed from natural forests. The success of such large scale reforestation projects such as the Five Million Hectare Reforestation Program in Vietnam which target native species will depend on

reliable sources of such seed from residual natural forests. A greater degree of landscape heterogeneity can be developed if these plantations are surrounded by buffer strips or if a mosaic of different species is planted across the landscape at different sites. Even more can be created if multi-species mixtures are used in plantations instead of monoculture plantations (Lamb 1998, 2001).

In many degraded landscapes the best approach might be to use a variety of reforestation techniques depending on ecological or social circumstances. A landscape might contain regenerating regrowth forest, various monocultures of several native species and perhaps some mixed species plantations. The end result of such an approach will be much different to that obtained using the more traditional monoculture plantation of exotic species covering the complete area. This approach has been referred to as Forest Landscape Restoration (Lamb and Gilmour 2003). The advantage of these more varied methods of reforestation is that they are likely to generate a much greater variety of goods and ecological services and, hence, to be much more attractive to rural communities. Such a diversity of approaches might be a particularly useful way of dealing with degraded areas located within and adjoining PAs and caused by resident human populations. The combination of approaches might offer a way to foster biodiversity recovery while stabilising agricultural practices of residents.

6.4.6 *Overcoming rural poverty*

Forests can provide safety nets for traditional communities by being a source for a whole range of timber as well as non-timber products (Wunder 2001). On the other hand, compared with the opportunities provided by agriculture, forests can also be a poverty trap for these people because they are never able to accumulate enough capital to break free from their dependency. Few traditional forest dwelling communities have benefited much from industrial logging operations. At the most they have done so from the often short-live labouring jobs provided and in many cases these benefits are quickly out-weighed by the losses of non-timber forest products caused by logging.

Because of this Wunder (2001) arrived at the rather gloomy view that biodiversity conservation in forests and poverty eradication are probably mutually exclusive and cannot co-exist on the same site. However, he has the important caveat that this takes no account of the value of ecological services and that any payment for these might generate a quite different conclusion. The issues are different in the case of degraded agricultural lands. In this case reforestation may form an important part of any sustainably managed agricultural landscape.

6.5 *Future directions*

There is no single set of prescriptions for achieving forest conservation within and outside PAs. Ecological, social and economic circumstances vary from one landscape to the next. This means that different situations will require different strategies and any successful program will probably have a number of separate but mutually supportive elements. A network of well-managed protected areas will be a key component in any such program complemented by policies that retain other forests, natural or restored, across the landscape.

Some key strategies include:

6.5.1 *Establish a permanent regional forest estate*

Recent experience in the region suggests that present forest policies and programs are insufficient and will need modification. Some of the underlying causes of apparent policy failure are outside the protected area forests and production forest sector (e.g. shortages of agricultural lands and inadequate land use planning) but many are not. A key policy requirement is for the recognition of the need for a "permanent

forest estate” in each country and throughout the Lower Mekong region.¹⁰ This has been partly achieved in the form of the PA network, especially in Thailand, Cambodia and Lao PDR. But effective forest conservation across regional landscapes requires that these special forests are complemented by a linked network of forests managed for other purposes including timber production. That is, effective forest conservation within and outside PAs depends on having a number of forests managed for social, economic and environmental goals. The management emphasis may vary but policies should facilitate (1) management and protection at local levels and not just a national level, and (2) a high degree of coordination between managers of production forests and forests in the PA network.

Not all forests need be government owned or controlled. Another key policy area is to develop means of fostering permanent forests and forest management on privately owned or managed land. Arrangements might be made to foster new forms of land tenure or access such that communities might undertake some of the management tasks currently undertaken by government agencies. This would mean these agencies adopt a facilitation role in place of a management role.

6.5.2 *Prepare integrated regional plans*

Many decisions regarding forests are made in a piecemeal fashion and the collective impact of these across a region can lead to sub-standard practices. Better regional planning is needed so that forests that are important for biodiversity or for watershed protection reasons are identified and retained as an essential part of the surrounding development landscape. A principle of “one plan for one area” is needed which lays down a framework of conservation standards and requirements which all sectors embrace. Regional plans would facilitate the establishment of buffer strips and corridors linking existing forest areas. Improved regional planning could ensure these forest are not subsequently sub-divided by highways or disturbed by various small land use changes that, over time, collectively reduce their value. This necessarily requires collaboration between all levels and sectors of government.

Governments in the Lower Mekong Basin are moving toward a regional planning approach and finding it difficult. Thailand is introducing river basin planning and structures in addition to exploring a forest complex approach to its remaining forests. The Cambodian MOE is experimenting with planning for clusters of protected areas. The forest complex and PA cluster concepts are similar and based on a bioregional approach to planning. On a bilateral scale, Lao PDR and Vietnam are collaborating in preparing a conservation plan for the shared Annamite Mountain chain. The main purpose of these forms of regional planning is to define the natural systems which need to be kept and the backdrop of conservation safeguards, standards and guidelines against which development can take place.

A great deal can be done at the Lower Basin level to provide the initial logic and impetus for regional planning by identifying the critical watersheds, forests and aquatic systems and guidelines for their conservation which can be adopted as part of the Basin Development Plan or special regional agreement and action plan. Such a basin wide plan would define the permanent regional forest estate and associated network of protected areas and zones.

6.5.3 *Build capacity to implement forest conservation policies*

Good policies must be matched by an appropriate supply of resources - human and financial - to implement them. Capacity is needed at the national and local level to undertake the increasingly complex demands placed on PA and other forest managers. For example, current concession agreements need to be more carefully policed and the prescribed resource rents or taxes collected and used for forest maintenance and enhancement. This requires enhanced skills and authority. The growing relationships

¹⁰ Subject to the qualification noted above concerning the primacy of certain management objectives while allowing other land uses, such as agriculture, also to take place under prescribed conditions.

with local communities requires a whole new set of skills in forest managers, especially in and around PAs.

With increased capacity must come authority. Forest managers within and outside PAs at the local or District level must also be given the political and institutional support needed to manage and control more powerful groups trying to exploit forests for their own benefit at no cost.

There is an important role at regional level in providing opportunities for training of PA and forest managers. A regional PA training institution or network of institutions needs to be identified and supported to implement regular programs of training.

6.5.4 Develop financial mechanisms to ensure an equitable sharing of costs and benefits

Forests resources now being exploited currently provide a substantial financial benefit to those concession holders exploiting them. Only a small proportion of those funds go back to paying for management. And many other beneficiaries of good forest management frequently pay nothing at all. These beneficiaries include (but are not restricted to) water supply authorities, hydro-electric authorities, commercial agriculture, tourism and fisheries and those who gain from biodiversity preservation and carbon sequestration.

What is needed is a way of sharing the costs and benefits between managers and other stakeholders. This will require a proper valuation of the costs of management. It requires valuation of the goods and services supplied when forests are well-managed. It also requires the removal of inappropriate subsidies that impede good management such as low tax regimes. Finally, it requires adequate regulation and supervision to ensure that prescribed payments are assessed, collected, appropriately managed then go to the agreed conservation activities.

Innovative financing methods need to be tested and demonstrated within the region as a basis for regional guidelines, exchange and training. The potential value of establishing a Mekong Conservation Fund, introduced in Chapter 4, needs to be explored to promote protection of the permanent regional forest estate and rehabilitation and monitoring programs.

6.5.5 Develop monitoring programs to trigger corrective responses

The management of ecosystems as complex as tropical forests is difficult and it is especially so when ecological and silvicultural knowledge is incomplete. Under these circumstances it is best to adopt an "adaptive management" approach by which is meant a system of management that learns from experience and which adapts practices when experience shows that certain management tools or approaches have not worked. Monitoring systems appropriate to the particular management objectives (e.g. biodiversity protection, watershed protection, and timber production) need to be developed together with an indication of the sorts of changes which, when identified by monitoring, should trigger corrective management intervention (ITTO 1999).

The special monitoring and reporting system should be set in place to keep watch on the condition and trends in the permanent regional forest estate, and as a basis for cooperative bilateral and multilateral action.

6.5.6 Create partnerships to support forest conservation

Effective forest conservation will require the development of various partnerships.

Between government and communities: One important partnership is between government forest and conservation agencies and forest dwelling communities. The links between government forest conservation goals and the social and economic goals of communities are too strong for governments or local communities to achieve their objectives separately. If forest management and conservation is to be effective the communities living in and around forests will have to be involved in developing local policies

and management practices. This means finding ways of linking conservation and development objectives. In some cases this may lead to the development of collaborative management arrangements. In others it might mean inviting communities to take a leading role in management with the role of governments being mainly to provide technical support. Communities must be well resourced to be effective partners

Between forest managers and users: A second necessary partnership is between forest management agencies and the users of goods and, most especially, ecological services. All those reliant on good forest management must be identified so they can become participants in the development of appropriate management practices and share in both the benefits and costs of management.

Between forest managers and international organisations: A third partnership is between forest managers and some appropriate international agencies (e.g. ITTO, CIFOR) and NGO's (e.g. WWF, IUCN) who can, if required, often bring funds and resources to assist in the development of policies and new techniques and act as links to facilitate the spread of more appropriate policies.

Forming partnerships require new management structure, forms of agreement, a sharing of roles, responsibilities and benefits and a concentrated capacity building so that those involved can make credible and useful contributions. At regional level, a program of training and exchanges is needed in conjunction with pilot projects to test and demonstrate methods of collaboration.

6.5.7 *Rehabilitate degraded forest landscapes*

Large areas of degraded landscape have been created in all countries of the lower Mekong Basin. There are a variety of means by which rehabilitation might be carried out to recover at least some (though usually not all) of the goods and services these areas once supplied when forest cover was still present and to take the pressure off existing protected areas. Rehabilitation is expensive and innovative ways of financing it must be found. Further, the responsibilities for rehabilitation and who must pay for it needs to be established – is it government, the private sector, communities or a combination of potential forest users? And how might the best overall outcome be achieved across a region from perhaps many small reforestation decisions?

Regional guidance on these issues and priorities for rehabilitation should be prepared.

6.5.8 *Develop complementary legal frameworks to enhance cross-border collaboration*

There are significant macro-economic drivers of forest degradation both within and outside PAs in the region. Markets have a large impact on the way forests are used or managed, especially in situations of under-development. These market forces are mostly beyond the control of forest managers. There are advantages in seeking common solutions to the problems associated with the trade in timber and non-timber forest products. Other cross-border approaches may be useful as well including those relating to transboundary protected areas discussed in Chapter 9.

The Mekong Basin forms a common ecological context in which to devise improved methods of forest conservation. Yet, the differences across the region in the extent of remaining forest cover, in economic situations and political structures mean there may be considerable advantages in simplifying legal frameworks and making them more complementary to enhance the opportunity for greater collaboration in forest and PA management across the region. Certainly regional principles and guidelines are needed within the Basin Development Plan or special agreement.





7 Agriculture and protected areas

7.1 Protected area services to the agricultural sector

The agriculture sector in the Lower Mekong region receives many benefits from forest protected areas. They arise from water source protection, a “smoothing” of the supply of surface and groundwater that eases dry weather shortages and reduces wet season flooding, a windbreak function, pollinators for crops, predators to consume crop pests, and the maintenance of a local climate (microclimate) that produces a more moist atmosphere in dry weather. Yet in modern agriculture these services are often not taken into account until forests decline, their services begin to fade and, as a consequence, agricultural production declines. There is no payment from

the agriculture sector for these services and, except sometimes in the special case of PA “buffer zones”, in few cases are commercial agricultural systems being modified so as to protect and sustain the PAs that provide these valuable services to the sector.

Sources of the water needed for crop production must be protected for agricultural production to be sustained. Various forms of protected forest area that serve this purpose have been established. Clever and ecologically sustainable forms of water control have been developed by some of the many different cultural groups of the region. The water management systems developed for lowland rice cultivation are of particular significance. They are based on natural water flow and have proved sustainable over many centuries.

The drift of agriculture away from the ecological context in which it originated has led to modern irrigation systems that are based on simplistic engineering principles for overcoming what are seen as environmental “barriers” to water use efficiency. In past decades, this was a key element of agricultural development in Thailand, for example, and it now faces high economic and social costs from the environmental consequences of dramatic changes to soil and surface water regimes. Vietnam is in the process of making similar far reaching changes to its natural water systems with major environmental effects.

PAs protect cultivated land from excess runoff of surface water and in this way reduce the erosion of adjacent cultivated land. Other ecological services they provide include pollination and pest control – through the habitat they provide for crop pollinators and for crop pest predators. Bats, wild bees, and other insects are the principal pollinators of fruit trees and other important regional crops such as cassava, yam, sweet potato, taro, beans, coffee and coconut. Pollination of these crops is the result of intricate relationships between plants, insects and animals. The reduction and loss of any one of these reduces the effectiveness, and even the survival of the prospects of others. Pollination is an ecological service and it is provided by PAs and by relict areas of natural vegetation in agricultural landscapes. Agricultural production and agro-ecosystem diversity are at risk from a decline in pollinators as the regional landscape becomes more fragmented due to expanding cropland.

Even as they adopt new crop cultivars and modern practices, farmers adjacent to the U Minh Thuong Nature Reserve of Vietnam’s Mekong delta take advantage of environmental services offered by the PA. They have established shelters to attract bats from the Reserve so that these animals will focus on crop pests in nightly sweeps across the farmers’ fields. The resulting harvest of nutrient-rich bat guano provides an economic bonus.

7.2 Key issues

7.2.1 *Protected area contributions to modern agriculture are not taken into account*

Traditional farmers of the region have long understood the relationship between their environment and the small plots on which they depend for their survival and for modest trade. But their relationship with their environment has changed a great deal as modern forms of commercial production have been promoted, and where population increases have forced farmers to exploit their limited agricultural and forest resources more intensively.

Schemes to promote large-scale agricultural development have rarely been accompanied by measures to prevent or to minimise adverse effects on local biodiversity. The costs that loss of biodiversity imposes on the agricultural sector and its farmers have not been understood. This has reduced the capacity of protected forests to moderate and sustain soil water and to reduce the excess surface runoff that leads to soil erosion.

Protected areas can become islands of dying biodiversity in an agricultural landscape. Fires escaping from rice stubble burns erode PA margins, and invasive alien species of plants and birds aggressively compete with native species to bring about changes in the composition and structure of those PAs. This damages their capacity to sustain the ecological services needed by local agriculture.

7.2.2 *The biodiversity of the agricultural landscape is not valued*

There are growing pressures against the farmers who maintain crop genetic diversity in the form of local cultivars. Increased population, poverty, land degradation, environmental change and the introduction of modern crop varieties have contributed to a substantial loss of crop genetic resources and of the knowledge with which it is associated. Many Vietnamese farmers have shifted to introduced hybrid rice for their higher productivity and returns in the market. Traditional varieties are seldom cultivated even though these tend to require less chemical additives and expense to grow. These farmers maintain a strong interest in local cultivars but tend not to get the same level of government extension worker support or subsidies if they use them. For immediate economic reasons, hybrids are promoted and traditional cultivars are not.¹¹

Scattered throughout the agricultural landscape are small areas of degraded forest or grassland that are not farmed or are used only for light grazing and these often contain native terrestrial and aquatic species (Chapter 6). However, surrounded by a landscape of more intensive development, unless they are cared for they will progressively lose their more distinctive species.

Rural communities using traditional resource management practices and knowledge have achieved a great deal for the global community in developing a broad portfolio of agrobiodiversity, and caring for it. This is threatened. The custodians need support to continue their conservation effort – and agriculture sector initiatives to expand production need to accommodate an objective of protecting what agricultural biodiversity still remains.

Some initiatives are being taken. In Vietnam, gene management zones for traditional cultivars of several important crops are being established – rice, taro, tea, litchi-longan, citrus, and rice bean



¹¹ Mid-Term Evaluation Report on the UNDP-GEF Protected Areas and Resource Conservation (PARC) Project; August, 2002.

or mung bean.¹² A community-based conservation approach has been adopted, and associated traditional knowledge is being documented. In Thailand there has been extensive characterisation and documentation of a very wide range of cultivars of fruit trees. This effort now needs to be translated into field action to protect the genetic diversity that has been described.

7.2.3 *Changes in the agricultural landscape affect the biodiversity of PAs*

Forest clearance and agricultural expansion changes local climate. Protected areas of forest that evolved in a moist environment change when their surroundings are converted to crops. The immediate impact is on forest margins. They become drier, resulting in a change in species and, eventually, changes in the structure of the forest ecosystem. Situated on a high plateau, the ecosystems of Cambodia's magnificent Bokor National Park depend on mists from which water condenses onto vegetation. These mists form from moist air rising from the surrounding lowlands. Agricultural crops are extending across those lowlands and, as the remaining forest declines, the amount of moisture raised to the Bokor plateau in mists will reduce threatening the Park's ecosystems.

7.2.4 *"Buffer zone" concepts may inhibit a broader view of agricultural landscapes*

Considerable effort has been put into working with farmers to develop "PA-friendly" farming systems and practices in areas bordering onto PAs. Success, overall, has been disappointing, though some useful ideas and technologies have emerged. However, this focus on shaping agriculture to protect PAs may be generating a misleading message. It implies that the biodiversity of strictly defined protected areas must be the focus of conservation effort and not biological diversity beyond it borders. "Buffer zone" interventions with farmers are focused on protecting the PA – and only rarely, if at all, are the biodiversity values of the buffer zone itself addressed and supported.

More biodiversity may be conserved, more effectively, if biodiversity support measures were introduced into agricultural landscapes – with initial emphasis on farms neighbouring PAs, but always with the intention to extend these measures into the agricultural landscape. In some situations this would correspond with initiatives to extend the biodiversity values of PAs along corridors – either continuous, or through patches. This idea is being addressed in a project supporting the management of two neighbouring PAs in northern Vietnam (Na Hang Nature Reserve and Ba Be National Park).¹³

7.3 *Future directions*

Most PAs are biodiversity preserves – many being "islands" of native biodiversity in a "sea" of farms. Little has been done to boost the value of these PAs through actions to conserve the relict biodiversity of the fragmented agricultural landscapes of which PAs are part, or to incorporate this in "corridors" to extend the ranges of native species. Also, the experience with agricultural practices by communities living inside protected areas needs to be reviewed and approaches adopted which reinforce PA objectives.

7.3.1 *Development of a regional action plan for conservation in agricultural landscapes*

This is an issue of such importance to all countries of lower Mekong Basin that a regional approach is needed so expertise, experience and resources can be shared. As a first step a regional action plan and implementation program should be defined. An effective action plan requires that actions be taken at regional and national levels to:

- facilitate working links between PA authorities and agricultural agencies to identify opportunities and

¹² UNDP-GEF Project: In Situ Conservation of Native Landraces and their Wild Relatives in Vietnam.

¹³ UNDP-GEF funded PARC Project (Creating Protected Areas for Resource Conservation Using Landscape Ecology), Ministry of Agriculture and Rural Development.

- mechanisms for demonstrating the value of PAs for the agriculture sector, for maintaining and enhancing those benefits and for extending biodiversity conservation into the agricultural landscape;
- build on initiatives taken in Thailand and Vietnam to conserve valuable crop biodiversity and associated traditional knowledge – by reviewing lessons and defining guidelines that extends the scope beyond farmers' fields and into the protected forests that harbour wild relatives of crop plants;
 - establish criteria for identifying the “patch” and “corridor” biodiversity of value in agricultural landscapes and develop a system for classifying this biodiversity and defining its management needs;
 - develop innovative new approaches to agriculture where communities are located inside protected areas;
 - seek opportunities to incorporate measures for the protection of biodiversity in agricultural landscapes into agricultural development projects; and
 - identify water courses that retain significant biodiversity and cooperate with farmers to support them in managing riverine “corridors” in ways that will enhance biodiversity value while contributing to farmers' welfare.

Important components of a regional PAs and agriculture action plan would be to provide guidance on landscape planning, and for agriculture inside and outside protected areas which supports biodiversity protection.

7.3.2 *Adopt a landscape approach to biodiversity protection*

Lasting biodiversity conservation can be achieved only through addressing biodiversity protection in the context of the whole landscape and, in the case of the agricultural sector, in a way that has meaning for farmers. This involves:

- adopting a landscape perspective as a basis for biodiversity conservation planning and management;
- focussing on understanding and working with native biodiversity (both wild species and those that constitute local agricultural biodiversity) and the ecological processes important for sustainable agricultural production to improve local food security; and
- developing and adopting measures to encourage native biodiversity throughout the agricultural landscape.

A broader perspective on farming practice would open up opportunities to manage biodiversity in a way that would contribute to agricultural production through pollination, wind breaks and water management while at the same time increasing the biodiversity value of relict areas and, so, of the landscape as a whole.

