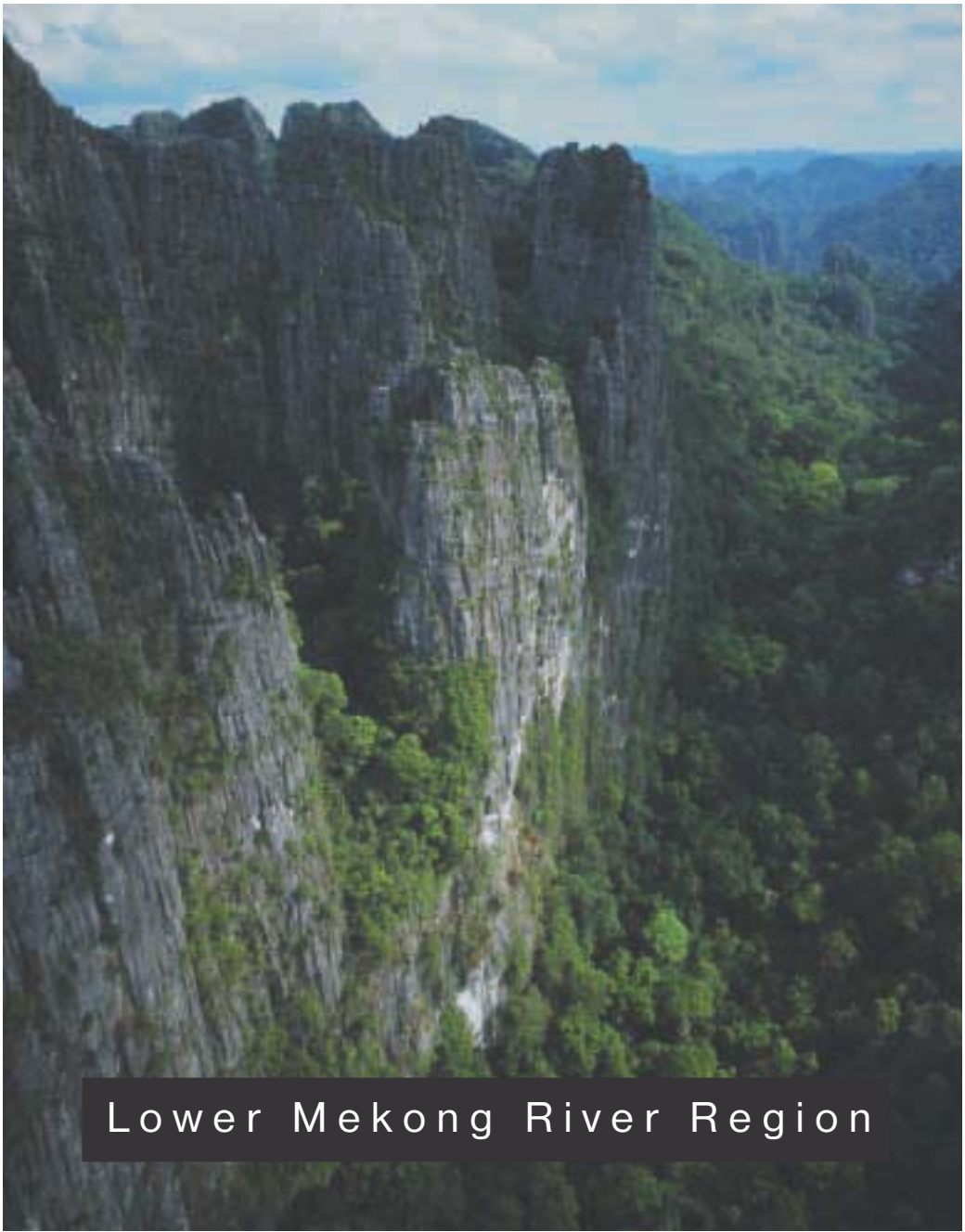
National Report

Review of Protected Areas and Development

Lao People's Democratic Republic

National Report on Protected Areas and Development



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

Lao People's Democratic Republic

National Report on Protected Areas and Development

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National Report on Protected Areas and Development

The PAD Partnership - 2003

The PAD Partnership

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Department of Forestry and Wildlife, Ministry of Agriculture, Forestry and Fisheries