The biodiversity conservation goals for an agricultural landscape can be met by protecting and establishing local biodiversity in an integrated pattern across farms. Non-farmed areas can be utilised to provide “patches” of certain types of habitat, or to form “corridors” linking protected areas and enabling species to maintain genetic interaction between populations that otherwise would be isolated. This involves protecting remnant native vegetation and/or re-establishing wild species.

“On-farm conservation” is a term used by innovative agricultural managers to refer to the maintenance of populations of local crop cultivars (or landraces) in the natural habitats where they occur, whether as uncultivated plant communities or in farmers' fields as part of existing agro-ecosystems, and with the active participation of farmers. This approach provides an



opportunity for agriculturists and PA managers to interact in developing an approach to agricultural development that makes a significant contribution to overall biodiversity conservation while also promoting improved and more efficient agriculture.

7.3.3 *Prepare regional guidelines for agriculture inside protected areas*

The boundaries of some PAs in the region have been drawn in such a way that they include communities of farmers, some of whom have resided there for very long periods prior to PA declaration. These are usually upland farmers practising shifting cultivation. Since this farming practice is not consistent with management of the surrounding forest for its biodiversity values PA managers have attempted to support these farmers in changing to a settled form of agriculture that does not require further forest clearance. This is an issue of regional significance. It requires a culturally sensitive approach and innovative thinking about agricultural systems and practices.

Governments are increasingly reluctant to relocate PA communities. Strategies to integrate them within the PA include:

- The promotion of agroforestry and forestry activities on areas of land already cleared, and enrichment planting in degraded forest areas with a mix of commercial species native to the area. This entails facilitating a gradual transformation of the product basis of the local economy to one based on agroforestry, tourism and natural conservation.
- Support for the adoption of organic farming methods and markets so that the PA settlements and land uses are chemical free.
- Promotion and support to the development of ecotourism and home stays with cultural and nature experiences as the primary attraction.
- Definition of zones of resource use in the protected area and agreed controls and safeguards for each zone
- If feasible, identification of community forest zones to be managed by communities for sustainable use of forest products
- The collaborative demarcation on the ground of PA zone boundaries by “walking the border” with local communities
- Joint agreements between the PA managers and the resident communities which record the boundaries, zones and management arrangements. The inclusion of these agreements in formally endorsed PA management plans.
- The establishment of a collaborative management structure including community representation on the PA management committees.
- Well defined roles in PA management for resident communities including monitoring and enforcement of joint agreements and resource use, and rehabilitation and conservation activities.
- Provision of employment of residents as PA staff and nature guides.

7.3.4 *Prepare regional guidelines for conservation in agricultural landscapes*

To make progress it is necessary to bring together the thinking and management practice of PA managers and of managers of agricultural landscapes, of whom the most important are farmers – individually and in their professional groupings. No longer should the surrounding landscape be seen simply as a source of threats to PA integrity, but as the context in which the PA



is set. There are many unused or lightly manipulated areas that may harbour native biodiversity at a local scale and even help to sustain it at a landscape scale. These include:

- Streamside vegetation, natural waterways, irrigation canals, uncultivated and ungrazed water catchment areas, and farm drainage ways.
- Wood lots, vegetation filter strips used to trap sediment and to facilitate breakdown of agrochemical residues, and uncultivated strips between crop fields.
- Windbreaks, border plantings and “living fences” along field boundaries.
- Irrigation bunds, vegetation barriers planted to reduce surface soil erosion and promote water infiltration, and areas taken out of production to control salinity, or abandoned as a result of salinisation.
- Areas along roadsides and railways, “sacred groves”, temple yards, burial grounds and recreational areas.
- Areas left undisturbed because of their cultural or historical significance.

Accordingly, PA management would be better undertaken in terms of what the PA contributes to the surrounding landscape and of the measures to be taken within that landscape to support the PA. On the part of the agriculture sector, there is a need for a parallel opening of ideas and management practice – and for agriculture to be managed in a landscape context taking into account its relationships with PAs. There are long-term benefits for biodiversity conservation and for food security.

The establishment of biodiversity protection regimes in areas of crop and livestock production should build on local residents’ understanding of conservation benefits. This is likely where:

- the PA clearly helps to make farming more productive or sustainable (for instance, by protecting valued pollinators);
- it helps to protect locally-valued environmental services (such as good water quality);
- the PA offers attractive alternative income generating options (by enhancing fishing income, perhaps, or attracting tourists);
- farmers are adequately compensated for loss of land or helped to make the transition to an equally attractive livelihood option (payments for biodiversity services, for instance); or where
- local communities themselves value the aesthetic, cultural, or recreational aspects of the habitat or of particular species (as in the case of sacred groves).

For example, to gain the greatest benefits from the pollination service provided by PAs, farmers and agricultural planners should:

- Seek to minimise damage to pollinators (for instance, by avoiding pesticides that adversely affect them),
- promote the conservation and diversity of native pollinators (by supporting the maintenance of appropriate vegetation in the vicinity of farmers’ fields), and
- restore natural areas to improve pollinator services.

New thinking is emerging in some parts of the world, with innovative arrangements to accommodate the idea that there is much of biodiversity value even in fragmented landscapes. Farming and conservation interests need to be brought together in pursuit of shared biodiversity and resource sustainability objectives, and consideration needs to be given to a new protected area classification system that can accommodate dispersed areas of biodiversity in agricultural landscapes.





8 Tourism development and protected areas

8.1 Status and trends

8.1.1 Introduction

Nature and culture based tourism is a rapidly expanding segment of the tourism industry in the lower Mekong region with an increasing focus on protected areas for its development. The stakes are high. Well planned, resourced and managed nature-based tourism development in PAs can yield considerable economic and social benefits for society – especially for disadvantaged rural communities – while actively contributing to the protection and enhancement of a nation's natural and cultural heritage.

Conversely the explosion of poorly planned and implemented nature based tourism development in the region has resulted in significant environmental and social impacts, provided few local benefits and has at times undermined the economic sustainability of tourism itself.

It is often examples of poor practice that have attracted media headlines and resulted in considerable cynicism toward the nature and culture based tourism industry. One example can be found in Vang Vieng in Lao PDR. In 1997 it was another quiet, rural town set in spectacular limestone mountains that was just beginning to 'be discovered' by foreign backpackers looking for the next exotic and untouched destination. Today, it is a thriving example of mass and unregulated tourism development that is in danger of collapse. A rapidly expanding backpacker tourism market has spawned a proliferation of small-scale unregulated nature and adventure-based tour operations that are causing environmental damage to sensitive cave ecosystems, that has resulted in deaths from unsafe river travel tours, that has produced little or no benefit for local communities and which has forced reputable and ethical companies to leave because of an inability to compete in the undercutting price war waged by 'copy cat' operators. In addition it is receiving a new and sinister reputation among tourists as a haven for 'experimental' opium drug use. A similar situation exists in Chiang Rai Province of Thailand where unregulated trekking over many years has caused significant impacts on the cultures and way of life of some of the local hill tribes with few economic benefits being returned to the communities (PDA 2002).

In such situations reactive policies and management can be an effective and necessary step in mitigating negative impacts. However, it can be very difficult to reverse siting decisions of inappropriate tourism infrastructure and operations after they have been established as can be seen most dramatically in some of the island marine PAs of Thailand e.g. Koh Samet and Koh Chang (ICEM 2003g).

Fortunately the nature-based tourism industry is still relatively young in the region – Lao PDR, Cambodia and Vietnam in particular have only just 'opened their doors' to tourism over the last decade - and so there is time to be proactive in the planning and management of nature based tourism development.

In the face of a rapidly expanding nature-based PA tourism industry, a principal challenge and opportunity for the lower Mekong countries, is to enable local authorities and other stakeholders to engage in early planning for tourism development. In particular this needs to include the implementation of strategies for managing the impacts from tourism before they become problematic and cause unacceptable changes to the ecology of the target PAs, their communities and, in the process, ultimately threaten the viability of the tourism industry itself. An equally important challenge is to go beyond managing impacts to fulfilling the goal of nature-based tourism in PAs as a strategy for socio-economic development of local communities and the protection and enhancement of the PA resource base.

8.1.2 *Establishing the principles for sustainable tourism development in PAs*

Over the last decade there has been a growing interest and commitment among the lower Mekong countries to adopt ecotourism as a strategy for sustainable nature-based tourism development. Ecotourism has been incorporated as a priority, to varying degrees, in the national tourism development plans for all countries, with PAs identified as a focus for its development. The Greater Mekong Subregion concept plan for tourism development 1999-2018 forecasts that the region will become “one of the world’s most important ecotourism and cultural tourism destinations” (AMTA 1998).

In spite of this high profile there is continuing misunderstanding and lack of consensus among tourism stakeholders as to the principles and objectives of ecotourism. A widely acknowledged definition is:

... ecotourism is environmentally responsible travel and visitation to relatively undisturbed natural areas to enjoy and appreciate nature and any accompanying cultural features – both past and present – that promotes conservation, has low negative visitor impact and provides for beneficially active socio-economic involvement of local populations (IUCN 1996).

The term ecotourism is often used in developments that do not adhere to the principles of this definition. Many view ecotourism as any type of tourism activity taking place in natural surroundings. Other terms are used for similar activities such as adventure tourism, recreational tourism, cultural tourism or community-based tourism. The term is not so important, but a common understanding is needed within the region of principles and practice for the development of nature and culture based tourism in PAs. The definition must be compatible with the dual goals of biodiversity conservation and sustainable community development and be broad enough to accommodate the full range of natural and cultural tourism experiences that are possible within PAs.

It is vital too that tourists are educated about the principles to encourage appropriate behavior in culturally and environmentally sensitive areas and to promote their important role as ‘regulators’ and a market demand for responsible tourism products. The media has a major role to play in this process of public education and, in turn, the government and NGOs have an important role in providing the media and the public with consistent and appropriate information.

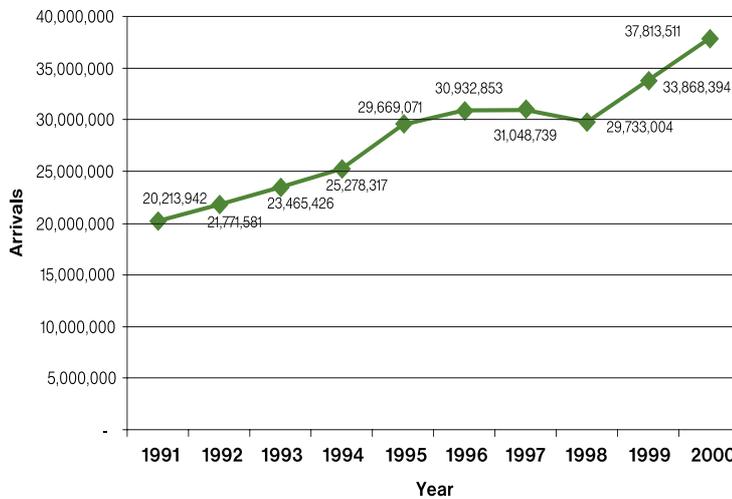
In this chapter, “nature-based tourism” refers to all forms of tourism experience based on natural and cultural attractions.

8.1.3 *Trends in tourism activity in lower Mekong countries*

Tourism is a major earner of foreign currency in the lower Mekong region. International visitor arrivals to the ASEAN region as a whole have increased from 20 million in 1991 to almost 38 million in 2000 (Figure 8.1) reflecting a compound annual growth rate of approximately seven per cent. That figure was negatively affected by the Asian Economic Crisis in 1997 and 1998, and is likely to be significantly higher over the next decade.



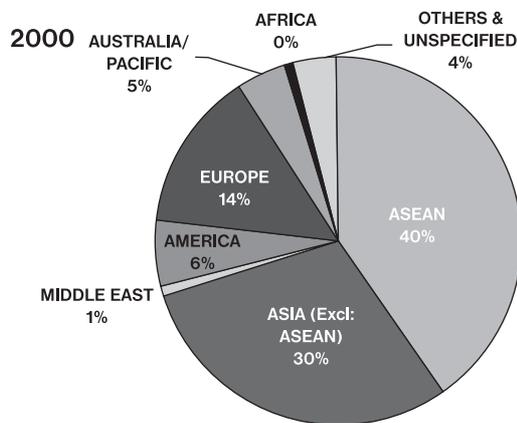
Figure 8.1: International visitor arrivals in ASEAN 1991-2000



Source: ASEAN Secretariat Statistics

As shown in Figure 8.2, 40 per cent of these visitors come from ASEAN countries. A further 30 per cent are from Asian countries other than ASEAN. Europe and America are other important sources of visitors.

Figure 8.2: Origin of tourists to ASEAN in 2000



Source: ASEAN Secretariat Statistics

Table 8.1 shows tourism visits in 2000 to the four countries of the Lower Mekong region. Approximately 12.9 million visitors arrived during that year, of which roughly three-quarters visited Thailand and one-sixth visited Vietnam.

According to data published by the Tourism Authority of Thailand, the average tourist stays 7.7 days and spends 30,000 Baht (approx US\$714). Total revenue from tourism in 2000 was 285,000 million Baht (approx US\$6,785 million). The implied tourism expenditure for the countries shown in Table 8.1 is in the order of US\$8.6 billion per year. If the growth rate in tourism over the last ten years is maintained, this value can be expected to double by the year 2012.

Table 8.1: Visitor arrivals for lower Mekong countries in 2000 ('000)

Country of Residence	Cambodia*	Lao PDR**	Thailand*	Vietnam*	Total
Asia	142.1	590.7	6081.6	1332.6	8147.0
Middle East and Africa	1.5	4.4	198.6	0	204.5
America	42.2	42.1	580.0	239.5	903.8
Europe	65.2	86.5	2049	262.2	2462.9
Australasia/Pacific	13.2	13.6	379.8	73.4	480.0
Others	202.2	0	219.6	242.4	664.2
Total	466.4	737.3	9508.6	2150.1	1286.2

Source: *ASEAN Secretariat, **National Tourism Authority of Lao PDR

The figures have important implications for protected area management in the lower Mekong countries. Protected areas are an increasing attraction for international and domestic visitors constrained only by ease of access and facilities. In Thailand, for example, visits to Thai national parks increased approximately 35 per cent between 1995-1999, from 11.5 million to 15.5 million persons. Ecotourism in Thailand has been the fastest growing tourism subsector with an estimated annual growth rate of 10 to 15 per cent over the past few years (ICEM 2003d). Vietnam has experienced similar increases and so too has Cambodia although a lack of facilities in protected areas continues to concentrate tourists at relatively few locations.

The rate of increase in international tourist arrivals, combined with increasing interest in domestic tourism in all four countries is remarkable, despite the setbacks of the Asian economic crisis and the events of September 11 2001. This growth nationally has dramatic effects at the local level. Increasing tourist activity must be absorbed somewhere. In 1992, there were only 34 rooms available for visitors in Luang Namtha Province, Lao PDR. By 2001 it had increased to 312. Vietnam's Sa Pa region has witnessed growth from two hotels in 1992 to over 60 hotels and guesthouses with many others under construction in 2002.

Strong growth in visitor arrivals, albeit from a low base, is likely to continue in Cambodia, Lao PDR and Vietnam. The situation in Lao PDR is discussed in Box 8.1. The growth expectations for Thailand are similar even though tourism levels are already one of the highest in the ASEAN region. In 2001, Thailand recorded over 10 million visitor arrivals.

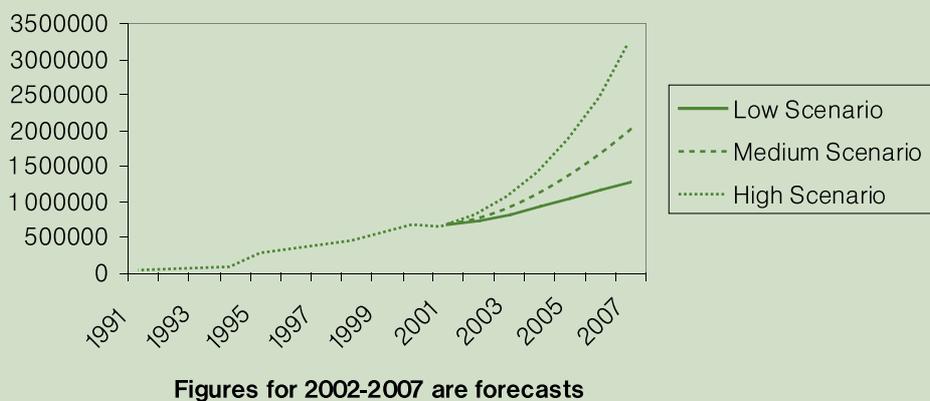
Studies have shown that backpackers are a significant source of expenditure. While tending to minimise their costs for accommodation, backpackers typically spend freely on other amenities, such as organised nature-based tours, scuba diving and individual visits to national parks and other protected areas. Surveys at key tourist locations within the region of foreigners' willingness to pay for use of natural areas have revealed that international visitors will pay much more than the PA entry fees charged, especially if the funds are used for conservation management. Domestic tourists were also willing to pay more for protection of the natural amenities (e.g. MPI 2000; ICEM 2003d).



Box 8.1: Case study – Lao PDR

Figure 8.3 shows tourist arrivals in Lao PDR for the period 1991 to 2001 and gives three scenarios for growth over the next five years. The low scenario is based on the average growth rate of the last five years (11.43 per cent), the medium scenario assumes an average annual growth of 20 per cent and the high scenario assumes 30 per cent growth. A simple projection (low scenario) forecasts almost 1.3 million arrivals to Lao PDR in 2007. This is likely to be a conservative estimate as the Asian economic crisis and events of September 11, 2001 negatively affected activity during the last five years. The consequent low result for 2001 forms the baseline for the outlook.

Figure 8.3: Actual and projected growth of tourist arrivals, Lao PDR



International visitors use various kinds of infrastructure that create further mechanisms – more indirect – for raising funds to support the establishment and management of PAs within each country. Such mechanisms, discussed further in this chapter, include hotel taxes, airport charges, transport fees, scuba diving fees and charges for the use of amenities located within PAs.

Different types of tourism have different resource requirements. For example some less accessible PAs have potential for ecotourism targeting the foreign market without the need for substantial investments in infrastructure and roads. In those cases, partnerships with the private sector would be needed as well as capacity building of local authorities to manage ecotourism enterprises including visitor information and booking services.

The countries of the lower Mekong are likely to experience rapid growth in tourist arrivals in the next decade. The opportunities afforded within protected areas are an essential and growing part of the tourist experience and must be carefully maintained for a sustainable tourism industry and to maximise the economic benefits that accrue from it.

8.2 Key issues for tourism and protected areas

A number of issues persistently emerge from experiences and lessons gained in the region as being central to meeting the challenges of increasing tourism demand for nature based experiences.¹⁴ In summary, they are the need for:

¹⁴ The management issues addressed in this chapter have been drawn from the experience of initiatives to develop sustainable nature and culture-based tourism in the region. In particular the UNESCO Nam Ha Ecotourism Project (NHEP) in Lao PDR has been an important source of information on site level management and lessons learned.

- Tourism development to be balanced with the required inputs of human resources and capacity building – especially at the local level.
- Clarification of institutional roles and responsibilities.
- Protected area management planning for tourism development.
- Supportive and sensitive PA infrastructure and visitor information services.
- Tourism to contribute to the maintenance and enhancement of PA resources.
- Participatory arrangements and clear benefits for local communities.
- Quality product development that meets market demands.
- Monitoring of impacts and of lessons from nature based tourism.

These key issues are not all encompassing and their relevance or priority to each country will vary according to the local development context and situation. Lao PDR, Cambodia and Vietnam have limited experience of tourism development whereas Thailand has a longer history of tourism activity, more tourism resources and comprehensive tourism policy and strategies.

8.2.1 Building capacity to manage and benefit from sustainable tourism development

Each community and local government should be equipped to determine their own tourism development goals and aspirations. For this to occur, they must have funding and access to information and professionally trained individuals.

8.2.1.1 Building capacity of PA managers to manage tourism development

A significant constraint to effective management is that most PAs in the region have inadequate staff numbers, technical abilities, and funding. Emerging responsibilities for tourism management and the growing complexity of relationships with local communities are placing additional demands on PA staff for which they are not equipped. In Lao PDR, Vietnam and Cambodia overall levels of staff training are rudimentary.

PA managers tend to have insufficient status and authority to influence development activities that may be incompatible with PA objectives. Low skill levels and lack of exposure to appropriate development options compound their limited influence as do low budgets and salaries. Reform of government salaries is a critical component of institutional capacity building and the achievement of sustainable tourism development goals.

Training of PA managers needs to be one of the highest priorities for governments seeking to explore the development potentials of PAs while maintaining conservation goals. Tourism development and facilitation should be a key component of such training.¹⁵ Enhanced capacity needs to be accompanied by increased resource and authority to apply new skills.

8.2.1.2 Clarifying roles and responsibilities

Many tourism developments have met with problems through lack of consultation. Early identification and inclusion of stakeholders in the process is necessary to establish a shared vision, minimise delays in implementation, avoid negative consequences, and ensure an equitable sharing of benefits. Most important at an early stage is to define roles and responsibilities of the various parties.

The sharing of tourism management and development responsibilities between PA and tourism authorities should be clarified to promote effective cooperation between the two sectors. In protected areas, PA management agencies should take the lead and coordinate the planning process to ensure PA

¹⁵ A number of training materials have been developed internationally and are freely available. For example www.sustainabletourism.org identifies materials ranging from short technical courses to postgraduate degrees.

conservation objectives and regulations are met. Their ability to do so will depend on available funding and staff capacity.

Appropriate activities for tourism authorities can include marketing and promotion, pricing, market research and facilitating product development, private sector management, facilitating community involvement, training and certifying guides (in cooperation with the private sector), developing and disseminating codes of conduct, monitoring socio-economic and cultural impacts and the provision of visitor information and booking services.

Other public sector agencies, such as road and electricity authorities also make an important contribution to tourism development and conservation and should be included in participatory planning.

The relative contributions of private and public sectors must be clarified to avoid situations where government staff become closely involved in implementing tourism operations and are unable to perform their core duties, or where a conflict of interest could arise between PA staff who monitor the impacts of tourist activity but also rely on tourism revenue. Mechanisms are needed such as concession systems, for separating the management of tourism development from park management functions while maintaining the flow of financial benefits to PAs.

The private sector has a major role to play in the development and implementation of tourism products and to facilitate the involvement of local communities.

8.2.1.3 Community participation

Community participation in the planning process will support the development of products that are sensitive to the needs and vulnerabilities of the destination. Bringing together all stakeholders, including managers, community residents, private sector partners and tourists allows ideas to be exchanged and increases the level of knowledge of tourism in the community. These interested parties should be kept involved throughout the process. Local cultures and communities are also important to the tourist experience (Box 8.2).

Box 8.2: Revaluing Culture: A tourist guide manual about the Tampuan people

The rapidly disappearing indigenous culture is a growing concern among hill tribe people in Northern Cambodia.

As part of the DRIVE project trainee guides undertake research into their culture by gathering legends, customs and songs from village elders and family members. This provides a rich source of information for tourists and presents the community with an opportunity to teach the younger generation about their traditions.

One of the more challenging aspects of community participation is involving a balanced representation of a community. Consultation often focuses on the views of the more visible decision makers, usually males from leading families. By contrast, women and children provide many of the tourist services in and around PAs. Women are also the primary producers of handicrafts often sold to tourists.

8.2.1.4 Assessing feasibility of individual communities to participate in tourism

In protected areas there are often many communities that may be interested in participating in tourism development. However, careful assessments are necessary to ensure communities are ready, willing and able to develop viable tourism products, and that limited tourism development resources are optimally targeted to meet community priorities and conservation objectives.

Local PA and tourism management authorities need clear criteria for assessing a community's suitability for tourism development. Criteria used should reflect the conservation objectives of the zone in which the community is located, socio-cultural considerations and community development and tourism sustainability objectives.

Once a community has been assessed as suitable for tourism development it is the responsibility of local authorities to ensure they are well informed as to the costs and benefits and that there is consensus within the community to participate.

8.2.1.5 *Promoting equity in community based tourism*

Tourism development can provide communities with an immediate and significant source of much needed income, education and skills, but these benefits do not automatically accrue to all members of the host community.

For example, Ban Nammat Mai, an Akha ethnic community in the Nam Ha PA of Lao PDR is estimated to be earning 40 per cent of its total village income from tourism (US\$350 over a 3 month monitoring period) in the form of hosting trekking groups of up to eight people and limited to two visitations per week. Income is sourced mainly from accommodation in a village guesthouse and from sale of food. Nearly half of the 33 village households have almost doubled their average quarterly income from tourism and most of this money is spent on medicines, hospital visits and food (UNESCO Nam Ha Ecotourism Project 2001). In this situation tourism is making a tangible contribution to the social and economic welfare of the village. Yet, a significant proportion of families in Ban Nammat Mai receives little or no benefit and remain very much on the poverty line. This is due to a lack of organisational capacity within the village, ineffective leadership and existing socio-economic inequities.

Generally the wealthier families that have sufficient labour, who are in relatively good health and who are able to communicate with the tour guides are those that benefit from tourism. In those situations, tourism can exacerbate inequities and precipitate conflict. It may also lead to the emergence of undesirable behaviour such as begging and aggressive selling of products and, in the process, ultimately threaten the viability of the tourism business.

The lesson learned from Ban Nammat Mai is that active intervention may be necessary to assist a community to distribute benefits and manage impacts of tourism development. The supporting project is attempting to address these problems through facilitating organisational strengthening and developing alternative income sources for poorer families such as the sale of handicrafts.

Another example where the benefits of tourism are not equitably distributed is Cat Cat village in northern Vietnam, a community of 360 Hmong people and a staging point for many trekking operations from Sa Pa. In 1997, studies revealed that on average the village received over three times its population in tourists every day and benefited only from the sale of a few handicrafts and cold drinks. Most tourists arrive with non-local guides, carry their own food and water and generally do not require local goods or services.



8.2.1.6 *Maintaining a balanced community development strategy*

A balance must be found between tourism activity and other economic opportunities for communities living in and around protected areas. Communities that become highly dependent on tourism benefits may do so at the expense of maintaining other important subsistence and economic activities. Such communities are particularly vulnerable to the inherent instability and possible failure of the tourism market. Where possible, tourism should be developed in conjunction with other sectors consistent with conservation requirements such as health, education, natural resource management and agricultural food security (Box 8.3). This will help to diversify and strengthen a community's economy and so reduce its dependency on tourism. It will also assist the community to build its social capacity to more effectively manage tourism development.

One option is the creation of a protected area or community development fund for those living in the vicinity of a PA whereby some of the income raised through tourism is used to assist other forms of economic development. It is important however that there is a transparent system for the collection and allocation of village development funds and clear criteria for governing the use of funds to ensure that activities are compatible with PA conservation objectives.

Box 8.3: Contributing to Sustainable Community Development, Chiang Rai, Thailand

The Population and Community Development Association (PDA) is working with Ban Lorcha, a Phami-Akha ethnic village in Chiang Rai province Thailand, to develop a model for hill tribe based tourism that contributes to sustainable community development. A key component of the project is to strengthen the organisational capacity in the village to manage tourism and ensure that benefits are equitably distributed within the community and are used for development activities. This is achieved in various ways:

- A number of working groups have been set up in the village to manage the daily tasks associated with tourism including an Area Development Group, the Welcome and General Services Group, the Cultural Education Group, the Occupational and Product Development Group and the Finance and Bookkeeping Group.
- Income generated by tourism is deposited into a Village Bank in which all households are members.
- At the end of each year the funds in the Village Bank are divided into two parts. One part is invested for village development activities including the education of needy children, financial assistance to the elderly, orphans and villagers who have no means of supporting themselves and for reinvestment back into the development of tourist activities. A second portion of the annual fund is distributed equally among all households for personal use.

The funds for developing the tourism enterprise were advanced to the village as a 'soft loan' from the Revolving Loan Fund established by PDA. The Village Bank will have to repay the loan from income generated by tourism which will then be used to assist other villages to participate in sustainable tourism development initiatives.

Source: Adapted from a presentation by PDA at the Chiang Mai Regional Conference on Community-Based Ecotourism in Southeast Asia 2002

8.2.2 *The need for an ecosystem approach to planning and zoning*

8.2.2.1 *Pressure for short term income and profits*

The 'rush for the tourist dollar' at the expense of planning and management is a major threat in the region to sustainable nature tourism development in PAs. This is true especially in those areas suffering a chronic lack of local government funding and where poorly paid government workers at all levels, through necessity or inclination, take advantage of alternative income sources offered by tourism at the expense of their professional and ethical responsibilities.

Once tourism revenue comes on stream it can be politically difficult to contain the pressure to capitalise on short-term and high economic returns at the expense of long term sustainability. Tourism revenue provides a considerable incentive to exceed PA management guidelines for economic gain, resulting in high impacts on the environment and local communities and ultimately undermining the tourism resource base and the industry itself.

8.2.2.2 *Protected area zoning for tourism development*

Few PAs in the region have implemented effective zoning for tourism. Inadequate zoning is due to insufficient information and capacity to map and analyse ecological and socio-economic priorities in the PA, unclear demarcation of PA boundaries and limited flexibility in the zoning classification system for optimising tourism development and its contribution to PA management objectives. One exception is Cat Tien National Park in Vietnam where various zones have been identified for various types and scales of tourism development based on conservation and community development objectives (Box 8.4).

Land use planning integrates tourism, environmental and socio-economic priorities within the PA. Multiple use zoning of PAs through a participatory process is probably the most basic and effective strategy for managing impacts from tourism development.

Box 8.4: PA zoning for tourism development, Cat Tien NP, Vietnam

The Cat Tien NP Tourism Management Plan has identified five zones for tourism development and conservation.

1. An 'Intensive Tourism Zone' is located around the park headquarters where visitors enter the park. It offers accommodation, services and information and is intended primarily for use by 'weekend' recreational tourists and educational groups (maximum 60 visitors per day). Activities include short scenic walks, boat trips and other recreational activities. The ecological value of this zone is relatively low.
2. An 'Ecotourism Zone' is for low impact, overnight excursions by small groups (three to seven visitors per destination per day) into the PA into areas where there are opportunities for bird and other wildlife watching.
3. An 'Expedition Zone' is meant for very small groups (five people/expedition) who want to experience the park's wilderness areas.
4. A 'Community Tourism Zone' intended for developing economic activities for several villages in the park. It is primarily for cultural based tourism but also offers short excursions into the forest with village guides. It is intended for small groups only (five to seven people/destination/day). Additionally the buffer zone is designated for community based tourism on a more intensive scale (max of 200 people at any one time) to spread economic benefits and accommodate those tourists which exceed the carrying capacity at the Park Headquarters (max of 200 people at any one time).
5. A 'Restricted Zone' that contains the core populations of rare and endangered mammal species including Tiger, Elephant and Javan Rhinoceros. Research only is allowed in this zone.

The primary function of zoning is to identify areas where higher levels of tourism impacts can occur without harming areas of ecological significance. Beyond PA boundaries there is often contiguous natural habitat that remains important to the maintenance of viable PA wildlife and fisheries populations and which should be included in the zoning plan. This requires an ecosystem level approach to PA land use planning. Zoning for tourism development in areas of lower conservation value outside the PA also provides a management opportunity to redirect tourism development and high visitor numbers away from more sensitive or stressed sites inside the PA.

A basic zoning approach includes a core zone of high conservation value for strict protection and a buffer zone for conservation and restricted multiple use by communities and other stakeholders. Yet, this broad framework does not always accommodate the complex, spatial distribution of traditional community resource use areas, important biodiversity areas, degraded habitat and ecologically sensitive sites in the PA. Buffer zones may contain key habitats and species that require strict protection and core zones often contain less sensitive areas where managed use may be acceptable.

As ecotourism development is generally less consumptive than other forms of natural resource use it may not always be incompatible with the conservation objectives of designated core zones. Strict adherence to regulations prohibiting use in poorly defined core zones may mean that tourism development potential and the socio-economic and conservation benefits that it can bring is unnecessarily lost from the PA. Similarly the blanket designation of buffer zones for tourism development, in the absence of detailed land use planning, may encourage high use and be incompatible with both conservation objectives and sustainable community development objectives.

8.2.3 *Funding protected area tourism initiatives*

An important requirement for biodiversity protection in the region is the provision of funds to support bioregional assessments, ecological research and the management of protected areas. Methods of increasing revenue range from direct pricing and charging on a user pays basis to indirect taxes and charges on goods and services associated with the tourism trade.

8.2.3.1 *Entry fees for protected areas*

Most studies have indicated that the fees paid for entry to PAs are much lower than the amounts that people are prepared to pay (Box 8.5). This is especially the case for international tourists. There is significant scope for increasing fees, creating a revenue stream that can be used to support infrastructure development, conservation management costs and community development activities.

Across the region there is a strong case for countries to collaborate on fee schedules. Countries that under-charge will fail to capture the full revenue stream. Also, if fees are kept low to attract tourists, the increased numbers may simply add to the threat of resource degradation and, in the longer term, diminish the values that attracted tourists.

8.2.3.2 *Other charging mechanisms*

Various other kinds of charges can be applied to fund protected area management and contribute to local development. For example, commercial operators should be required to pay license fees and for leases and concessions. Rights to operate within PAs may be offered to the private sector on a competitive auction basis so that payments for concessions and leases reflect market demand.



Revenue for conservation can be raised from taxes on goods used for nature-based recreation and tourism, such as camping gear, fishing equipment, diving equipment and similar items.

In all these cases, it is important for countries to have comparable charging rates, otherwise the tourism trade will be distributed inequitably (and probably inefficiently) throughout the region.

Box 8.5: Implementation of a tourist fee system in Sa Pa, Vietnam

International visitors to Sa Pa are asked to pay a small fee at access points to three frequently visited villages. The money is used for salaries, English training and general development, however, no information is given to tourists on where the money is spent, and there is a perception that the collection of fees is ad hoc and the income is not returned to the local area.

The *Support to Sustainable Tourism in Sa Pa District* project commissioned a consultant to survey international and Vietnamese visitors and provide advice on what they are willing to pay. The study found that:

- the fee could be raised from 5 000 (US 35 cents) to between 20 000 and 30 000 Vietnamese Dong a day;
- higher fees are more readily accepted if tourists agree with how the money is used; and
- tourists prefer the money be spent either to help ethnic minorities in the region or for conservation of the natural environment of Sa Pa.

The survey will be used to review the current fee structure and develop a more transparent and informative system.

8.2.3.3 Adequate budgetary support for conservation and a regional fund

The level of government budget support to protected areas should reflect the full economic value of interesting landscapes and ecosystems as attractions for nature-based tourists. A proportion of tourism revenues should be labelled specifically for the purpose of establishing, enhancing and maintaining protected areas including their tourism attractions and facilities. Currently, only a small proportion of revenue from tourism is returned for maintenance of the affected protected areas. For example, in 2002, the Cambodian Ministry of Environment received only one per cent of US\$650,000 from tourism associated with Bokor National Park. The rest went to traders operating at Toek Chou waterfall, the private sector in Kampot Town (e.g. hotels, restaurants and transport) and the Tourism authorities. In addition, all the tourism services contribute to provincial and central tax revenues through the fees, levies and charges they remit (ICEM 2003g).

A special regional fund should be considered to support strategies for establishing and maintaining protected areas and promoting nature tourism based on their natural attractions and to support a more systematic approach to the various economic instruments which are available to government to increase revenues.

8.2.3.4 Product Development

Tourist facilities and services associated with PAs are products that can be bought, sold and marketed according to market demand. Different types of tourists seek different experiences and market research can be used to reveal visitor expectations and to better focus scarce management resources. With increasing interest in recreation and tourism from both domestic and international visitors most PA managers in the region should expect to cater to more than one market and different approaches are called for (Box 8.6).

As with commercial products, tourism in protected areas should be developed and managed to serve a particular market or group. An unsuitable product, one that does not meet the needs or interests of the market, will be unsustainable. Many products do not compete as a result of poor research or design. Local authorities, the private sector and NGOs need to collaborate – using a forum such as a PA Tourism Committee - to ensure that tourism products developed are of sufficient quality and diversity to be able to compete in a limited market.

Box 8.6: Sa Pa, Vietnam - three tourist markets

A major attraction of Sa Pa is the Hoang Lien Son Nature Reserve, a unique habitat with several species of rare or endangered fauna and flora, and a large variety of orchids.

Early studies were based on the premise that there were two main markets in Sa Pa. These are Vietnamese tourists who like Sa Pa for its mountain scenery, cool climate and orchids. They take short walks around the town, collect orchids and enjoy Sa Pa's bars and other nightlife. The second group is foreign visitors who are attracted by the diverse ethnic communities and their mountain environment. International tourists tend to be more interested in trekking and visiting the villages of ethnic minorities.

A recent study, commissioned primarily to gain insights into the activities, issues, opportunities, business environment and linkages in the local industry identified a third segment: international expatriates living in Vietnam who are seeking a retreat from the densely populated urban centres.

8.2.3.5 *A region survey of willingness to pay studies to guide pricing regimes*

Surveys in the region of willingness to pay reveal that international visitors (and domestic tourists) are generally willing to pay much more than the entry fees charged, especially if the funds are used for conservation.

The higher incomes and expenditure capacities of international visitors create a strong case for differential entry fees. Thailand, for example, has an entry fee structure applicable on a national scale: 20 Baht (50c US) for Thai adults, 10 Baht (25c US) for children, and 200 Baht (US\$4.65) for foreigners. But, as Vietnam has found, differentiation is not always popular with international visitors so other forms of fund-raising focussing on international tourists to support PA management can be explored.¹⁶ On a regional scale, it would be appropriate to adopt charging systems (at least for foreigners) to better reflect the level which tourists are willing to pay for the conservation of assets they have come to enjoy.

A comprehensive review of existing studies of the willingness-to-pay should be undertaken. The purpose of conducting such a survey is to provide guidelines to PA planners and managers in the region on pricing regimes, so as to appropriate more fully the tourism benefits that PAs yield. The techniques mostly used to determine these values are contingent valuation, which can identify the willingness-to-pay for use values and non-use values, and the travel cost method, which focuses on use values (ICEM 2003f).

8.2.4 *Managing Impacts*

8.2.4.1 *The need for standards*

Impacts on the resources and communities of a PA are an inevitable consequence of tourism development. Negative impacts arise from two main sources – visitation by tourists and the development of infrastructure and visitor facilities. The question that PA and tourism managers and communities need to ask is “What values do we wish to protect and how much impact or change to those values is

acceptable in this area or in our community?" These impacts can be ecological, social as well as economic (Box 8.7).

Box 8.7: Cultural Do's and Don'ts

In Muang Sing, northern Lao PDR, community workshops addressed the question 'what are the most important things to tell tourists if you don't speak English?' The messages are displayed on a poster *A Message from Your Local Host* which encourages positive interaction with local people, purchase of new handicrafts and payment for food and accommodation. It also discourages negative behaviour such as consumption of drugs, wildlife and purchase of family heirlooms. The poster has been well received and is distributed to travel agents and guesthouses throughout Lao PDR.

The poster is written in English and Lao and is also useful as an educational tool in villages. The approach has also been used in Northern Thailand.

Defining appropriate tourism requires agreement on the ecological and social standards desired for any given area or community. Once agreement is reached, managers can work towards those objectives and also ensure that the desired ecological and social outcomes are maintained.

Even small scale, low impact tourism can cause incrementally small changes and may eventually lead to unacceptable impacts. Damage of this nature is difficult to detect until obvious degradation has occurred. An essential component therefore in managing tourism impacts is to design and implement a monitoring system that will enable managers and communities to detect impacts before they become too large to manage effectively.

If other measures are not successful sanctions may be necessary to protect the natural and cultural values of an area.

8.2.4.2 Visitor Management

Tourist activity can also impact on the quality of visitor experience. Many ecotourists seeking an experience in nature are sensitive to perceived over crowding or environmental impacts such as littering and noise pollution. Dissatisfied visitors through 'word of mouth' are likely to erode the reputation of a PA as a quality tourism destination resulting in a reduction in visitation and loss of economic benefits (Box 8.8).

In popular PAs such as Cat Tien NP in Vietnam, increasing visitation, coupled with insufficient funding and staffing, is resulting in serious impacts including widespread littering, vandalism to trees, trail erosion, disturbance to wildlife, reduced visitor satisfaction due to disturbance and overcrowding and the pilfering of orchids (WWF Vietnam 1999).



¹⁶ Following complaints from international tour operators in 2000, Vietnam moved from a differential to a uniform fee structure.