Department of Fisheries, Ministry of Agriculture, Forestry and Fisheries

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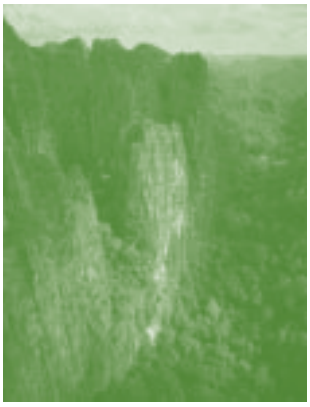


Foreword

The Lao PDR Protected Area and Development Review (PAD Review) has been a busy and exciting period of consultation and analysis. The results of the PAD Review are largely documented in this volume and have far-reaching implications. We can now more clearly understand the vitally important role of protected areas in our national development. They provide the essential bridge between our economic development and the conservation of resources on which it depends.

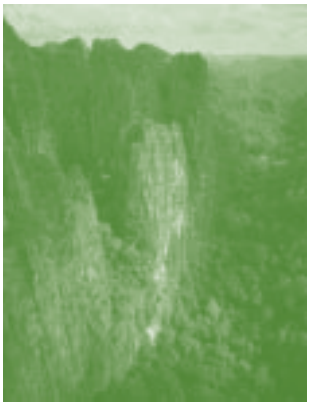
The Government of Lao PDR is proud of its achievement in establishing a national system of protected areas of international importance, covering more than 21 percent of the country including the growing number of areas at local level. Yet, still some question the development values of our protected areas. This report clearly shows that, far from being of no value, the extraordinary reservoir of natural resources in our protected areas is critically linked to economic development at the national, provincial and local levels. To foster these links we need to invest in maintaining and conserving the development benefits which protected areas provide.

The management of non-timber forest products (NTFPs) and water both demonstrate this relationship between protection and use very clearly. NTFPs contribute significantly to the welfare and livelihoods of a large number of Lao PDR's rural households. The PAD Review confirmed that these products play vital roles in meeting subsistence needs and providing cash income opportunities for many of the poorest people in the country. Yet, NTFPs are being over-harvested – we need to manage them on a sustainable basis within and outside protected areas to maintain their major contribution to poverty alleviation.

Lao PDR is well endowed with water. The Government is conscious of the need to husband this natural resource as one of the nation's few comparative advantages for economic development. The role of protected areas in water resource management is widely appreciated and improved protection of upland catchments is a prominent feature of Government policy for a variety of downstream benefits especially for agriculture and hydropower. The Government has recognised the potential linkage and the benefits of protected areas for hydropower projects and has pioneered in the region the use of a hydropower levy for protected areas management. We need to develop further this economic link between use and conservation and to ensure that hydropower levies for protected area management and catchment protection are universally and equitably applied, are adequate in amount, and are used by the correct authorities to conserve our natural systems.

The PAD Review process has created a productive partnership between economic planning and conservation management organisations within and outside government and between national and international agencies. This PAD partnership focuses on the relationships between protected areas and the development sectors receiving benefits from them. It identifies the obligations of those sectors and ways in which their policies, budgets and programs need to be reorientated to invest in protected areas as critical development assets. We need to foster the PAD partnership so that the recommendations and strategies of this report receive the consideration they deserve. For its part, the government is fully committed to implementing the report and calls on all development assistance agencies and conservation organisations to assist in the process.

Veunevang Bouttalath
Department of Forestry
Ministry of Agriculture and Forestry



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More than 150 people contributed to the Lao PAD Review either through interviews, roundtable meetings, group discussions or written comments and materials. Most are government officers representing some 30 agencies at national and local levels. This was truly a cross-sectoral review initiated by government as is reflected in the Lao PAD Technical Core Group membership which provided the overall technical guidance for the review, undertook the field studies and prepared the sector background papers. Other review contributors come from NGOs, international development organisations, and conservation projects. This report is rich with their ideas, views and experiences. Their involvement and commitment to conservation in Lao PDR is deeply appreciated.

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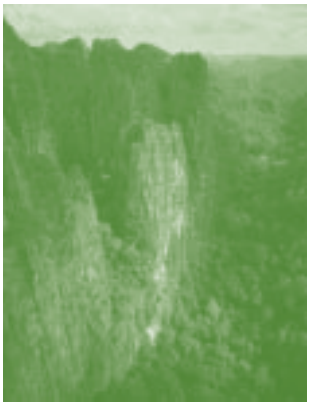


Summary

Overview

Despite being one of the world's "least developed countries", Lao PDR has established an extensive set of protected areas (PAs) designed as an integrated system on sound scientific principles. Lao PDR's National Protected Area (NPA) system is unrivalled in the region and indeed by few countries in the world. Only wetlands and lowland forest might be considered under-represented. In addition, there is a growing number of provincial and district PAs, a rich and diverse complement from frog ponds and fish pools to important watersheds. Combined, the protected area system covers more than 21 percent of the land area, one of the largest "land uses" in the country.

Yet, the contribution of both *in situ* and "exported" benefits of Lao PDR's PAs to national development is not well understood or recognised. Consequently, inadequate technical and financial management resources go to preventing an on-going and probably increasing deterioration of important PA values.

This situation is unlikely to change until the government makes a serious attempt to recognise PA benefits in economic terms and invest in improved PA management. This report emphasises the necessity of adopting "the total economic value" approach to identifying the economic benefits associated with PAs, instead of focusing only on some of the direct commercial values. It presents a more complete picture of the economic importance of PAs, and demonstrates the high and wide-ranging economic costs associated with their degradation, which extend far beyond the loss of direct use values.

Currently, PA benefits are treated as "free or under-priced" goods and services. Once appropriately valued, the economic justification can be made for increased revenue to flow back to PAs based on application of the "user pays" principle. Those sectors which benefit should pay for maintaining the PA goods and services they consume.

Of special importance in Lao PDR is the significance of non-timber forest products (NTFPs) for rural communities, especially in periods of stress (droughts, post floods etc.) and the role PAs play in sustaining NTFP supplies. Yet, all the indications are that NTFP stocks are declining, being over-exploited for commercial gain. More effective PA management is needed to halt this trend.

While most of the recommendations of this report are presented as sectoral responses, three cross cutting strategies are promoted:

- A better use of economic analysis and instruments in integrating PAs in local and national development planning;
- Greater collaboration with communities and sectors in rural development planning and management of protected areas; and,
- A strengthened and more focused protected area policy and institutional framework.

Sectoral strategy recommendations

Forestry

Sustainable forestry sector
PAs are an integral component of the forestry sector and until such time as the forests are managed on a sustainable basis, PAs will come under constant pressure.

Sustainable NTFP management and poverty alleviation.
A large proportion of Lao PDR's rural poor derives some part of their livelihood from NTFPs. For many the dependence on NTFPs is a function of their poverty - they lack better alternatives. Helping poor communities meet their subsistence and food security needs through sustainable NTFP management needs to be a high priority for the forestry sector and protected area managers.

The role and significance of NTFPs in Lao PDR has been elegantly articulated as follows:

"NTFPs are uniquely essential for the Lao national economy, both for subsistence and trade. NTFPs are key elements in poverty alleviation, forest and biodiversity conservation, land use planning and allocation, substitution of shifting cultivation and industrial development. Every project or program aimed at rural development or biodiversity conservation in Lao PDR should have an NTFP strategy, similar to the way each project should have a gender/equity strategy" (Foppes and Kethpanh 2000).

Water

Valuing watershed protection
Until such time as water supplies from protected areas are officially valued, they will be treated as a 'free resource' with no revenues channelled back to protected area management and watershed protection.

Water tariffs
Water tariffs are generally introduced to recover costs of supply and to improve efficiency in use. Tariff levels also need to be set to include protected area and watershed management costs.

Energy

Institutionalising hydropower water catchment levies
Hydropower levies should become a standard policy tool in all hydropower schemes affecting or benefiting from protected areas with revenues going directly to conservation management. Such levies should be enacted in legislation to ensure transparency and a consistent policy so that every hydropower producer is treated similarly and according to the same conditions and standards.

Agriculture

Sustainable upland agriculture
Unsustainable upland agriculture continues to be the subject of extensive government policy, strategy and action. Effectively managing upland agriculture is of critical importance to the conservation of protected areas.