Box 8.8: Limiting group size and departures in community-based ecotourism

The Nam Ha PA Ecotourism Project in Lao PDR has, in consultation with communities, limited the group size of visitors to a maximum of 8 people per trip and the number of visits to 2 per week in an effort to minimize socio-cultural impacts and maintain the quality of visitor experience. Using a precautionary approach in setting limits with communities, coupled with regular monitoring of impacts, enables managers and communities to determine the carrying capacity in the village for accommodating tourists. Monitoring results to date suggest that there are no significant socio-cultural impacts but that the communities are already approaching the limit of their capacity to provide sufficient food to the current number of visitors without impacting their own welfare. Monitoring of visitor satisfaction is also indicating that the maximum limits set are close to the tolerance level for perceived overcrowding by ecotourists seeking an authentic cultural experience. Setting limits on group size is becoming an increasingly important factor in the competitive marketing and pricing of ecotourism products.

Regulating the number of visitors and trips is one strategy for managing such impacts if appropriate (Borrie et al. 1998). In some instances it is not the total number of visitors that can cause problems, rather how visitors are managed. Even small numbers of inexperienced snorkelers and divers can cause significant damage to coral reefs by standing on them or brushing them with their flippers. In this type of situation, where tourists are visiting sensitive ecosystems, providing codes of conduct and trained guides is likely to be a more effective strategy for managing impacts.

Understanding the causes of impacts is crucial to enabling the selection of effective management strategies.

8.2.4.3 Infrastructure Development

The design and location of infrastructure can have a severe impact on conservation objectives. Common forms of infrastructure associated with protected areas are visitor centres, toilets, lodges and interpretive trails and many organisations have prepared guidelines for tourism infrastructure development in protected areas. These usually advocate use of local materials and labour, minimal impact technology and recycling. The use of new technologies, such as solar panels and composting toilets, can be expensive to install but they are relatively cheap to maintain. A soft loan could be considered to fund initial costs.

Infrastructure development may not be appropriate in all circumstances and concern has been raised in some protected areas that provision of small scale infrastructure can generate demand for further facilities, thus adding to pressure on sensitive areas rather than relieving it. This underscores the importance of planning and zoning for PAs before infrastructure is considered.

A lesson learned in Luang Namtha, Lao PDR, was that villagers found an architect designed lodge for use by trekkers more difficult to maintain than local houses. The supporting project and provincial tourism authority has since changed its approach and now selects an existing house in the target village and negotiates with local people to construct a similar building as a visitor lodge.



8.2.4.4 *Monitoring*

Monitoring is as an essential, yet much neglected, component of sustainable tourism development. It provides managers and communities with an early warning system for detecting ecological and socio-cultural impacts before they become too difficult to address and it informs stakeholders on progress made in meeting the objectives of sustainable tourism development in PAs.

There is a need for monitoring systems that are simple and resource inexpensive to implement. In situations where there is low technical capacity, staff numbers and funding as occurs in many PAs, sophisticated systems are likely to fail. NGOs, regional training institutes (such as APPETIT) and research institutes have an important role to play in designing and disseminating user-friendly monitoring and evaluation systems.

Both private and public sectors can assist in collecting and compiling monitoring data, and communities have a special role to play.

Monitoring data should be independently evaluated by a stakeholders' board (for example, a PA management committee) to resolve emerging issues and improve existing operations. A stakeholders' board is also an effective forum for monitoring how public funds are used to enhance local PA management and community development objectives.

At the national level an appropriate agency should be allocated responsibility for synthesising monitoring results from all PAs and making them available to policy makers.

Once indicators have been selected for important characteristics, baseline data needs to be collected (as a benchmark against which changes and trends can be measured) and target levels set which define acceptable limits of impact or desired results based upon agreed conservation, socio-cultural and economic objectives.

At a site, community and national levels a number of broad indicators need to be monitored.

8.2.4.5 *Enforcement*

Government is responsible for disseminating regulations and monitoring their compliance by the private sector, guides and tourism public. Where regulations are directly violated there needs to be some form of enforcement and deterrence. This may include, for example, warnings, direct fines, and a cancellation of concessions or licenses to operate in the PA or a forfeiture of performance bonds.

Enforcement of regulations however can be very time consuming for management staff, expensive to undertake and may not be an effective deterrent unless consistently and correctly applied. Managers should first consider the use of education and voluntary codes of conduct as a more practical strategy. Where codes of conduct are repeatedly broken and, as a result, are causing unacceptable impacts it may then be more effective to use regulations if there are sufficient resources to enforce them. In certain situations the use of regulations is essential - especially where prescribed by national law - and resources need to be made available for enforcing them. Examples may include controlling the operation of unlicensed guides and private operators in the PA, the taking or purchase of flora and fauna from the PA, the vandalism of natural and cultural heritage sites, the use of drugs by tourists and the pollution of waterways.

All contracts and MOUs between the private sector, communities and public sector should include consensus-building mechanisms for resolving conflicts and ensuring compliance to agreements. The NGO community too has an important role to play in monitoring government performance and adherence to policies, laws and relevant international agreements.

8.2.4.6 *A legal framework for tourism development in PAs*

A priority for all governments is to review and strengthen the legal framework for protecting communities from exploitation and enabling them to participate in and benefit from tourism development associated with PAs. This is very much linked to issues of citizenship for ethnic minorities and the allocation of land and resource use rights to communities living in and around PAs.

PA legislation should confer the right to ethnic communities to develop tourism businesses on their customary lands and to retain revenue from those businesses. Importantly, legislation should give the right to communities to refuse tourism development or terminate contracts with private operators.

8.2.5 *Developing partnerships with NGOs and the private sector*

In many remote protected areas managers, communities and local private operators may not have sufficient funds, capacity or knowledge to be able to develop, manage and market sustainable tourism products without external assistance.

NGOs have a valuable role to play in building the capacity of all stakeholders. Many successful community-based ecotourism projects in the region have been strongly supported by NGOs, sometimes in partnership with the private sector.

8.2.5.1 *NGO projects and poverty alleviation*

The use of sustainable nature-based tourism as a strategy for poverty alleviation of rural communities is a policy objective of all countries in the region. In reality though PA communities are often marginalised from genuine participation in tourism development, or where they are involved, non-local operators and guides are taking most of the benefits. In some situations communities are being exploited by outside tourism operators resulting in little economic benefit and causing significant socio-cultural impacts. NGOs can provide the critical supports to local communities in establishing the skills and mechanisms for capturing the benefits of tourism development and in forging equitable working links with the private sector.

8.2.5.2 *Role of the private sector*

The private sector is an essential partner in the development of nature-based tourism in PAs. They can contribute to the capital investment required for the development of products, to capacity building of communities and small scale local operators to manage tourism through joint ventures, to the training of guides, to marketing and promotion and to the monitoring of impacts. In an unregulated environment, however, a proliferation of tourism operators interested only in financial gain threatens the sustainability of tourism development. This can be managed in a number of ways:

- **The allocation of concessions or licenses** to operate in PAs compatible with levels of use identified for each zone and which ensure there is a sufficient diversity of tourism products to meet market demands and optimise economic benefits.
- **Binding private operators to abide by regulations and codes of conduct.** In return the contractor can be offered protection from unregulated private sector operators. This can be a major incentive to reputable private operators which, in an otherwise unregulated environment, will eventually have to compete in price cutting wars with 'copy cat' operations.
- **Performance Bonds** can be applied to tourism operators that rely on PAs as a tourist attraction or who operate infrastructure within PAs. Under this arrangement, an up-front payment or financial guarantee is lodged with the relevant management authority as a condition of an operating licence. This ensures that, if environmental damage is caused, funds will be available for restoration purposes. Discounts on

the sums of money required can be given to operators that demonstrate compliance with codes of good environmental practice, thus encouraging environmental responsibility.

- **Accreditation or certification schemes** for 'eco friendly' companies can ensure that reputable operations are given priority in the allocation of concessions to operate in PAs. To protect local interests and minimise economic leakage away from local areas it is important that regional and national accreditation schemes are sufficiently flexible to accommodate small scale operators who may be unable to meet the strict requirements of the larger commercial companies. Additionally regional and national schemes should consider criteria that require companies to form joint ventures with local communities and small-scale operators in the interest of returning benefits to local economies and building local capacity in tourism management.

8.3 Enhancing PA conservation through tourism development

Government policy recognises that ecotourism should be ecologically sustainable and contribute to the conservation of natural heritage. Policy makers and PA managers therefore need to develop strategies not only for managing ecological impacts but for ensuring that tourism development, where possible, is contributing to the conservation of the PA resource base. This also makes good economic sense as the success of the nature-based tourism industry, in an increasingly competitive market place, is very much dependent on the quality of the natural environment that supports it.

Apart from the direct flow of revenues to communities and protected areas through the use of economic instruments as detailed earlier in the chapter, tourism can contribute to the conservation of the PA resource base in a number of ways.

8.3.1 Collaborative management arrangements with PA communities

It is often assumed that the economic benefits from nature-based tourism will provide sufficient incentive for local people to conserve the natural resources that support the tourism enterprise. Yet, the threshold at which economic benefits will sufficiently motivate a community to conserve natural tourism attractions is difficult to predict and is influenced by many social-economic and cultural variables. Typically the limited revenues from community-based ecotourism - which is small scale by definition - will be insufficient to meet the basic needs of a community and will need to be combined with other forms of assistance to provide the necessary incentives for a community to change its resource use patterns in the interest of long term conservation.

The immediate economic benefit generated by tourism can however provide an effective entry point and opportunity to develop collaborative management arrangements with PA communities to protect and conserve PA resources. Experience from the UNESCO Nam Ha Ecotourism Project in Lao PDR has shown that communities benefiting from tourism are receptive to PA management programs and conservation agreements in return for tourism benefits and continued assistance.

Agreements that ask a community to forgo income from the harvesting of natural resources or use of land in return for tourism benefits alone are unlikely to succeed. To be effective, co-management programs should include provision for development incentives, education and awareness raising programs and capacity building (Box 8.9).

8.3.2 Targeting strategically important PA communities for tourism development

The survey and mapping of biodiversity in a PA, as part of the zoning process, will reveal areas and sites that are of relatively high conservation value but which remain within the traditional resource use areas of adjacent communities. Actively enforcing sites of high conservation value and core zones against resource use can be very difficult in areas remote and rarely visited by PA staff. In these situations tourism

development can be an effective strategy for enhancing the conservation of these areas. High quality ecotourism products that include visits to remote and relatively undisturbed areas to observe wildlife and scenery in the company of ethnic guides can yield considerable economic benefits to communities which can be linked to a requirement to enter into collaborative arrangements to protect and patrol areas of high conservation value.

8.3.3 *Creating tourism protected areas*

The creation of voluntary, community managed biodiversity reserves for tourism development can be an effective way for diversifying the tourism product and generating additional income for the community while providing an additional incentive to communities to protect areas of high conservation value.

Box 8.9: Collaborative partnerships in community-based tourism to promote development and conservation, Kirirom NP, Cambodia

With assistance from the NGO, Mlup Baitong, villages in the Chambak commune of the buffer zone of Kirirom NP have prepared an Ecotourism Management Plan to develop and manage a waterfall tourism site that is becoming increasingly popular with domestic tourists. Tourism represents a significant opportunity for local communities to generate income and to help reduce their dependency on the use of natural resources in the NP. The plan, in addition to prescribing actions for developing and managing tourism, includes a number of initiatives to conserve and protect the natural resources of the Park. These include:

- Local zoning of the tourism development area, including sub zones for the conservation of bats and rare plants.
- Patrolling of the site to enforce against illegal hunting and tree cutting activities.
- Protection of waterways from tourism waste and pesticides.
- Fire prevention by ensuring that tourists are always accompanied by at least one guide to patrol against accidental fires.
- Limits on the quantity and type of NTFPs collected by the villagers in the area.

In return the community requests support from the Ministry of Environment, the PA management agency and Mlup Baitong to help with tourism infrastructure development, technical advice on natural resource management and in managing visitor impacts, guide and tourism management training and protection from demands to share income with local soldiers and from the operations of unlicensed private tour companies.

Source: Adapted from the "Tuk Chrak Waterfall Ecotourism Management Plan", Chambak Commune, Kirirom NP, Cambodia 2002

The village of Ban Nammat Kao in the Nam Ha PA of Lao PDR has created a 100 ha reserve within their village area for the purpose of tourism development and the conservation of bird and squirrel populations which are in rapid decline from over hunting. Hunters guide tourists who visit the village on a nature trail in the reserve to view bird life and learn about the ecological knowledge of the Akha people. A natural history field handbook for the reserve is in preparation to assist the guides with tourist interpretation. Each of the village guides receives a fee that is built into the price paid by each tourist for the trek thus guaranteeing a steady source of income. The hunters are proud of their knowledge and abilities to track wildlife and this is readily observable in their interaction with the tourists. In this way the reserve is adding value to the trekking experience, fostering an enhanced appreciation for local culture, and providing an incentive to the community to preserve their knowledge and traditions – a primary objective of ecotourism.

The village has full authority for the management of the reserve and has taken it upon itself to establish penalties in the form of warnings and fines for enforcing the no-hunting regulations.

Tourism reserves also offer an opportunity to demonstrate to local communities the principles of natural resource management. With protection, time and simple monitoring techniques it should be possible for the people of Ban Nammat Kao to see increases in the abundance of NTFPs and bird and squirrel populations inside and around the reserve. In this way this local reserve can serve as a catalyst for the community to establish management systems for other economically important natural resources. Initiatives like this however require active facilitation by PA staff and/or outside organisations.

8.3.4 Tourism as an employer of local resource users

The employment of local hunters as guides helps to raise conservation awareness among the sector of the community that has the greatest influence on the levels of wildlife harvesting. Paying a reward to local hunter guides who are able to locate wildlife for tourists also provides an incentive to conserve.

A policy to use local resource users in ecotourism enterprises may have a measurable effect on reducing the harvesting of wildlife and fisheries and will also assist in raising awareness about the link between conserving natural resources and tourism benefits (Ferraro and Kramer 1997).

This does not necessarily occur in all circumstances. In the Nam Ha PA of Lao PDR, for example, ecotourism has not led to a significant reduction in the time available to harvest natural resources. On the contrary some households may be expending more time to harvest natural resources to provide food for tourists. Additional community controls and incentives may be needed.

8.3.5 Tourism as a deterrent to illegal land and resource use

The regular presence of tourist groups in certain sites of the PA can act as a deterrent to 'outsiders' undertaking illegal activities (Box 8.10). PA managers can channel tourism to areas under threat, such as navigable rivers, as a strategy for patrolling and deterring the presence of outsiders. It is imperative that security and safety issues are given priority consideration when employing this strategy and that locally trained guides and/or PA staff accompany tourist groups into areas where there is the likelihood of outsiders engaged in illegal activities.



Box 8.10: Tourism-based monitoring as a tool for enhancing PA management

In the Nam Ha PA, Luang Namtha, Lao PDR the Wildlife Conservation Society (WCS) has worked with the PA Management Unit to develop and jointly implement a wildlife and resource use monitoring program with the Provincial Tourism Authority and local Guides Association along trekking trails and rafting rivers in the PA. The monitoring program is intended to detect the long term impacts, both positive and negative, of tourism on the wildlife populations and level of resource use in the PA. Additionally the regular visitation of guides and tourists to the PA and communities provides the under staffed PA Management Unit with valuable and regular patrolling information on urgent threats to conservation values that require immediate attention, such as the activities of wildlife traders, illegal logging and tiger-livestock conflicts in villages. The monitoring program is designed to be undertaken jointly with tourists offering them an opportunity to participate in PA management and, in the process, enhance their interpretive and educational experience.

Source: UNESCO Nam Ha Ecotourism Project, Luang Namtha, Lao PDR

8.4 Future directions

Many strategies for enhancing the development and conservation benefits of tourism in protected areas have been canvassed in the preceding sections of this chapter. This section outlines critical actions which need to be taken at regional level.

8.4.1 Prepare a regional action plan for tourism in protected areas

Tourism is regarded as a spearhead branch of the economy in all four countries and each is actively seeking to maximise its values as a tourist destination. When current plans under the Greater Mekong Sub-region development program to upgrade roads, airports and communication links are completed by the end of the decade there will be direct, all weather highways from China, through Luang Namtha to Bangkok, on to Danang and into Cambodia. New or upgraded airports and roads will facilitate movement between the countries and provide access to protected areas. The potential impact of this activity is clear: there will be more tourists, and different types of tourists simultaneously making demands and presenting opportunities for protected area management. The expected influx of tourists will need to be effectively managed and coordinated if the greatest benefits for the least cost are to be achieved.

A regional tourism and PAs action plan would help attract different segments of the tourist market to the most appropriate locations, at the most appropriate times and according to best management practice. It would provide relevant background information on the region's natural and cultural assets, infrastructure and tourism products, market analysis and industry structure, coordination and research. It should set a strategic direction for ecotourism management and define steps to achieve its goals. Most important, it should provide the policy framework for a regional program of technical support, research, monitoring and training.

The action plan would:

- Facilitate collaboration between countries of the region in the development of nature based tourism products and facilitates.
- Promote protected areas as tourist destinations and identify priority activities to develop and promote nature based tourism activities.
- Provide guidelines for tourism development so that it maintains and enhances the natural and cultural assets in the protected areas which tourists come to experience.

The action plan would set out a code of practice for tourism development in and around PAs, and provide guidance on the economic relationships which need to be understood between tourism operators, the PA managers and local communities. It would give direction on the use of economic instruments to facilitate and manage ecotourism activities.

The definition of bioregions and a network of PAs covering the lower basin would provide an appropriate analytical framework of the action plan. Bioregions assist in priority setting for tourism development and PA management attention. By achieving contiguity of PAs on a multi-country basis and supporting viable populations of plants and animals, the prospects of attracting tourists and sharing benefits is enhanced. The importance of a bioregional approach to planning is developed in several of the sector chapters, especially on water and forests. It is also explored in the next chapter on transboundary protected areas.

Many of the benefits of sustainable tourism are abstract concepts at a regional level and the action plan needs to be linked with pilot projects which test and demonstrate application of the guidelines and methods. The action plan would provide a stimulus to national policy development (Box 8.11). Although some steps have been taken in Vietnam and Thailand to develop national ecotourism strategies, none of the lower Mekong countries currently have a plan exclusively addressing PA tourism development. The issue is recognised in each country's national tourism strategy where the benefits of natural and cultural tourism products are clearly understood. It would be beneficial if the tourism and PA management sectors were to cooperate in preparing a collaborative plan for the development of tourism associated with protected areas. Most important, all protected area plans should have a strong tourism component developed through consultation with all spheres of government. Protected area managers have a vital contribution to make to provincial and local nature based tourism plans within the framework of regional and national planning.

All issues raised in earlier sections have regional, national and local policy implications. Regional issues are particularly difficult to address as they involve joint efforts from all lower Mekong countries. The regional action plan process should provide the foundation for the following high priority regional actions:

8.4.2 Build professional expertise and quality control

- Provide leadership by endorsing and disseminating the principles of ecotourism as regional policy.
- Establish a collaborative regional training program to ensure high quality planning and management.
- Use information from case studies to inform policy and planning.
- Establish a regional tourism and protected areas working group, or link with existing groups such as the environment forum managed by Pan Asian Tourism Association (PATA).
- Establish a regional system for accreditation of operators so that they adhere to responsible, professional and ethical standards.

8.4.3 Prepare bioregional management plans and monitoring systems

- Develop bioregional management plans and guidelines for nature based tourism.
- Develop regional indicators to measure the impacts of tourism development in PAs.
- Undertake market research to ensure that products in each bioregion are carefully developed to match visitor expectations and maximise the benefits of tourist activity.

8.4.4 Develop funding strategies for protected area tourism management

- Review existing economic instruments and incentives to optimise the flow of revenue for PA management.
- Undertake a review of willingness-to-pay studies in the region and globally to guide the level of entry fees and commercial concessions arrangements.

8.4.5 *Reduce the negative impacts of tourism development*

- Develop guidelines for tourism infrastructure development and tourist behaviour to minimise negative impacts.
- Undertake further research on how PA management decisions can impact on tourism activity to maintain natural and tourism values.
- Develop monitoring protocols to ensure that the integrity of conservation and cultural assets is maintained.

8.4.6 *Work with the private sector and NGOs to test, demonstrate and learn*

- Prepare a review of lessons learned and case studies of PA-tourism experience covering all four countries.
- Undertake additional pilot projects in bioregions where none exist.

The development of tourism policy is often reactive, occurring in response to negative impacts of unplanned development instead of proactively enabling communities and local government to ensure tourism is environmentally and socio-economically sustainable. This pattern can be reversed in countries of the lower Mekong if they cooperate in early planning and adopt strategies to take advantage of the potential contributions that PAs and tourism can make to the socio-economic development of the region. Protected areas, and all the tourism products and services they support, are an essential component of the sustainable development of the tourism sector, but it needs to be professionally managed if the importance of protected areas to local and national economies is to be maintained.

Box 8.11: National and local policy initiatives

Build professional expertise and community understanding

- Review the institutional framework for managing tourism development in PAs to ensure that PA management agencies take the lead role in planning and coordinating other agencies.
- Mobilize stakeholder boards and a national technical advisory group to support tourism planning.
- Develop a national PA management training curriculum. Provide training to PA staff in protected area planning and zoning for tourism.
- Develop guidelines and criteria for conducting pre-feasibility assessments for community-based tourism and ensure that assessments are undertaken before communities are involved in tourism development.

Establish planning structures and procedures for tourism development in PAs

- Require land use planning and zoning to precede all tourism development in PAs.
- Develop Tourism Management Plans for all PAs that provide clear direction for balancing conservation and social needs with tourism development.
- Confer legal rights to ethnic communities to develop and benefit from tourism development on customary lands.
- Develop strategies and guidelines to involve women, children and older village members in the planning process.
- Inform communities of the potential costs and benefits before proceeding with tourism development.
- Establish a stakeholder forum to oversee the implementation of tourism management plans, to promote transparency and accountability in decision-making and ensure that objectives are met.

Develop funding strategies for protected area tourism

- Provide PA and tourism managers with simple and standardised methodologies for evaluating and presenting the economic benefits flowing from tourism development.
- Develop mechanisms to ensure that local communities and PA managers retain some income from tourism in their area.

Develop strategies to reduce negative impacts***Visitor management***

- Develop codes of conduct on culturally appropriate behaviour, noise pollution, litter, vandalism, taking of flora and purchase of wildlife products.
- Encourage tourists to be accompanied by trained guides when visiting sensitive ecosystems.

Infrastructure

- Wherever possible locate infrastructure outside PAs.
- Review the environmental impact of any proposed development, either through a formal EIA or, in the case of small scale interventions, a simple checklist to assess such things as visual impact, social change, noise, ecological disruption during construction and after the facility is in service.
- Establish a soft loan facility to fund the purchase of solar panels, composting toilets and other minimal impact technology that can be repaid through user charges.

Monitoring

- Establish monitoring protocols for inclusion in all PA tourism management plans.
- Establish a national level environmental and socio-economic auditing process for PA tourism development using standardised performance indicators (to be informed by site level monitoring protocols).
- Identify NGO and private sector partners to facilitate product development and build capacity of local communities.
- Develop legally binding contracts for private operators that protect community rights and stipulate mechanisms for returning economic benefits to communities.
- Establish a forum for resolving disputes between communities and tourism development partners that is facilitated by local authorities.



9 Transboundary protected areas as a mechanism for conservation and development

9.1 Introduction

A transboundary protected area (TBPA) is “An area of land and/or sea that straddles one or more boundaries between states, sub-national units such as provinces and regions, autonomous areas and/or areas beyond the limits of national sovereignty or jurisdiction, whose constituent parts are especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed co-operatively through legal or other effective means” (IUCN 2001).¹⁷ Cooperation between

two or more adjoining protected areas on either side of a political or administrative boundary is a prerequisite for recognition as a TBPA.

In this chapter protected areas which have trans-national implications are considered and not those on either side of sub-national boundaries, although many principles of cooperation and collaboration are similar. In fact, the experience from successful cooperation in managing protected areas that span inter-provincial borders can provide useful lessons for trans-national cooperation.

Not all existing or proposed protected area complexes covered in this chapter might qualify as TBPAs according to the IUCN definition. The intention is to cover situations in the region where major adjoining protected areas or potential protected areas lie on either side of international borders and have direct or indirect habitat connections. The chapter seeks to highlight the importance of such complexes for international relations, economic development and conservation and to promote transboundary collaboration for their management. Several of the sites identified in the lower Mekong region would involve the establishment of new protected areas by the participating countries as a basis for transboundary cooperation.

When two or more countries actively engage in the establishment and cooperative management of TBPAs it brings important benefits. It provides a forum and ongoing technical relationship which facilitates discussion on a wide range of international matters – i.e. it nurtures closer ties between neighbours and opens the way to more extensive cooperation. It enables more effective cross-border control of poaching and smuggling of fauna and flora, and the management of forest fires and invasive species. It facilitates research and monitoring to mutual advantage. Overall, it enhances biodiversity conservation and environmental protection across national jurisdictions.

9.1.1 TBPA development benefits

TBPAs have another important role. Border areas in the region are usually remote and relatively poor. TBPAs can be a vehicle for social and economic development in these areas reinforcing government policies for decentralisation and the promotion of remote regions. They facilitate closer economic ties between people living across borders, and build common understanding and values. TBPA initiatives include activities that support sustainable economic development, for example, through ecotourism and local enterprise development. Joint marketing and promotion for tourism in adjoining sites can greatly enhance the opportunities and benefits from TBPAs to the countries and local communities involved.

In particular, the management of contiguous natural areas through the establishment of a TBPA better safeguards ecosystems and the goods and services they provide. Those services have been described in

¹⁷ The IUCN-WCPA publication on Transboundary Protected Areas for Peace and Co-operation (Sandwith et al. 2001) is a good source of best practice guidance on the establishment and operation of TBPAs, including parks for peace.

earlier chapters. They include broad regional benefits such as flood regulation, erosion control, soil formation and nutrient cycling, to more local benefits like pollination by insects and birds, water supply, food and raw materials, recreation, genetic resources and cultural and scientific amenities. The economic value of the goods and services produced by protected natural ecosystems has been shown to be very substantial (ICEM 2003f), with a benefit-cost ratio of around 100 to one, i.e. economic returns are one hundred times the cost of investment (Balmford et al. 2002).

As the Greater Mekong Sub-region program of hydropower, irrigation, transport and other infrastructure projects moves forward, TBPAs have special potential for the countries of the region as a mechanism for landscape management in areas. The upland areas hold much of the region's natural wealth, particularly along the forested border areas with their rich biodiversity (Donovon 1998). Degradation and deforestation in such areas is affecting local livelihoods as well as the quality and timing of water flows to lowland rice-producing regions and industrial and urban areas (Badnoch and Dupar 2002).

9.1.2 *TBPAs in the lower Mekong region*

There have been 169 complexes of internationally adjoining protected areas identified globally, containing 666 individual protected areas in 113 countries (Zbicz 2001). This list also includes 21 adjoining protected areas on international borders in the lower Mekong region. The list in Table 9.1 of existing and potential TBPA complexes in the lower Mekong is compiled from geographic information system (GIS) analysis conducted as part of the PAD Review and by drawing on other assessments. It includes adjoining protected areas and those that have the potential to form parts of large TBPA complexes connected by remaining natural forest (Map 9.1):

In addition to these eleven sites, Lao PDR has identified two wetland complexes in the Mekong River between Lao PDR and Cambodia and between Lao PDR and Thailand that have potential as TBPAs and preliminary discussions have been initiated involving the National Mekong Committees to launch collaborative projects.

This list does not include the range of important potential TBPAs linking Thailand, Lao PDR and Vietnam with Myanmar and China. For example, a very important potential cross border conservation initiative would involve extending protection from Thailand's Western Forest Complex to the rich connecting natural forests in Myanmar and southward until it joins with another complex of protected areas on the Thai side—the Khan Kha Chan Complex. Also, there are many smaller scale cross border conservation opportunities involving the four lower Mekong countries which bring together local governments. For example, In recent years, commune and district authorities in Tay Ninh Province of Vietnam have held monthly meetings with counterparts in Cambodia to discuss issues of mutual concern, such as cross-border trading and security. Staff of Tay Ninh Forest Protection Department and Lo Go Xa Mat National Park have participated in these meetings. Conservation issues have been raised, such as illegal logging, hunting, and the wildlife trade. Lo Go Xa Mat National Park has advised authorities in Cambodian communes on tree planting to meet local demands for timber and forest products, with the aim of taking pressure of the Park. Meeting locations alternate between Vietnam and Cambodia. These meetings have had a positive impact on forest protection along the border and improved local self sufficiency in forest products.

9.1.3 *Model TBPAs*

Southeast Asia's first TBPA was Bentung Kerihun-Lanjak Entimau (1994) along the Indonesian and Malaysian border in Borneo. It provides important lessons on management approaches. The Sabah-Phillipines Turtle Islands Heritage Protected Area is an example of a TBPA covering the marine environment.

Map 9.1 Potential transboundary protected areas linking the four lower Mekong countries



Table 9.1: List of existing and potential TBPA complexes in the lower Mekong region

	Countries	Protected areas
1	Vietnam Lao PDR	Muong Nhe Phou Dene Din
2	Thailand Lao PDR	Doy Phu Kha Nam Pouy
3	Vietnam Lao PDR	Vu Quang; Pu Mat; Phong Nha Nakai-Nam Theun; Hin Nam No
4	Vietnam Lao PDR	Pu Mat Nam Chouan
5	Thailand Lao PDR	Pha Tam; Kaeng Tana Phou Xiang Thong
6	Lao PDR Vietnam Cambodia	Dong Amphan; Phou Kathong Chu Mom Ray; Ngoc Linh Virachey
7	Lao PDR Cambodia	Xe Pian; Xe Khampho; Bolaven south-west Virachey
8	Thailand PDR Cambodia Lao	Yot-Dom; Phanom Dong Rak; Phu Chong – Na Yoi; Khao Pra Wiharn Preah Vihear Dong Khantung
9	Vietnam Cambodia	Yok Don Phnom Nam Lyr (Mondulkiri)
10	Thailand Cambodia	Tapraya; Huai Tabtan-Huai Samran Banteay Chmar
11	Thailand Cambodia	Klong Krue Whay Chalerm Prakiate Samlaut

Some TBPA are covered by international designations like World Heritage Site – e.g. the Sunderbans World Heritage Site between India and Bangladesh – and Biosphere Reserve, e.g. the La Amistad Transboundary Biosphere Reserve between Costa Rica and Panama. The UNESCO's Man and Biosphere (MAB) Program has prepared guidelines for the establishment and functioning of Transboundary Biosphere Reserves (UNESCO 2000). Such international designations can provide recognised status and support in establishing and managing TBPA.

A sub-set of TBPA is the "Parks for Peace" established to promote cooperation for biodiversity conservation and peace through prevention and resolution of armed conflict. The earliest example of a peace park is the transboundary nature reserve established by Czechoslovakia and Poland in 1924 to resolve a border dispute. More recently in 1998, the agreement to settle the border dispute between Peru and Ecuador included the establishment of a peace park. The Peace Parks Foundation in South Africa is dedicated to promoting peace through the establishment of TBPA in the Southern African Development Community, while the United Nations University for Peace based in Costa Rica promotes the concept of a global partnership on Parks for Peace.

The ASEAN Regional Centre for Biodiversity Conservation (ARCBC) has tentatively identified areas meriting designation as peace parks in Southeast Asia (Table 9.2).

Table 9.2: Proposed international Peace Parks for Southeast Asia

Name of National Park	Countries
Spratley Islands	Malaysia, Vietnam, Brunei Darussalam, Philippines, China
North Annamite Mountains	Vietnam and Lao PDR
Lanjak Entimau/ Bentuang	Indonesia, Malaysia
Turtle Islands	Malaysia, Philippines
Tri-state Park (Dong Amphan, Virachey, and Mom Ray)	Lao PDR, Cambodia, and Vietnam

Source: MacKinnon 2000

9.2 Key Issues

There are important issues drawn from experience within and beyond the region that lower Mekong countries need to take into account and manage for when considering initiatives for TBPA cooperation.

9.2.1 *Natural systems on international borders will continue to degrade without collaborative action*

Transboundary conservation efforts require equal commitment from each of the participating countries if they are to achieve their objectives. Forests, water resources and biodiversity do not recognise national boundaries and are best maintained through collective action based on common goals. Many of the forces that drive forest and natural resources degradation are regional and cannot be addressed adequately by measures in one country alone. Their control requires collaborative and coordinated management.

9.2.2 *Collaboration works best where efforts are made to level the playing field*

Differences in economic development between countries can lead to differing priorities between conservation and resource exploitation, making it difficult to cooperate on the basis of a common agenda. There may be incompatibility in terms of professional capacity, financial resources and availability of technical equipment, making effective cooperation through equal contributions difficult. Countries on a more secure economic footing may need to take on a greater share of the cost of collaboration. Also, regional bodies such as MRC can act to bring a greater balance in resources available to the partners.

Different levels of decision-making authority delegated to counterpart managers in the partnership can be an impediment to progress, as can differences in environmental policy and legal frameworks. Sometimes language, religious, and cultural differences need to be taken into account and respected to enable successful communication and cooperation.

9.2.3 *TBPA initiatives can help ease tensions where issues of national sovereignty remain to be resolved*

Collaborative conservation initiatives have worked to ease political tensions and encourage working relations on a technical level. But governments need to work hard to launch TBPA initiatives where there has been a



history of armed conflict or political tension. For example, although there is interest in and great potential for creating TBPA in the demilitarised zone between North and South Korea, in the Spratley Islands of the South China Sea involving five countries, and in the Siachen Glacier between India and Pakistan, progress has been slow. Strong and consistent political will to cooperate is needed, especially in the early stages when the framework for collaboration is being established. The perception that joint conservation efforts might threaten national sovereignty is a common constraint.

9.2.4 *Regional organisations have an important technical and catalytic role to play*

Regional governance structures and practices are still not sufficiently robust to address transboundary cooperation issues in the absence of strong national initiative. The authority for managing particular natural resources may reside at the national and local levels, but no authority exists to coordinate and monitor conservation and development activities affecting ecosystems at the level of the catchment or other ecosystem units. Thus, there is great potential for the MRC, for example, to play a more assertive role as a catalyst, facilitator and technical guide in nurturing TBPA. Regional agencies need to be instrumental in creating the neutral environment for the necessary background technical work and action planning process.



These issues are relevant to the lower Mekong region countries and need to be carefully considered and effectively addressed as part of any TBPA conservation program.

9.3 TBPA experience in the lower Mekong region

9.3.1 *Sub-Regional Biodiversity Forum Project*

The experience of the Sub-Regional Biodiversity Forum Project, implemented by WWF – Indochina with funding from the UNDP offers valuable and relevant lessons (Box 9.1).

The project provided a platform for international dialogue and cooperation to enhance biodiversity protection in border areas involving the shared forests between Vietnam (Kon Tum), Lao PDR (Attapeu), and Cambodia (Ratnakiri) covering both protected and non-protected areas. This work was complemented by the LINC transboundary conservation project of WWF Indochina in 1998 that aimed at establishing a transboundary limestone forest complex between Phong Nha-Ke Bang in Quang Binh Province of Vietnam and Hin Nam No in Khammouane province of Lao PDR.

The transboundary landscape in the tri-border area is a forest complex of some 800,000 ha that extends over north-east Cambodia, south-east Lao PDR, and into Vietnam's central highlands where their frontiers meet. This area is of global conservation significance for biodiversity conservation. It includes the Virachey National Park in Cambodia's Ratnakiri Province covering 332,500 ha; an important watershed feeding into the Mekong River. Its effective management is critical to the socio-economic development of the north-east of the country. On the Vietnam side, Chu Mom Ray National Park in Kon Tum Province is one of the richest forest blocks remaining in Vietnam. In Lao PDR, the Nam Khong and Dong Amphan NBCAs are large, species rich forest blocks that serve as key northern extensions to the tri-border landscape.

Box 9.1: Lesson learned from the Sub-Regional Biodiversity Forum Project

Much was learned in designing, planning and implementing the project over four years. As with the more than 100 other transboundary efforts up and running elsewhere in the world, this project experienced substantial successes, encountered numerous unforeseen obstacles, and recognised several shortcomings. The most important lessons can be summarised as follows, under the three general headings of management, political and technical elements:

Management elements

- Project supervision needs to include all relevant stakeholders.
- Project staff must be stationed in all countries concerned to coordinate with governments and stakeholders, and to facilitate implementation.
- Institutional arrangements, supervisory mechanisms, and lines of communication must be clear, simple to understand, and provide the opportunity for equal participation of all key stakeholders.
- Multi-national conservation projects are management intensive compared with single-country projects.

Political elements

- International project meetings involving senior government officials can create good will, build political support, and are needed to give authority and direction to cooperation at lower levels.
- Activities at the provincial and local level need to be related to provincial institutions; without this, there will be lack of project ownership.
- Local and community-level institutions need to be more involved in field activities.

Technical elements

- Biodiversity surveys of previously unsurveyed areas, combined with advocacy, often leads to expansion of the protected area system and international funding for priority areas.
- Collaborative land use planning in border areas is expensive, time-consuming, and potentially sensitive.
- Current conditions in Indochina are not conducive to fully integrating land use planning and protected area management across borders.
- Attempts to create national scale biodiversity databases face large technical and institutional obstacles and are costly in terms of both staff time and funds.
- Bilateral and multilateral meetings should focus on a few issues and recommendations should be specific in terms of responsibilities and actions.
- Resources must be focused on achieving specific output in a restricted number of locations to make a significant, long term impact.

Above all, to advocate and try to organise international cooperation across a broad cultural, historical and political divide is extremely difficult, and much time will be needed before a full-fledged transboundary conservation initiative in Indochina can be realised. The Sub-Regional Biodiversity Forum, however, made important progress toward this goal over the four years of implementation.

Future activities will be geared toward meeting specific needs in a tightly-focused geographical area, and using these initiatives to assist in national conservation planning and policy development. The project will focus its activities in the region known as the tri-border area.

The area faces a number of challenges – commercial logging, human immigration, land conversion and large-scale hydropower development schemes threaten ecosystem integrity and the livelihoods of the numerous forest dependent indigenous groups. Interventions that promote conservation and sustainable resource use through transboundary collaboration can prevent the region from becoming a complex of increasingly fragmented and isolated forest blocks with diminishing potential to bring development benefits.

The Sub-Regional Biodiversity Forum and the LINC projects followed adaptive approaches and implemented a number of important activities. Biological assessments were conducted to identify, explore and describe important sites for biodiversity conservation and a process was started for establishing biodiversity database and GIS support. These studies provided the technical support and justification for expansion of individual adjoining protected areas and creation of new ones. The project also facilitated transboundary dialogue through meetings at the national and provincial levels, and supported a capacity building program through a range of training activities.

9.3.2 *ITTO transboundary initiatives*

The International Tropical Timber Organisation (ITTO) has implemented the “Management of the Pha Tam Protected Forests Complex to Promote Cooperation for Trans-Boundary Biodiversity Conservation between Thailand, Cambodia and Laos Project”. This project has focussed on strengthening the management planning system for the Pha Tam Protected Forests Complex in North Eastern Thailand, and on developing a strategy for trans-boundary biodiversity conservation. In its first Phase, the project activities consist of gathering data for management planning, installing an information system and a database, identifying issues of trans-boundary concern, and initiating a dialogue on cooperation for trans-boundary biodiversity conservation between Thailand, Cambodia and Lao PDR (ITTO 2002).

The ITTO has also supported TBPA conservation between Malaysia and Indonesia through the Lanjak-Entimau Wildlife Sanctuary / Betung Kerihun National Park and the Kayan Mentarang National Park, and proposes to support the Mondulkiri TBPA between Cambodia and Vietnam.

9.3.3 *Building on other forms of transboundary cooperation*

There is considerable potential to link biodiversity conservation with other fields of transboundary cooperation in the region as a powerful way of meeting mutually reinforcing objectives. For example, in May 2000 the Kien Giang Province authorities in southern Vietnam and their Cambodian counterparts in the bordering province of Kampot signed a bilateral cooperation agreement for boosting trade, security and tourism development. Nature based tourism focussing on the effective management and use of protected areas could contribute significantly to those three objectives.

The provincial and local authorities on both sides regularly meet and exchange information to intensify their border and maritime patrols, and to raise awareness among local communities of the need to respect the border. Apart from combating crime, the two provinces can count among their achievements the opening of a new tourist route for visitors going between Kien Giang and Kampot. This is a significant advance in promoting economic cooperation and trade, benefiting local communities on both sides of the border. A similar spirit of cooperation is a prerequisite to success in TBPA initiatives.

9.4 *Guiding principles for transboundary conservation*

The global experience with transboundary conservation provides lessons expressed in this section as principles and guidelines for TBPA development in the region. Box 9.2 summarises and supplements this important framework of rules for planning and management that need to guide the process of transboundary cooperation.