Cash crop encroachment and land allocation
For NPA management, the two issues of cash crop encroachment and land allocation are strongly intertwined, the latter specifically in the form of zonation which is a legal requirement within NPAs.

Land zoning based on land capability
If land allocation is to result in a successful move from swidden to sedentary farming, a critical requirement is zoning based on land capability assessment.

Conserving agricultural biodiversity
There is a need to establish protected areas for the purpose of conserving agrobiodiversity.

Fisheries

The fisheries sector would benefit from a re-orientation resulting in:

- official status for wetland protected areas;
- increased assistance for community co-management and conservation;
- a more balanced approach to aquaculture development and conservation of natural fish habitat; and,
- a specific program for capture fisheries and frogs in upland areas.

Tourism

Review of Lao PDR ecotourism initiatives
Ecotourism development is a government priority and there are several initiatives underway, including the well-known Nam Ha project. A review of the lessons learned would provide practical guidance to provincial governments in promoting protected areas as a development strategy.

Regulatory framework for ecotourism
Governments are frequently subjected to pressure from tourism enterprises to choose unrestrained and hasty development over carefully planned growth at a scale and form appropriate to local conditions and which maintain the conditions essential for nature-based tourism.

Road development

Integrated development planning
Roads to remote areas and especially to or near protected areas should be built as a component of integrated development plans by provincial and district authorities.

Appropriate specifications
Not all roads in remote areas need be built for heavy transport or indeed cars. Road infrastructure should be developed at a scale and form appropriate to local needs.

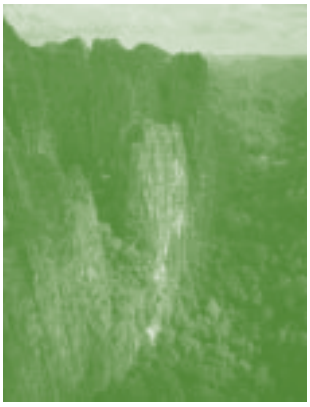
Improved environmental assessment and mitigatory action
A component of a good integrated development plan will be an EIA of a high standard which has a regional perspective and which assesses carefully the direct and indirect impacts of proposed new roads.

Trade and industry

Cross-border cooperation
While domestic trade and use of wildlife in Lao PDR is probably significant, the cross-border wildlife trade is far more serious in its impact on natural systems and their long term development potential.

Regional trade cooperation
The wildlife trade in the lower Mekong region is a regional issue, not solely a bilateral issue and addressing it deserves greater regional recognition and attention.

Convention on International Trade in Endangered Species (CITES)
Lao PDR should actively build the capacity needed to become a signatory to and implement CITES – the Convention providing the international umbrella for management and control of wildlife trade.



Part 1: Biophysical and Demographic Characteristics of Lao PDR and Implications for Protected Areas

1 Purpose of the Review of Protected Areas and Development

1.1 Overview

Development planners often consider protected areas (PAs) as having little or no economic value. Typically, they are seen as an uneconomic use of land and resources, as an obstacle to growth and as a drain on scarce public funds. Yet, more than 13 percent of Lao PDR's land area is designated within the National Protected Area system[1] and an additional significant area is designated in provincial or district protected areas bringing the total coverage to more than 21 percent of the country.

Far from being of no value, this extraordinary reservoir of natural resources is of critical importance to economic development. It encompasses the most important species, ecosystems and genetic resources, provides stability and maintenance for land and water systems and underpins sustainability in national, provincial and local economies in ways only now becoming apparent. Of critical importance is its role in poverty alleviation for a large number of Lao PDR's poorest households.

Yet, in common with those throughout the lower Mekong region, Lao PDR's protected areas are degrading and their existing and great untapped potential contributions to development are diminishing.

The purpose of the PAD Review undertaken by the Lao PDR government is to examine the extent and reasons for this negative trend and to demonstrate the need for raising the priority of PAs in government planning and budgeting.