9.4.1 *Explore the development of international agreements for transborder conservation*

Cooperation as part of TBPA conservation can be initiated at the national level through formal cross border agreements and institutional arrangements, or it can take place at the local level through formal and informal contacts. An example of an agreement involving national and local commitments is the MOU signed between India and Nepal for conservation of transboundary biodiversity, including cooperation in TBPA management and control of illegal trade in fauna and flora. Such broad based bilateral or multilateral agreements can be initiated and facilitated through a third party such as an international conservation organisation, as has been done by WWF in Indochina, or a regional inter-governmental agency such as the MRC.

The IUCN-World Commission on Protected Areas (WCPA) guidelines on TBPAs provide several examples of cooperative arrangements between countries in the form of memoranda of understanding and bilateral agreements. The essential elements of such agreements include recognition of the TBPA complex, the objectives of the cooperation, specific activities to be undertaken, roles and responsibilities of various stakeholders, implementation mechanisms, mechanisms for settlement of disputes, and a framework for financing implementation.

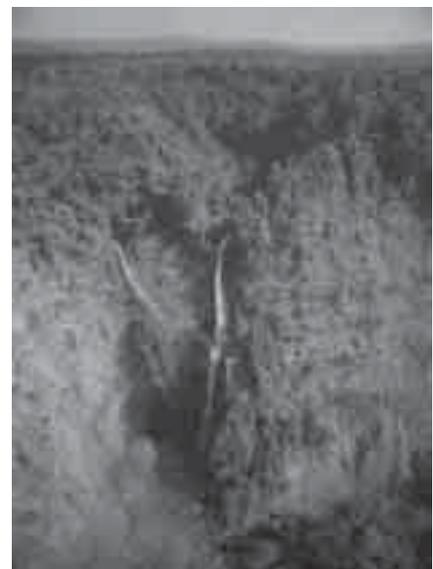
9.4.2 *Target border areas already the focus of national conservation effort*

The prerequisites to effective transboundary cooperation are a conservation planning and management capacity, a commitment and resources at the national and local level to work collaboratively on conservation issues of mutual interest, and national government policies and programs that support conservation in the targeted border areas which can provide the foundation for the technical cooperation. Situations where there are protected areas on both sides of a border provide a foundation of management, institutional arrangements and on-going national budgetary and staffing commitment needed for successful TBPAs.

9.4.3 *Explore and promote economic opportunities in TBPA cooperation*

TBPAs have a key role in providing sustainable economic opportunities and benefits to the local people in remote and economically deprived regions. Principal among these are the potential benefits from a collaborative planning and marketing of ecotourism, including cultural tourism among the countries concerned (Chapter 8). TBPAs provide the opportunity to form mutually beneficial partnerships between government agencies, the private sector and community based enterprises. The planning and marketing of such tourism attractions, routes and facilities can promote travel to all key destinations within a TBPA complex as well as nearby cultural destinations in all countries concerned. Such a coordinated approach can have considerable knock-on economic effects through the development of the service sector, handicraft and other non-timber forest product based industry, transportation, and other related infrastructure and services.

A successful example of TBPAs bringing development benefits is the Kgalagadi Transfrontier Park between South Africa and Botswana. Authorities in both countries work together to promote nature based tourism in the complex. Enhanced tourism is recognised in the bilateral agreement between the two countries as one of the key management objectives for the TBPA (Sandwith et al. 2001).



9.4.4 Identify additional border areas where shared natural systems need protection

There is great potential for enhancing cooperation among the lower Mekong countries in managing shared biodiversity resources through existing protected areas. There is also need to identify new border areas to protect habitats that help establish connectivity among existing protected areas. In particular, consideration should be given to identifying transboundary wetlands and marine areas for designation and management as TBPA.

The countries need to consider innovative approaches to transboundary conservation in which management strategies for networks of protected areas along the Mekong River mainstream, or on any of its tributaries shared by two or more countries, are defined for the cooperative management of upstream/downstream effects. For example, protected areas need to be an essential ingredient of hydropower projects with downstream impacts in other countries. In such cases of shared river systems or catchments, the protected areas may or may not be on a shared border to be part of a transboundary conservation initiative.

9.4.5 Define the institutional arrangement and authority for cooperation

Institutional arrangements, supervisory mechanisms and lines of communications associated with a TBPA must be very clear, and simple to understand. If complicated and time consuming the initiative quickly loses momentum. Cooperative arrangements should provide for the participation of key stakeholders, in particular the local communities that live in the target border areas. Involvement of local communities from the very early stages of establishing a TBPA is crucial to its success and long-term sustainability.

9.4.6 Begin with regular meetings and information exchanges on technical issues of shared concern

Collaborative management of a TBPA may not always be possible or even desirable. Initially, countries involved should aim at a coordinated approach to management. This would include, for example, regular sharing of information on species movement and illegal activities. Also, it could involve discussion and exchange on a common approach to management of fire control, alien species, and tourism – including cross-border tourism. Sharing of information and views early on can lead to the development of complementary components in management plans for PAs each side of the border, including a shared vision and strategy for moving towards a collaborative management of the area.

9.4.7 Begin with problems common to both parties and requiring cooperation to solve

The rule of thumb is to start small and build up as confidence and trust are established and benefits become apparent. Guard against seeking to achieve too much with too few resources. Meetings should focus on a few technical issues and aim at achieving specific outcomes. For example, the initial focus could be on resolving a single problem which is a matter of concern to both governments. Sharing intelligence to control illegal activities as well as information on the movement of migratory species could be a good start. The suite of cooperative activities could be expanded gradually to include more elaborate ones, and eventually, joint management planning activities for the whole TBPA complex.

9.5 Future directions

By their very nature, TBPA are of regional concern and require support and guidance at the regional level.

9.5.1 Prepare a regional agreement to promote transboundary conservation

The 1985 ASEAN Agreement on the Conservation of Nature and Natural Resources, which provides opportunities for transboundary environmental cooperation, has not been ratified by the required six

countries and cannot be implemented. Chapter VI of the Agreement dealing with international cooperation includes articles 18 to 20 covering “Cooperative Activities”, “Shared Resources”, and “Transfrontier Environmental Effects”. There comes a time when an old international initiative needs to be given a fresh packaging within a new framework. Circumstances have changed in the region and the excitement and momentum of an initiative reflecting a new era in regional cooperation is needed. An agreement within the framework of MRC tailored to the lower Mekong region should be explored with the potential to have it extended to cover the Greater Mekong Basin. A draft agreement should be prepared to reflect the principles and guidelines set out in this report.

9.5.2 Define the roles of MRC and the Greater Mekong Sub-regional arrangement in promoting TBPAs

The MRC will need to introduce transboundary conservation as an important component of the Basin Development Plan process in recognition of the critical role of protected areas (including TBPAs) in catchment protection and regional development. The MRC or an associated working group needs could take the initiative in the formation of a partnership comprising the four lower Mekong countries, relevant regional organisations and interested donors to promote and support TBPA initiatives in the region in a systematic and well-coordinated way.

While China and Myanmar remain outside the MRC membership, the Greater Mekong Sub-region collaborative arrangement supported through ADB needs to build this issue into its program.

9.5.3 Mount a regional training program to build capacity in transborder conservation and PA management

Improving capability of staff in sector and protected areas agencies to manage areas along international borders is an important requirement. Capacity building programs should be undertaken as part of all TBPA initiatives. This entails significant investments, which might be beyond the capacity of some of the countries in the region. Each country needs to identify this priority in its discussions with donors. A regional training program is needed working through and building capacity in existing training institutions.



9.5.4 Link transboundary conservation with poverty alleviation

Transboundary conservation is based on the imperative that human security ultimately depends on sound management of natural resources. Sound management – i.e. the maintenance, enhancement and sustainable use of natural resources requires that ecosystems are managed as distinct units, and in many cases, these units transcend national boundaries. Cooperative conservation planning across borders is thus an important ingredient of human security – especially as affected communities in these areas of the lower Mekong region are among the poorest and most dependent on natural systems for their basic needs. TBPAs are an important cooperative strategy to reduce vulnerability of the poor to resource degradation and conflicts that arise through misuse of resources.

Box 9.2: Guiding principles for transboundary co-operation

Empower field level functionaries: Empowering field level functionaries through decentralised and devolved authority is a basic prerequisite to any transborder initiative and TBPA's are no exception. The success of collaborative working groups/committees depends on the capacity of all members to make decisions on specified issues on behalf of their agencies. This allows for greater flexibility and adaptive management. Management becomes stifled when day-to-day decisions pass up and down a convoluted chain of command.

Stress law enforcement on both sides of the border: There should be equal commitment among the partner countries to law enforcement; particularly in those countries that are used as transit routes or markets for illegally sourced biodiversity.

Begin with small steps: Find the common ground and issues that can be readily resolved so that trust and cooperation develop. As effective working relationships develop, complex issues become simpler, and the portfolio of cooperative activities can be gradually enlarged.

Be realistic in expectations: While joint management might be desirable it is not always possible. A collaborative approach to managing a TBPA under a common and agreed set of objectives, as reflected in complementary but separate management plans that are prepared collaboratively by all partners, can yield very effective results.

Pilot cooperation by focussing on specific shared technical concerns: Cooperation can start on a pilot basis with local field level exchanges of information on shared problems and continue to be effective in this form, or later it can become formalised through agreements at national levels.

Conduct regular technical meetings, particularly at the field level. Regular meetings are essential for building a strong cooperative program. Meetings should seek to exchange information and address specific issues of mutual interest and concern.

Involve local communities: Co-operation across boundaries needs to involve local communities. A landscape management approach requires the cooperation/coordination of all land managers. Transboundary agreements across boundaries need the support of the wider community.

Keep it simple: Institutional arrangements, decision-making processes and channels of communication must be simple, easy to understand, and promote easy access by key stakeholders.

Clearly define roles and responsibilities and work through existing institutions: Institutional arrangements must be clearly defined and understood by all partners. To the extent possible, strive to work through existing institutional structures rather than seeking to create new structures and arrangements that are complex to manage and costly to sustain.

Keep to agreed timetables: All agreements and decisions should be followed through in a timely and effective manner.

Promote social interaction between the cooperating teams: While formal agreements and policies are important it is often the social interactions and bonds between individuals that determine the effectiveness of cooperation (Cervovsky 1996).

Work to standardise information and data collection systems e.g. GIS mapping. It is very difficult to plan cooperative activities like fire fighting or biodiversity inventories and databases when information is not compatible.

Collaborate in raising funds and defining budgets for TBPA initiatives: There is a need to work cooperatively to ensure funding sustainability of the TBPA complex as a whole. This could include coordinated development and marketing of proposals. An important cooperative strategy to reduce vulnerability of the poor to resource degradation and conflicts that arise through misuse of resources.

9.5.5 *Identify pilot TBPA and initiate collaborative activities*

The proposed regional agreement on transboundary cooperation will need to be complemented by a number of pilot and demonstration projects which provide the basis for learning and training. Priorities are to assist Vietnam, Cambodia and Lao PDR:

1. Recognise and establish the TBPA complex on the tri-state border involving Vietnam, Lao PDR and Cambodia, comprising the Chu Mom Ray-Dong Amphan-Virachey TBPA complex.
2. Explore the establishment of a TBPA comprising Phong Nha Ke Bang (Vietnam) and Hin Nam Nu (Lao PDR), with the possibility of extending it to include the other nearby areas in Vietnam such as Pu Mat and Vu Quang and Nakai Nam Theun in Lao PDR.

Much work has been done on these areas through the Sub-regional Biodiversity Forum and LINC projects described earlier. These areas offer the potential of being developed into models of cooperation for transboundary conservation of biodiversity and in promoting protected area based transboundary tourism circuits.

Other TBPA initiatives that have begun need to be supported in advancing to the next level of cooperative activities in the field. These include the areas of interest to the ITTO, namely the Mondulkiri area between Cambodia and Vietnam (involving Phnom Nam Lyr in Cambodia and Yok Don in Vietnam), and the Pha Tam complex between Thailand, Cambodia and Lao PDR.

The MRC has a role in facilitating TBPA collaboration by promoting the establishment of formal MOUs among the countries concerned. ADB also has an important role in promoting TBPA and associated activities through its Mekong program. Other regional organisations and agencies such as ASEAN, ARCBC, IUCN and WWF need to contribute by promoting relevant national policies and initiatives for transboundary cooperation and effective protected area management.





Part 3: Strategies for integrating protected areas in regional development

10 A regional protected areas and development program

10.1 Introduction

The Protected Areas and Development Review covering the four lower Mekong countries led to the definition of priority strategies for implementation at regional, national and local levels. This report emphasises the PAD issues facing the region as a whole and the priorities needing collaborative attention. The four countries are intimately linked through river and mountain systems, and shared seas. For economic and environmental reasons, actions in one part of those natural systems often affect conditions elsewhere. Therefore, many of the natural resource problems in each country, whether they relate to energy, irrigation, fisheries, forestry or tourism for example, require joint responses with neighbours.

Protected areas are one of the most important management responses in a Mekong Basin regional development strategy to maintain and enhance shared natural systems for mutual development benefits. The importance of protected areas is reflected in the size of the existing national PA systems – among the largest in the world as proportions of national territory. Yet, for PAs to reach their full potential as productive assets in national and local economies, collective management and investment approaches are needed based on an understanding and respect for the limits and potential of the region's natural systems.

The PAD Review found that protected areas in the lower Mekong Basin countries are making a very significant contribution to a wide range of development sectors (Box 10.1). However it is equally clear that not only is this contribution largely unrecognised, it is frequently threatened by development planning and decision-making among the different sectors. The record in all four countries is that immediate and tangible development options such as roads and hydropower schemes have frequently overridden protected areas at serious long term costs to regional development.

The problem reflects a broader lack of cross-sectoral integration in national planning and resource management. Yet, to a greater extent it stems from a lack of awareness among non-conservation agencies of the breadth of economic and social benefits provided by protected areas. Their functions in serving biodiversity conservation are acknowledged but otherwise they are regarded as a hindrance to sector, and even to local community development. In part this is because the developmental benefits of individual protected areas have not been identified or quantified. When making key economic commitments, decision makers have not had the benefit of information on the wider development contributions and opportunities PAs offer in their natural state.

The fundamental starting point for creating a greater appreciation of this aspect of protected areas is the identification, preliminary



assessment and documentation of the goods and services generated by each protected area, and then making sure that the relevant government agencies and private developers are aware of and have access to this information. Only Vietnam and Lao PDR have summary profiles of their protected areas, but these are focussed very much on conservation values and do not systematically address the goods and services provided by each area.

Box 10.1: Key PAD Review findings and conclusions

1. **Protected areas are development assets:** Protected areas provide products and services essential to national and local economies.
2. **PA development assets are degrading:** The natural capital held in protected areas must be conserved, maintained and enhanced so that it brings the greatest development returns over the long term.
3. **PA benefits are not fully valued:** These values need to be expressed in development terms so they can be effectively integrated in the national accounts and socio-economic development plans and budgets.
4. **User pays principle has demonstrated success:** Protected areas need higher levels of investment and users of PA services and products must pay for their maintenance and conservation
5. **Protected areas are isolated:** Planning and management of protected areas should be undertaken on a landscape basis that recognises them as critical components in regional and local development strategies
6. **Protection maintains and enhances sector productivity:** All sectors need to embrace protection as an essential part of their own development strategies.
7. **Protected area concepts are being applied outside formal PAs:** Regimes of protection and conservation must extend beyond protected areas throughout the development landscape
8. **Benefits and costs of PAs are not equitably distributed:** Any increase in revenue going to manage and safeguard protected areas must also safeguard and enhance the wellbeing of local communities.
9. **Protected areas lack national policy frameworks:** The existing system of protected areas requires a comprehensive national policy and legal framework that clearly defines responsibilities, categories and uses, and that promotes linkages with development sectors.

In this way the development contributions from well maintained protected areas can be better appreciated and factored into national and sectoral budgets and development plans. The sector chapters in this report identify just some of the development benefits to be gained from recognising and integrating protected area goods and services into economic planning include, for example: improved food security; reduced poverty; increased community health and wellbeing; increased social stability in rural communities; enhanced and more consistent agricultural productivity; a continuous supply of renewable resources to support development; increased economic activity supported by renewable energy and water; and, reduced pollution in urban waterways and atmosphere.

This chapter draws from others in the report to synthesise the main PAD actions needed as part of a region wide collaboration. They provide the foundation for a regional PAD action plan and work program with national and local piloting and demonstration aimed at:

1. **Planning across boundaries:** Introducing ways of planning across natural systems which focus limited resources on the most important parts and which encourages common and complementary management action
2. **Identifying what needs to be kept:** Determining the parts of the region's natural systems that need to remain in their natural state for human and ecosystem wellbeing
3. **Assessing development values:** Determining the full development value of those parts which should be kept
4. **Financing PA conservation:** Introducing innovative ways of financing their effective conservation and management
5. **Making the user pay for maintenance:** Introducing economic instruments and other mechanisms so that those who use or abuse the systems contribute to their maintenance
6. **Demonstrating how it is done:** Demonstrating and piloting innovative approaches to PA management
7. **Promoting best practice:** Providing codes of practice for each sector to guide use and management
8. **Learning from experience:** Monitoring and reporting on the status and trends in their use
9. **Building capacity** to prepare and implement the action plan and work program

The PAD Review showed that a regional PAD action plan and program should help countries determine how much of the region and where should be kept in its natural state for the best development outcomes. It should promote valuation studies at the protected area, watershed and basin level so their true worth can be built into budgets and development plans. It must provide guidance on practical economic analysis tools and instruments for use by PA managers with their counterparts in other sectors. The valuations need to be done within the framework of piloting a landscape approach to PA planning and management. The pilots should emphasise collaborative management agreements involving communities and sectors, financing arrangements and poverty alleviation. At regional level, studies must distil the experience with co-management agreements and financing mechanisms and identify options appropriate to the Mekong countries. The PAD Review advocates user pays arrangements for the sectors such as energy, tourism, industry and fisheries benefiting from PA goods and services. The action plan should detail options for these arrangements and facilitate their testing in the pilot areas and at national level. Underlying these activities, action plan implementation must have a strong capacity building component including a series of PAD training activities and exchanges within the region. The component should include a feasibility study on the establishment of a network of PAD training centres in the region.

10.2 Preparing a regional PAD action plan and program

Following two years of discussion and consultation, the PAD Review undertaken by the four nations has laid the foundation of information and directions the governments of the region wish to take. The results are to be integrated over time in policies, programs and practice of each country and of their international partners. Yet, a distillation of priorities is needed to give impetus to essential PAD activities requiring collaboration at regional level.

10.2.1 A regional PAD agreement supported by an action plan

Many of the sector chapters in this report call for a new regional agreement covering conservation of natural systems in the Mekong Basin.

The MRC agreement, concerned with sustainable use and maintenance, currently unites four member states of the lower Mekong, with potential to expand to embrace upper Mekong countries. It could provide the umbrella for a more focussed conservation agreement (or protocol, which subsidiary international agreements are often called) between the six Mekong countries – or initially be limited to the four states covered by the PAD Review.

The approach recommended here is that a draft agreement be prepared as part of a regional PAD project with potential to cover the Greater Mekong Basin. The draft could be considered by the MRC members and also within the Greater Mekong Sub-region consultations. That way, protected area and development concerns would be formally placed on the regional agenda along side and as part of planning and discussion on the wider collaborative development program. A formal agreement would provide the legal underpinning of a PAD action plan and regular work program. This approach is consistent with the Biodiversity Convention, which encourages parties to enter into more focussed regional agreements to guide and facilitate collaborative action to conserve shared natural systems.

PAD issues do need to be comprehensively addressed within the MRC Basin Development Plan (BDP) now being prepared. This should happen irrespective of whether or not countries decide to pursue a special agreement for conservation linked to the BDP. Also, PAD issues need to be addressed through the Greater Mekong Sub-region program. Eventually these two fora will need to come together. In the meantime, the PAD agenda could be a force for unity. The ADB as the prime mover for the Greater Mekong initiative has a special role to play in promoting this Mekong wide PAD collaboration.

10.2.2 A regional PAD action plan and work program

Action should not wait on a formal regional agreement, but can continue in areas where already there is joint government commitment. The PAD reports need to be expressed as a concise regional action plan and initial work program. Much needs to be done and limited resources must be targeted on the most important issues. A PAD regional action plan can define those priorities. If governments decide that a formal agreement is required, then the action plan and work program would provide its implementation framework. The remainder of this chapter synthesises the components of a regional PAD program as they appear in the various chapters of this report. First some issues relating to institutional arrangements.

10.2.3 Institutional arrangements for a regional action plan

There are three main institutional arrangements for developing and administering such a regional action plan. It might be

1. **A project:** initially defined and implemented as part of a collaborative regional project;
2. **A program:** adopted as a permanent part of the work program of an existing regional organisation such as MRC, UNDP and ADB; or,
3. **A regional agreement and program:** undertaken through a new regional agreement providing the international legal underpinning of a collaborative program.