Similar national reviews have been undertaken in the other three countries of the lower Mekong River region - Cambodia, Vietnam and Thailand. They explore the links between economic development and conservation through protected areas, and examine their role as an integral component of economies and development landscapes - at regional, national and site levels. In addition to a process of national and regional consultation and information sharing, the PAD Review provides four major policy analysis and strategy reports of immediate relevance for Lao PDR:

- **National Lessons Learned Paper:** A review of the past decade of PA experience in Lao PDR;
- **Field study of protected areas and their economic and development linkages:** A case study of Nam Et and Phou Loei National Biodiversity Conservation Areas;
- **National Report on Protected Areas and Development:** Setting out strategies to maintain and enhance protected area development benefits;
- **Regional Report on Protected Areas and Development:** Dealing with PAD issues of shared concern to countries of the region and setting out strategies for consideration in the River Basin Development Plan process.

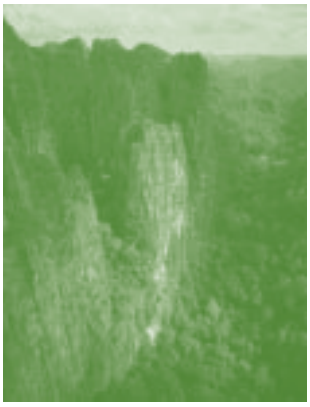
1 Formerly termed NBCA – National Biodiversity Conservation Area.

1.2 Scope and purpose of the *'National Report on Protected Areas and Development'*

This National PAD Report draws on the results of the Nam Et-Phou Loei field study (ICEM 2003a) and builds on the findings of the national lessons learned study (ICEM 2003c). It analyses the relationship between economic planning processes and institutional arrangements and those for protected areas and biodiversity conservation at national and local levels and explores ways for beneficial integration between the two systems. It defines practical strategies to enhance the contribution of protected areas to national and regional development.

In so doing the National PAD Report:

- Establishes the important role PAs play in socio-economic development;
- Identifies the problems PAs are facing in providing these benefits; and,
- Sets out policy options for each sector to recognise and help maintain the PA development services and products they receive.



2 Biophysical and demographic characteristics of Lao PDR

This chapter presents an overview of the biological, physical and demographic conditions in Lao PDR to provide a setting for the country's protected areas and its socio-economic development.

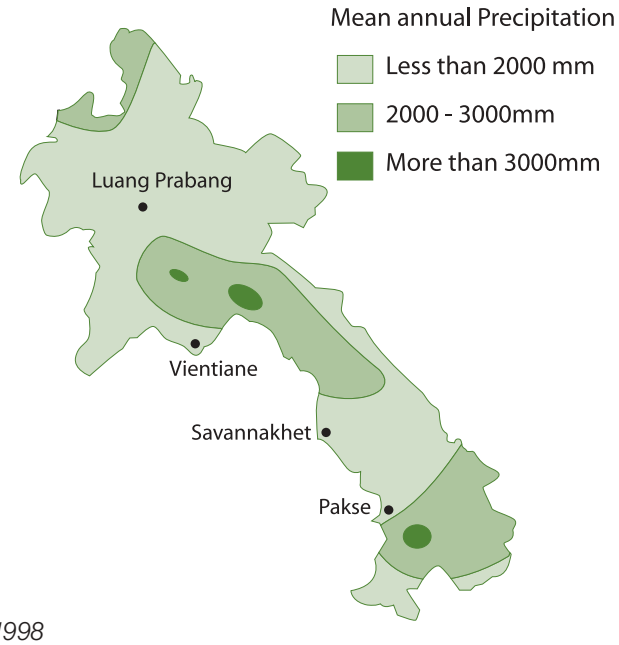
2.1 Climate

The climate of Lao PDR is strongly influenced by the annual monsoon cycle, with the wet SW monsoon from April to October bringing around 90 percent of annual rainfall. During the dry season from November to March, some months may be completely devoid of rainfall over much of the country.

Rainfall varies greatly between the Mekong Plain and the eastern mountain chain, particularly those high parts of the mountains where rainfall originating in the east can pass through the barrier. Some of these areas have rainy seasons that last for ten months of the year. Superimposed on this monsoon cycle are rainfall events associated with typhoons crossing through central Vietnam.

Mean annual rainfall ranges from less than 1,500 mm (Savannakhet and much of the north) to more than 3,500 mm (Bolavens Plateau). Figure 1 shows isohyets of mean annual rainfall over the 30 year period 1962-1991.