These approaches are not mutually exclusive. In fact the three might be stages in a process following the successful United Nations Environment Program (UNEP) regional seas model. Each UNEP environment agreement covering a shared region began with a project, which led to the preparation of a technical action plan agreed and implemented by participating countries. The project then moved on to support the negotiation of a regional agreement to underpin the action plan and facilitate regular financial contributions from participating governments and organisations.

The UNEP regional seas projects, which provided the energy and technical guidance for the process, were hosted by an existing regional organisation. In the South Pacific, a region of 22 countries, this was the South Pacific Commission (SPC) and its South Pacific Regional Environment Program (SPREP). Once a regional agreement is in place, it requires an existing or new organisation to act as secretariat to facilitate implementation. Like the MRC, the SPC is constituted through its own international agreement and so, in that case the new environment convention constituted SPREP as an independent organisation and secretariat.

There is much that can be learned from the South Pacific experience in defining a course for the Mekong region. Given the intimate natural system linkages and the growing economic interdependence as shared resources and systems are exploited, Mekong countries will need to establish a strong, independent and authoritative environment protection capacity at regional level. A three stage process of learning and initiative following the UNEP model is needed – (1) a project to drive the process; (2) an action plan and work program developed through the project; and (3) an agreement leading to a permanent institutional arrangement and legal framework for implementing the plan. The MRC has an environment program. As an initial step, it should be strengthened and its mandate extended to take on some of the essential ingredients of a regional conservation program.

10.3 Planning across boundaries

A key goal of a regional PAD program relates to setting in place a comprehensive system of protected areas and regimes of protection covering important natural systems. That requires a capacity for regional planning to help identify areas and priorities on a systematic basis.

Bio-regional planning is a process of understanding a geographic area in terms of its natural systems and for identifying priorities for conservation and development action. It is a means of determining what needs to be kept in its natural state. It proceeds at several levels from international shared natural systems such as rivers, forests and mountain chains to smaller scale systems crossing several communes, districts or provinces - what in PA terms is often referred to as landscape or ecosystem planning.

Already a basis for taking a bioregional approach to planning and managing natural systems across political and administrative boundaries and which integrates PAs within the wider landscape is being tested through various national initiatives:

In **Cambodia**, “biodiversity management regions” were used in the Biodiversity Action Plan Prospectus process as mechanism for setting priorities for action among broad geographic regions, and then for defining within each region clusters of protected areas across shared landscapes which need priority attention (Ashwell 1997; Carew-Reid 2002). While the Ministry of Environment still promotes bioregional and PA cluster planning, limited funding has prevented the approach being applied systematically.

In **Lao PDR**, the 2003 National Biodiversity Strategy and Action Plan advocates a regional approach to planning and managing biodiversity which groups provinces according to shared natural systems. Similarly, the 2003 draft National Forest Strategy recommends a regional approach to forest management. Currently the government is developing policies and procedures to pilot a river basin or catchment basis for spatial planning supported by a Danish ODA project and an ADB loan.

Thailand, has legislated for river basin planning where sectors and provinces come together in river basin management committees to resolve resource use conflicts and prepare integrated plans which all levels of government abide by. Twenty-five river basin committees are being established progressively across the country. Also, the Ministry of Natural Resources and Environment has identified 19 “forest complexes” or regions nation-wide as a basis for defining the national forest estate, identifying priority complexes, and planning and managing groups of protected areas on an ecosystem basis. The approach has been piloted in the Western Forest Complex covering 17 contiguous protected areas and now in the Dong Phrayayen-Khoa Yai forest complex close to Bangkok – which embraces four protected areas.



Vietnam, has also introduced a river basin approach to planning under the Water Law 1998. Three River Basin Planning Organisations are being piloted as a way of reaching agreement on the use and management of shared water resources. In one, covering the Don Nai River Basin in the south-east of the country, the Forest Sector Support Program¹⁸ is exploring the use of the river basin as a planning unit for forest conservation and protected area management and investment. Already MARD divides the country into eight agro-ecological regions for planning and administrative purposes, and FSSP is supporting the government in preparing regional forest plans for the south-eastern and central regions made up of six and nine provinces respectively.

At regional level, the MRC Basin Development Plan process is using catchments of the Mekong region as planning units. At a much broader scale, WWF has identified 200 of the world's "ecoregions" for priority conservation because of their biodiversity values, five contiguous ecoregions falling within the lower Mekong countries:

1. The Annamite Range moist forests
2. The Indochina dry forests
3. The Cardamom Mountains moist forests
4. The northern Indochina sub-tropical moist forests
5. The Mekong River catchment (Baltzer et al 2002).

WWF is helping Lao PDR and Vietnam prepare a conservation action plan for the shared Annamite Range ecoregion.

This wave of initiative to introduce and experiment with regional planning according to natural systems which cross political and administrative boundaries is in response to serious limitations of more conventional sector approaches which have led to inefficient and conflicting resource development. The importance of building a regional protected areas system based on bioregional or ecosystem planning is emphasised in all sector chapters of this report.

First an assessment of existing planning systems is needed so that a regional approach

1. builds on national initiative,
2. links (and integrates) the various systems now being implemented,
3. encourages consistency in terminology and methods, and
4. allows a systematic approach to be taken to protected areas.

Terms such as ecosystem, catchment, river basin, bioregion, landscape and watershed planning have much in common. The common principles and approaches need to be drawn together so that regional cooperation is facilitated. The following integrated hierarchy of natural system planning units from large to smaller scale provide a sound footing for analysing the region's natural systems building on existing initiative:

1. Ecoregions crossing one or more international boundaries
2. River basins crossing international boundaries
3. National agro-ecological or biodiversity regions (ie sub-national level but encompassing more than one river basin)
4. Sub-national river basins
5. Protected areas complexes (groups or clusters of PAs in shared landscapes)
6. Protected area and immediate buffer (including biosphere reserves)

¹⁸ A partnership between the Ministry of Agriculture and Rural Development and 19 international organisations

At the more focussed level of PA clusters (5 above), the PAD Review showed that protected areas are best understood as part of the wider landscape in which they are located, so that economic relationships with surrounding communities and sectors can be well defined and managed. The landscape or ecosystem approach allows PA planners to consider the management requirements of a number of protected areas together. It brings greater flexibility and efficiency in exploring development options while conserving the critical attributes of each protected area. A regional PAD program would promote pilot PA landscape planning projects and a distillation of best practice.

At its simplest, planning on a natural system basis allows for the preparation of a set of environmental standards and guidelines for the most important natural areas which reflects their sensitivities, capacities and limits, and against which all development proposals and day to day management is assessed.

Other complementary components of a regional planning system identified in the preceding chapters as important for effective PA management include:

- Strategic environmental assessment of development options within a region.
- A process for conflict resolution between competing resource uses and forms of tenure.
- A mechanism for effectively addressing transboundary impacts of development.
- A mechanism for establishing rules and regulations as needed.
- A monitoring and reporting system to keep watch on the condition and trends in a permanent regional forest estate, and protected areas system as a basis for cooperative bilateral and multilateral action.

The MRC and its Basin Development Plan process is beginning to take on some of these functions and build components of this system. For example, the MRC played an ad hoc role in establishing an expert environment committee to examine and resolve the downstream impacts in Cambodia of the Se San hydropower schemes in Vietnam. In this case, the Commission tested a conflict resolution and environmental assessment function.

10.4 Identifying what needs to be kept

Bioregional planning identifies the main ecosystems and critical environments in the region so they can be adequately protected and a continuing supply of their products and services assured. Some areas are more important than others from a conservation and development point of view. Governments would benefit from guidance in determining the different categories of protected areas which are needed to fulfil various primary management objectives, whether it be, for example, fish habitat protection, watershed management or remarkable natural tourist attractions. Some areas are of international importance for their world heritage values or the regional development services they provide, for example to hydropower development or fisheries. Other areas may provide primarily national benefits, while still others mainly meet the needs of local people. Each category of PA needs to be identified because it requires special management strategies.

This systematic approach to defining and managing protected areas is normally undertaken at national level (called a national protected areas systems plan), but there is much to be gained by undertaking the process for the entire region.

A regional program would define for priority protection and conservation action:

- the most important bioregions in terms of biodiversity conservation,
- the most important watersheds and locations of critical components for the water resource system,
- a permanent regional forest estate to be conserved in its natural state and used sustainably,
- existing and potential fish sanctuaries to maintain and enhance wild capture fisheries,
- areas of critical importance for agricultural productivity and biodiversity,

- potential natural system corridors for conserving a diversity of development values across landscapes, and,
- areas for natural system rehabilitation and renewal.

10.5 Assessing development values

A key message of the introductory chapter of this report is for PA managers to adopt the language of development. It sets out four steps which PA managers and their sector counterparts should follow to mainstream protected areas as essential elements in national and local development strategies – ie to define the PA development footprint. They are:

1. Define the economic actors and activities connected to protected area resources and services.
2. Identify the PA development benefits they receive.
3. Value those benefits.
4. Work with sectors to reflect the benefits in their development policies, budgets and staffing.

The need to express conservation assets in development terms applies to any area a government wishes to keep in its natural state, within or outside the formal protected area system. Valuation is an essential step in justifying protection as an appropriate form of tenure and one bringing the most appropriate development outcomes. It is necessary in reorientating sector budgets and in determining appropriate systems of economic instruments within sectors so that concessions, fees and other charges begin to reflect the cost of protection functions.

The fisheries chapter, for example, calls for a regional study to determine the economic value of services and products provided to the sector by natural systems within existing and potential protected areas. It proposes a network of sites be subject to rapid assessment as the basis for estimating values for individual protected areas and for wider landscapes or catchments in which a number of protected areas and critical habitats are located. Fisheries agencies can use the valuation information in a range of ways to argue for increased budget share to fish sanctuaries and other forms of protection, and to define appropriate revenue raising strategies.

The initial round of PAD review field studies demonstrated the importance of valuation to integrating PAs in socio-economic development planning. This work needs to be expanded so that economic planners and PA managers have a greater body of information to feed into the budgetary and development planning process. The regional PAD program would identify, assess, value where possible, and demonstrate in practical terms the development products and services provided by important groups of protected areas. It would apply and demonstrate rapid assessment methods as a basis for economic valuation of the relevant benefits and costs and then prepare regional guidelines and field manuals setting out the situations and methods for rapid PA valuation for use by PA managers in their day to day work.

10.6 Financing PA management

Increased PA financing through special funds acting as a stimulus and hub of innovation, coordination and management is especially important in the Mekong region. Low levels of investment in PAs have many repercussions. Most important, as in many situations of rapid growth and change, PA management capacities are falling well behind demands. The four countries, particularly Cambodia, Lao PDR and Vietnam are attempting to set in place over a few years institutional and management arrangements for their protected areas that took decades to evolve elsewhere – and they are doing it in a very dynamic economic environment. As in other fields of technology, investment is needed to leap frog over many of the more conventional stages and approaches and to define those best suited to the special pressures and characteristics of the region.

The PAD Review sector analyses found many opportunities for innovative PA financing mechanisms, especially sector investment through application of the user pays principle, economic instruments and the operation of special funds for individual or groups of protected areas.

The establishment of funds at various levels, in particular would provide platforms to test and demonstrate financing mechanisms. They can contribute to governance and economic reform priorities while achieving conservation goals. In Cambodia, Lao PDR and Vietnam where budget systems have been centralised and devolution is in its early stages, special funds facilitate the process and nurture the skills required. In summary, funds can be useful in:

1. testing and demonstration of various economic instruments to raise revenue and shape behaviours in PA beneficiaries;
2. providing for a long term vision and planning horizon for protected areas;
3. facilitating partnerships and pooling of resources from government, international organisations and other partners around agreed priorities;
4. promoting area wide management planning at various scales, but especially at the landscape level embracing more than one protected area;
5. helping decentralise and build capacity in governance, budget management and spatial planning;
6. promoting cross sectoral collaboration and planning including the use of transfer payments;
7. facilitating joint management arrangements and broad stakeholder involvement; and,
8. providing a secure institutional basis for transparent management of financial contributions including monitoring and reporting.

Three levels of funds are recommended in this report – a Mekong conservation fund, national conservation funds and local funds of various kinds.

A Mekong conservation fund: A special fund at regional level would resource implementation of the regional conservation program, promote partnership and help build the capacities needed to address those issues which require collaboration between two or more countries in the region.

National conservation funds: A national conservation fund in Vietnam and a national environment fund in Lao PDR are being established with support from the World Bank and the ADB. Now priority needs to be given to a national conservation fund for Cambodia and possibly for Thailand.

A review of financing protected areas in Vietnam found the system poorly suited to investing in conservation management. Funding is often insufficient, skewed towards a small number of protected areas, and heavily concentrated on infrastructure investment as opposed to operations supporting conservation (MARD 2003). In response, the government has designed a Vietnam Conservation Fund (VCF) to operate initially over six years with a capital contribution from the Global Environmental Facility (GEF). The VCF is being created to conserve biodiversity of international importance in protected areas as a pilot initiative to test a long-term conservation financing mechanism (Box 10.2). The GEF contribution of some US\$5 million is linked to a World Bank loan to the forest sector and a US\$5 million technical assistance component from the Dutch Government.



Box 10.2: Functions of the Vietnam Conservation Fund

The overall functions of the Vietnam Conservation Fund are:

- To establish an effectively operated sustainable financing institution for sites of international biodiversity importance.
- To reduce threats to biodiversity in priority protected areas throughout the country via grant funding for priority activities identified in conservation needs assessments
- To identify and support activities to strengthen the capacity of institutions that are responsible for planning, managing and developing PAs.
- To promote the integration of national, provincial and international investment for protected areas under one common policy, planning and management framework.
- To engage in fund-raising activities and donor liaison to increase the funding available to the VCF to meet its long-term conservation objectives.

The VCF initiative under MARD is relatively recent with planning commencing in 2001. Yet, since the mid 1990's, the then Ministry of Science, Technology and Environment (now Ministry for Natural Resources and Environment) foreshadowed a national environment fund under the 1993 Environment Protection Law. After more than seven years of debate around the relationship of such a fund to the government budget and consolidated revenue it is now established with a US\$20 million start up capital entirely from government. The Vietnam Environment Protection Fund will receive 10 per cent of the annual budget for state management of environment protection and has the prospect of further replenishment through the application of various charges and fines at this stage relating to pollution control. It has a mandate to support conservation activities and the relationship between this and the more focussed protected areas fund has yet to be worked through.

In Lao PDR, the government took out a US\$20 million environment loan from the Asian Development Bank (ADB) to support its policy reform agenda by:

- strengthening the national policy and regulatory framework for environmental management and social safeguards;
- enhancing policy implementation measures and capacity at sector and provincial levels;
- improving compliance and enforcement to environmental regulations;
- promoting river basin management as a multi-sectoral planning framework; and
- establishing sustainable financial mechanisms, including a national environment fund.

The focus of the loan is environmental compliance in the energy and transport sectors. The national fund can play an important role in promoting the user pays principle as the basis for transfer payments from the energy sector for PA benefits received in hydropower development.

The "Lao Environment and Conservation Fund" is in its final design stage and will be launched in 2004. Article 2 of the fund constitution states that "The purpose of the LECF is to implement Chapter V of the Environmental Protection Law by establishing a source of finance for supporting priority projects and activities in the fields of research, preservation, mitigation, and restoration of the environment, including the protection and conservation of natural resources and biodiversity, and the mitigation of adverse social and environmental impacts associated with development projects."

During the first 3 years of operation, total allocations from the LECF will be limited to US\$ 250 000 a year (from the initial capital of US\$ 5 million). This pilot phase will involve establishing the LECF executive office, setting up a project appraisal and monitoring process, an information and training campaign on the use of

the fund, and the funding of a limited number of pilot projects to test the mechanism. Remaining funds will be invested through an offshore asset manager.

Local funds: Conservation funds can operate at any sub-national level covering, for example, the activities of an industry such as mining, a sector such as fisheries, or be natural system based such as a catchment or river basin, a cluster of protected areas or a single area with its buffer. They can be tailored to suit the need. Fund disbursement is best tied to the preparation of a formal management plan for the area or activity concerned and then released following a performance based system guided by monitoring against targets. A range of mechanisms needs to be tested in the region while providing an opportunity for exchange and learning from the collective experience.

The first local fund for a protected area in the region is soon to be tested in Cambodia covering the Central Cardamoms Protected Forest, a 402,000 ha protected area set up in 2002 in south-western Cambodia's Cardamom Mountains. The area connects two large wildlife reserves, bringing the total land under protection to 990,000 hectares, the largest protected wilderness in mainland Southeast Asia. The local fund is to be capitalised by Conservation International's Global Conservation Fund with equal contributions from other international partners (ICEM 2003a).

Vietnam has established a sector environment fund linked to coal mining in the north-east of the country and two local funds dealing with environmental management in Hanoi and Ho Chi Minh City (MPI 2001a and b). Each has a very different structure and mode of operation.

The PAD regional program would demonstrate innovative financing mechanisms for protected areas, with special funds providing the impetus and institutional setting for testing and piloting. The program would:

- explore the feasibility and propose design options for establishing a basin wide conservation fund;
- nurture the establishment and operation of national conservation funds, especially in Cambodia;
- test a PA cluster or landscape fund (e.g. watershed and river basin) as a catalyst to effective PA planning and management;
- promote exchange and learning between conservation funds in the region; and,
- undertake a region wide study on PA financing mechanisms resulting in guidelines, codes of practice and tools for use by governments and their international partners.

10.7 Making the user pay for maintenance

There are two main concerns about applying the user pays for maintenance principle so that those who use natural resources and systems contribute to their conservation. First, as the gap between rich and poor widens in the region and populations grow, local resource users are often those who can least afford to pay. This is especially so for communities living in and around protected areas. Second, assessing the level of benefit received and therefore the level of payment due can be difficult in situations of limited technical capacity and resources.

While those concerns must be addressed in implementing the principle, one of the most important conclusions of the PAD review is the need for systematic application of the user pays approach as a way of better integrating PAs in development planning and of raising the level of investment to be commensurate with their importance to the economy.

Poverty and user pays is the most important issue and the analysis in the PAD report series suggests a number of guiding standards to avoid imposing further hardships on already disadvantaged communities and which need to be adopted at regional level:

- In applying the principle, emphasis is placed on public or private enterprise receiving PA benefits or

having negative impacts on PA assets for commercial gain.

- Local communities and subsistence users should decide themselves through joint management arrangements whether or not to introduce systems of charges for PA goods and services used by their members – and how resultant revenues should be applied to maintain supplies.
- Each protected area or group of PAs within their shared landscape will require a tailor made poverty reduction action plan built into their overall management plans.
- Special government adjustment programs for the poor affected by decisions to establish or extend a protected area are needed to minimise and overcome negative local impacts.
- Special policies are needed for each sector to ensure transfer payments benefit local communities (Box 10.3).

Box 10.3: User pays policy principles for the energy sector

For example, the chapter on energy proposes the following sector policies:

1. All hydropower facilities should pay for the ecosystem services they receive and for the ecosystem services they degrade.
2. In cases where those services are provided in part or in full by one or more protected areas, those payments should go to the rehabilitation, maintenance and enhancement of the natural systems protected.
3. All hydropower developments should lead to net benefits for local livelihoods and well being in ways that contribute to and enhance their involvement in the conservation of ecosystem services and products.

Assessing the level of payments for services: The second concern relating to the difficulty in making a fair assessment of what should be paid in return for a PA benefit or as compensation for damage done to PA assets applies mainly to ecosystem services. PA products are relatively easy to assess because most can be related to a market value. Services are more complex and require clear policy direction from government if the weight of technical studies and valuations to determine payment levels are not to make the user pays policy inoperable. The strategies to apply are:

- The principle should be applied systematically as a matter of government policy and not in an ad hoc manner with some developments paying and others not.
- A minimum level should be set for all types of services and forms of use based on a percentage of the per unit sale value of the product which results (e.g. electricity). The matrix in Chapter 1 for determining a PA development footprint can provide the framework for setting those percentage levels. Guiding standards should be defined on a regional basis so that levels are comparable across an industry and from one country to another.
- In the early stages of applying the principle, avoid differentiating between whole or partial use of a PA service when determining payment levels should be avoided, for example when a reservoir is fully or partially within a protected areas or downstream of it. Debate on extent of use or extent of benefit can cause extended delays to a project or make the principle unworkable. Political judgements based on regional standards are needed in the national and local interest so that the range of payments associated with a type of use are clear cut even if the biophysics of a specific development situation are not.
- The precautionary principle should apply so that, in situations of limited information and technical uncertainty, payment levels will ensure PA services continue to be provided. In complex cases, payment levels for use of PA services such as water regulation or watershed conservation should be determined through rapid appraisal methods with an expert government panel making the final

technical judgement concerning level of benefits received and level of negative impacts on the best available information and guided by the regional standards.

- Policy, regulations and implementation need to distinguish clearly between maintenance of benefits received and mitigation of negative impacts. Compensation and compensatory activities aimed purely at mitigating environmental impacts or impacts on livelihoods are different from payments for environmental services – i.e. payments that improve hydrological or other conditions that in turn lower operating costs or increase production potential.

In summary, the priority is for governments to apply the user pays for maintenance principle in a systematic way and not on a case by case basis. Certainly, better understanding and appreciation of the values of ecosystem services helps to determine the level of social and financial commitment that can be justified to protect them. Continuing studies are needed so that knowledge accumulates, and service “buyers” know what they are getting and are willing to pay for it. But systems need to be put in place and to function efficiently in situations of limited technical information. Adequate regulation and supervision is needed to ensure that prescribed payments are assessed, collected, appropriately managed then go to the agreed conservation activities.

The regional program would:

- Prepare guidelines and test models for the development of poverty reduction action plans associated with individual or groups of protected areas.
- Provide guidelines on when and how to apply special adjustment programs for the poor affected by decisions to establish or extend a protected areas.
- Undertake a number of pilot projects to test and demonstrate the user pays approach, giving special attention to concession holders in fisheries, forestry and agriculture, industrial and energy facilities, and irrigation and water supply systems. Also, methods would be tested for applying user pays approaches in joint management arrangements associated with individual or groups of protected areas
- Prepare guiding standards for the levels of payments applying to different categories of use and the PA services involved, and the administrative and economic instruments best suited to their management.

10.8 Demonstrating how it is done

A regional framework for PAD initiatives needs to be built around a network of demonstration projects which pilot the various policies and methods involved, provide for exchange and learning, are the basis for comprehensive training, and stimulate and promote appropriate reform and collaboration.

Demonstration is especially important to show how: (1) sectors respond to the challenge of integrating protection into their programs and budget; (2) protected areas work together to benefit from landscape approaches to PA planning and management; and (3) the experience is integrated into national PA policy and procedures.

10.8.1 Sector PAD pilots

The PAD review established that many sectors receive substantial development benefits from PAs. There is now the need to define PAD strategies with key sectors so that sector productivity is maintained and enhanced through appropriate strategic and budgetary commitment to protection as a development priority. A number of sectors, such as water, energy, tourism and fisheries were shown to have a special and growing relationship with protected areas and they could provide an initial focus for demonstration on a regional and national basis.

Each sector pilot would have a number of common ingredients involving close collaboration between the sector, PA managers and economic planning agencies. A regional sector code of practice would need to be drawn up from field experience. In each country, a sector development strategy should be assessed

against this code and changes proposed to better accommodate the role of protected areas and regimes of protection in maintaining productivity. A sector protected area plan distilling key policies and procedures and setting out priority actions should be prepared. The sector budget would need to be reviewed to reflect the reoriented priorities and, if necessary, budget submissions made to central government as part of the normal budget setting procedures. Sector assessment procedures are needed so that the flow of projects and actions through the sector could be appropriately shaped and adjusted. Those procedures should include a system for monitoring of performance and reporting in a way requiring management responses. Finally, each sector needs to identify a number of demonstration field projects to assist it in refining policy and procedures.

10.8.2 Protected area cluster and landscape pilots

Every protected area has its own characteristics and development potential when conserved in its natural state. Some can more readily realise that potential than others – when there is an accessible and receptive market for their goods and services for example. One protected area might host a reservoir for irrigation and hydropower, another may be well endowed with recreational and tourist assets, and still another might have none of those potentials but be providing a vital service as a catchment for a nearby settlement's water supply. Individually, protected areas often have difficulty “paying their way” because, while valuable in development terms, there may be no immediate market for what they have to offer or the users are primarily poor communities. Commonly in the lower Mekong countries a number of protected areas share a larger natural system or landscape. In these circumstances the collective development footprint of a cluster of PAs is more than the sum of its parts when managed cooperatively. Landscape and cluster planning are two concepts promoted by the PAD Review and which often go together. Even when one protected area stands alone, there are important development advantages in planning its management as a component of the surrounding landscape.

Development benefits of landscape approach to PA planning and management include:

- Facilitates joint management arrangements with local communities and other users of the protected area
- Allows for upstream and downstream affects to be identified and taken into account in PA and sector management
- Promotes coordination between sectors in defining a “one area one plan” approach to their activities which accounts for PA contributions
- Promotes coordination between provinces, districts and other local government in preparation and implementation of their development plans.
- Facilitates landscape wide strategies for rehabilitation of forests and other natural systems to optimise development benefits
- Allows for the development of natural system connections and corridors to optimise the development benefits from biodiversity and safeguard habitat for migratory species and those with large territories.

The PA cluster approach brings its own closely linked development advantages. In particular, it:

- Quickly establishes a simple common framework for management in situations of scarce resources (most protected areas in Cambodia for example, do not have management plans).
- Provides for the sharing of experience and lessons between parks in their conservation and development endeavours.
- Facilitates the sharing of limited staff resources and skills and equipment;
- Allows management resources to be focussed on the most important and urgent problems within the cluster.
- Facilitates collective agreements and strategies between the cluster PAs and sectors and a “one stop

shop” approach to PA - sector relations.

- Facilitates collaborative strategies for revenue raising, the use of economic instruments and financial management when this is to mutual advantage.
- Facilitates landscape wide development planning and coordinated delivery of PA services.

Both these concepts are relatively new to the Mekong countries and need to be actively promoted for the significant development advantages they bring. They should be viewed as important facets of the governments’ current move to test natural system planning as discussed in the earlier section on planning across borders, where they are identified in the hierarchy of six natural system planning levels.

In each country, the PAD Review identified a number of existing or potential PA clusters each in its shared landscape which would be appropriate as part of a network of PAD demonstration projects including trust fund initiatives and collaborative management agreements. Three candidate demonstration clusters in each country providing a diversity of development scenarios and biodiversity values are listed in Box 10.4.

Box 10.4: Demonstration PA clusters for landscape planning and management

Cambodia

1. South-west cluster of four national parks*
2. Easter cluster of three wildlife sanctuaries and one protected forest on the border with Vietnam
3. Cardamom Mountains cluster of two wildlife sanctuaries and one protected forest.

Lao PDR

1. Nam Et Phou Loei cluster of two National Biodiversity Conservation Areas in the north-east of the country bordering Vietnam*
2. The Attepau-Champasack cluster of three NBCAs and four proposed protected areas in the south and bordering Thailand, Cambodia and Vietnam
3. The Vientiane cluster of two NBCAs

Thailand (the term complex refers to a forest landscape encompassing a number of protected areas)

1. The Western forest complex of 17 protected areas of various categories and sizes
2. The Dong Phrayayen-Khao Yai complex of three national parks and one wildlife sanctuary
3. The Klong Saeng-Khaosok complex in the south-west on the country including one marine protected area, three national parks and a number of wildlife sanctuaries

Vietnam

1. Don Nai River landscape in the south with a biosphere reserve (encompassing Cat Tien National Park), several protection forests and a nature reserve
2. Thua Thien Hue landscape in Central Vietnam with a national park, two nature reserves, several proposed marine protected areas and extensive protection forest*
3. The Hoang Lien mountains landscape covering Lao Cai, Yen Bai, Son La and Lai Chau provinces in the north with one national park (Hoang Lien-Sa Pa) and two proposed nature reserves (Mu Cang Chai (Che Tao) and Van Ban). Flora and Fauna International are supporting implementation of a landscape-level project at the three sites.

* These clusters were the focus of the PAD Review field studies (ICEM 2003g)

10.9 Building capacity

Managing protected areas for development in the lower Mekong region will need to become a partnership enterprise between players not used to working on the same side of the fence. It will require forging partnerships for mutual benefit all driven by the goal of optimising productivity in PA goods and services while carefully conserving the natural systems producing them. Relationships between three groups in particular - PA managers, local communities and development sectors, will need to shift from one of combatants to collaborators in the use and management of scarce resources. If the relationships are to work, each group will need to learn a new set of perceptions and skills.

At the same time governments need to set in place the necessary policy drivers to reorientate and motivate, including economic incentives, regulations and opportunity for advancement and development. It will require the creation of an institutional and policy context which nurtures and encourages new skills and patterns of behaviour. Often government officials have returned from intensive training to find their new capacities have no place in their old institutions. For example, embracing communities as a necessary force in protected area management is not something that always sits easily with conventional PA management organisations. Or skills in defining transfer payments for ecosystem services may not be welcome in economic sector agencies.

Capacity building requires a range of integrated actions across many facets of the system. The right mix of incentives needs to be created. Another example. PA managers in Cambodia are among the poor in their community. Field staff receive around US\$12/day. To survive they must take on a range of other income generating activities not always be consistent with PA management objectives. Training alone will not solve this dilemma and can be a wasted investment if not accompanied by other capacity building strategies.

This sections deals mainly with PAD training requirements. The report overall explores many of the other elements of capacity building needed to manage protected areas as development assets. They must move forward together. All training activities should include institutional analysis to define the packages of supporting interventions needed before, during and after to sustain the capacity building investment.

10.9.1 A PAD training program

The main targets for PAD training are PA managers, local community leaders and groups, private and public development sectors, economic planners and financial managers. Each of these groups has its own mix of training needs in terms of methods and substantive focus. Training approaches can include on-the-job technical support, field training in demonstration projects, short term courses or formal tertiary education. Many of the priority subjects in which skills need to be built have been covered in this chapter including valuation, cluster management and landscape planning, joint management approaches, sector conservation agreements involving transfer payments and other revenue generating instruments, innovative financing including fund management, and national policy reform related for example, to applying the user pays and precautionary principles.

A regional PAD training program would need to include the following components:

- **PAD training needs assessments** in each country and in specific high priority locations
- **Institutional analysis** to determine critical capacity building interventions to accompany training activities
- **PAD training program design** to satisfy the needs of various key target groups
- **Short term courses and workshops** on PAD policy and procedures
- **Formal field courses** linked to PAD demonstration projects and addressing key issues the project is confronting

- **Exchange work experience** in PAD demonstration projects in the region
- **Long term PAD courses** (eg six months to a year) at regional training institutions
- **Maintenance of a regional PAD network.** There are some 800 members of the PAD network, built on four national PAD networks, and from government, local NGOs and international organisations operating in the region. These people are directly concerned with the role PAs play in development and had a key role in the PAD review. They represent a unique resource in contact through an interactive E-list and a PAD website. The network provides an important mechanism for exchange and learning and needs to be maintained.

10.9.2 A regional PAD training centre

The PAD Review found great demand in all four countries for a high quality, permanent and well resourced PAD training facility within the region. To date training in protected area management has been ad hoc through international projects or a small part of several existing forestry courses in Thailand and more recently, in Vietnam. Vietnam has identified three PA training centres in different parts of the country, one in Cat Tien National Park, but while a useful initiative these are rudimentary facilities, with few staff and no budget to provide courses on systematic basis, and no formal accreditation through the university system. In Thailand, the Kasetsart University Faculty of Forestry has PA content in its courses with the primary focus on production forestry. The RECOFTC (Regional Community Forestry Training Centre) also on the Kasetsart campus offered protected area and ecotourism courses over several years but no longer has appropriate staff or budget for the purpose. A second regional training institution, the Asian Institute of Technology, does not offer protected area courses.

A goal would be the establishment of a regional network of PAD training centres building on existing facilities with at least one in each country. As a first step one regional centre should be build up which, over time would help strengthen local centres and maintain a network to share expertise, training materials and offer a diversity of field situations. A project approach within an existing institution may be the most practical way to begin. An assessment of the protected areas training experience and opportunities in the region to define options for establishing a regional PAD training centre should be carried out.

10.10 Conclusions

The PAD Review found the governments of the region facing a number of conundrums. They continue to establish protected areas to conserve important natural systems but diminish their values through contradictory and inconsistent policies, decisions and practise in other sectors. They are expanding the protected areas estate, but not providing the resources to manage it effectively. They promote economic development as the overriding priority but without recognising or investing in the massive development contributions protected areas are making in their natural state. Two arms of government – one concerned with conserving natural systems and one concerned with developing them – appear to operate without connection, despite the growing evidence that the wellbeing and productivity of one is inextricably linked to the other.

The weakness needing attention is the institutional, policy and procedural relationship between those arms of government. The linkage between development and conservation, being so clearly expressed in the condition of the region's natural systems, must be built up and strengthened in institutional terms. An essential start is for protected areas to be treated as productive economic assets with their goods and services valued and expressed in development language. The process of making protected areas and conservation activity mainstream in regional development begins with the two arms of government talking the same language and acknowledging their mutual interdependence. Policy incentives and procedures need to define and reinforce the relationship from day to day so that it is progressively understood and expressed both in natural systems terms – for example, ecosystem services given and received – and as

development and conservation contracts and agreements – ie expressed as development.

Over the past two decades, a great imbalance has evolved. Budgets, staffing and overall investment in exploitative activities has grown rapidly while commitments relating to maintenance, conservation and restoration remain below 1 per cent of GDP. In part the imbalance is intentional – following the “consume now conserve later” philosophy. More important it results from a single track mentality within sector agencies and among economic planners driven by narrow agency mandates which discourage full cost-benefit accounting. Either way the loss of natural capital in the lower Mekong region and the serious impacts it is having in retarding development and accentuating inequities now show that the costs of many years of lopsided investment are high and the damage often irreversible.

Above all else, the PAD Review concludes that leaders in the region need to give much greater commitment and priority to conservation in national and regional development plans. The reason for this strategic reorientation of priorities is straight forward – it will bring the greatest long term development benefits to the communities and countries of the region.

The difficulty in making a political commitment to conservation on the scale required is that regional cooperation is a prerequisite to action. If a country conserves shared natural systems for long term development benefits while its neighbours exploit them for short term gains, then it loses all around. In that situation there is no incentive for conservation.

Therefore, a second principal conclusion reached by the PAD Review is that a regional conservation agreement and special institutional arrangements are becoming essential to long term regional development. An adequate and effective capacity is needed at regional level to facilitate, guide, monitor and inform conservation and development planning and management so that natural systems are safeguarded and function at their best.

A third conclusion is the need to redress the serious imbalance in investment, which is now impeding development. That will involve a much greater share of government budget for conservation, channelled directly to protected area managers and through sector development agencies benefiting from natural system goods and services. It will involve implementing a wide range of new economic and legal instruments to direct payments from public and private users to maintain the flow of those natural benefits. Given the current direction of budget and governance reform in the region, innovative and transitional forms of financial management through special funds will also be required.

Redressing the investment imbalance will need to be done in a coordinated and systematic way throughout the region and it will require direction from the highest level in each country. A practical way of moving forward is through the collective preparation of the regional conservation agreement, and within that framework to define a number of provisions relating to financing targets for each country to pursue. Given the large budgetary gap which has built up and the massive size of the protected areas estate, it will not be a matter of making small adjustments. A very substantial budgetary reorientation is needed. The PAD Review considers that a useful target would be for each country to increase its public sector allocation to protected area and conservation activities by one per cent of GDP each year over five years, and then to conduct a thorough evaluation before setting the next round of targets. Each country should aim to increase its conservation budget from well below one per cent to five per cent by 2010.

A conservation budget baseline is needed to measure progress and for comparative purposes across the region. Each country should use the same set of criteria for determining what to include and what to exclude in calculating the current conservation budget. It is now difficult to get a clear idea of how much in government funding goes to protected areas. Even more difficult to assess how much goes to conservation activities outside the PA systems. A set of regional criteria on what constitutes conservation expenditure should be prepared and an accurate baseline established.

A regional agreement also would involve the establishment of a regional conservation fund with member states making contributions according to an agreed formula and other states and organisations contributing according to regional interest. This arrangement follows the UNEP Regional Seas model, considered an appropriate one for the Mekong region.

Funding increases alone are not sufficient – strong policy guidance is required. Sectors such as energy, forestry, agriculture, transport, tourism, industry and fisheries which have immediate connections with protected areas require special codes of practice as a guide in their day to day decision making and planning. Codes are needed at regional level to be interpreted through national policy and sector strategies and programs. Yet, these too require supporting actions. A significant finding of the PAD Review is often new policies have been introduced at central level for implementation through local government, but without the regulations and guidelines necessary for local managers to apply the policy consistently. Often insight into what such detailed direction should contain only comes through the experience of implementation. That is why a network of PAD demonstration projects throughout the region should be a guiding force in a regional conservation program and the fertile ground for training and capacity building.



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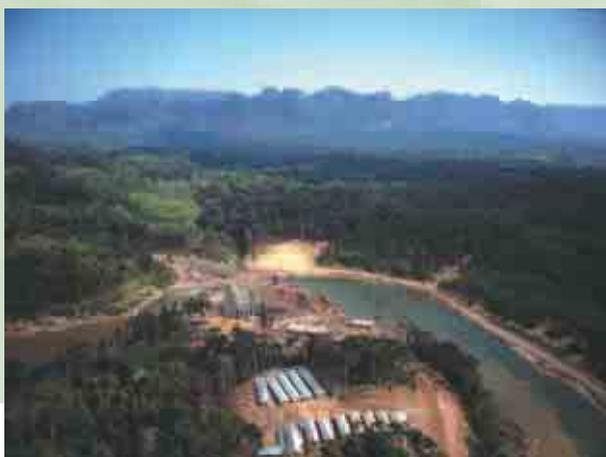
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Abbreviations and acronyms

ADB	Asian Development Bank
AFP	Agence France Presse
AMTA	Agency for Coordinating Mekong Tourism Activities
ARCBC	ASEAN Regional Centre for Biodiversity Conservation
ASEAN	Association of Southeast Asian Nations
BDP	Basin Development Plan
DDP	Dams and Development Project
DFID	Department for International Development, United Kingdom
EIA	Environmental Impact Assessment
FAO	Food and Agriculture Organisation of the United Nations
FSSP	Forest Sector Support Program
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GIS	Geographic information system
GMS	Greater Mekong Sub-region
GoL	Government of Lao PDR
HDI	Human Development Index
ICDP	Integrated Conservation and Development Project
ICEM	International Centre for Environmental Management
IEA	International Energy Agency
IUCN	The World Conservation Union
LECF	Lao Environment and Conservation Fund
LMB	Lower Mekong Basin
MAB	UNESCO Man and Biosphere Programme
MARD	Ministry of Agriculture and Rural Development
MOE	Ministry of Environment
MOU	Memorandum of Understanding
MRC	Mekong River Commission
MSY	Maximum sustainable yield
MW	Megawatt
NASA	US National Air and Space Agency
NBCA	National Biodiversity Conservation Area
NGO	Non-governmental organisation
NTFP	Non-timber forest product
ODA	Official Development Assistance
PA	Protected Area
PAD	Protected Areas and Development
PAD Review	Review of Protected Areas and Development in the four countries of the Lower Mekong River region
PATA	Pan Asian Tourism Association
PDR	People's Democratic Republic
SEA	Strategic Environmental Assessment
SPC	South Pacific Commission
SPREP	South Pacific Regional Environment Program
TBPA	Transboundary protected area
TSS	Total suspended solids
UNDP	United Nations Development Programme

UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
VCF	Vietnam Conservation Fund
WCD	World Commission on Dams
WCS	Wildlife Conservation Society
WRI	World Resources Institute
WWF	Worldwide Fund for Nature



The Review of Protected Areas and Development (PAD Review) examines the growing tensions between economic and conservation objectives in the four countries of the lower Mekong River region: Cambodia, Lao PDR, Thailand and Vietnam. It identifies the many development benefits flowing from protected areas and the need to reflect them in the plans and budgets of forestry, agriculture, energy, tourism, fisheries and other key economic sectors. The lessons of more than a decade of protected area management experience in the region are related to new and innovative approaches elsewhere in the world.

The PAD Review was undertaken by key government ministries in Cambodia, Lao PDR, Thailand and Vietnam through a partnership with the International Centre for Environmental Management, IUCN – the World Conservation Union, the Worldwide Fund for Nature, Birdlife International, the United Nations Development Programme, the Mekong River Commission, the New South Wales National Parks and Wildlife Service and the Tropical Forest Trust. The review was sponsored by Danish International Development Assistance, the Australian Agency for International Development, the Swiss Agency for Development Cooperation, the Asian Development Bank, the Royal Netherlands Government and the Mekong River Commission.

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