Figure 1. Rainfall isohyets for Lao PDR



Source: Lahermeyer-Worley 1998

2.2 Physiography and agro-climatic characteristics

Lao PDR is a mountainous country, with 80 percent of the land area classified as mountainous or hilly. The Mekong River, one of the world's great rivers (eighth largest in terms of flow), runs through the country for a length of 1,898 km and drains 80 percent of Lao PDR's land area.

Three physiographic units with differing agro-climatic characteristics can be distinguished (Figure 2):

- Northern Highlands – rugged mountainous topography between 500-2000m, only six percent of the area under 20 percent slope with half exceeding 50 percent slope. Moist to dry sub-tropical climate with annual rainfall between 1,500-2000mm. Soils heavily leached and acidic with low water retention capacity and generally low fertility.
- The Annamite Range[2] – mountainous topography between 500-2000m, with less rugged terrain than the northern highlands. Tropical monsoon climate with annual rainfall between 2,500-3,500mm. Soils generally similar to those in the north.
- Mekong Plain – the river plain along the Mekong and its larger tributaries. Tropical monsoon climate similar to the Saiphou Louang but varying rainfall. Generally flat upper levees with recent alluvial deposits which are acidic and shallow, the younger alluvial soils of the floodplain are fertile but are often subject to wet season inundation.

Figure 2. Physiographic units of Lao PDR

Source: Duckworth et al. 1999

The combination of rugged terrain and relatively poor soils over much of the country offers minimal potential for intensive agricultural production. This is exacerbated by a strongly seasonal climate and together these factors result in drought being a characteristic of upland agriculture. Only the Mekong Plain offers relatively good potential for intensive agriculture but it is limited in extent.

Climate, topography and soils combine to make most of the sloping land in Lao PDR susceptible to erosion and more suited to the production of trees than to arable land. The overall natural resource base is fragile with a limited carrying capacity (STEA 2000).

2 Known in Lao PDR as *Saiphou Louang*.

2.3 Biogeographical characteristics and significance

Four ecoregions of global priority occur in Lao PDR (Olson and Dinerstein 1998):

- Annamite Range Moist Forests;
- Indochina Dry Forests;
- Northern Indochina Sub-tropical Moist Forests; and
- Mekong River and its catchment.

This ecoregion analysis, combined with the analyses of MacKinnon and MacKinnon (1986) and MacKinnon (1997), identifies the following habitats in Lao PDR of high international significance:

- **Evergreen Forests of the Annamite Mountains and Foothills.** This is considered the most biologically distinct ecosystem. Species endemism is high for many taxa. Included are extremely wet forests, which are formed by an interaction of monsoon patterns and local topography. Annamite forests are found only in Lao PDR, Vietnam, and Cambodia, but they are probably of highest quality in Lao PDR, due in part to lower human pressure.
- **Central Indochina Limestone Karst:** Like the Annamites, species endemism is high and the habitat is found elsewhere only in Vietnam.
- **Dry Dipterocarp Forests of the Mekong Plain.** Found mainly in southern Lao PDR, and characterised by relatively flat, low elevation land with grass and herbs under widely spaced deciduous trees (predominantly *Dipterocarpaceae*). It is typically studded by permanent or seasonal pools, which are of high importance for a variety of wildlife, from large ungulates to rare waterbirds.
- **Bolavens Plateau.** This massif between the Mekong and the Annamites in southern Lao PDR is a habitat of high distinctiveness. It occurs only in Lao PDR.
- **Northern Highlands.** The mountains of the north are biogeographically distinct from the Annamites in the central and southern part of the country, with different species assemblages.
- **Mekong River**. Lao PDR has a pivotal role in the conservation of the biodiversity of the Mekong. Not only does much of the river run through Lao PDR and along its border, more of the drainage that feeds the river is found in Lao PDR than any other country. The Mekong undergoes major seasonal changes in flow rate and the exposed channel during low flow season is of outstanding significance to wildlife (Duckworth et al. 1999).
- **Other rivers and streams**. Because of the extensive mountainous topography of Lao PDR, streams are a widespread and key habitat. The fish diversity in streams of Lao PDR is very high, and so is endemism (Baird 1998; Baltzer et al. 2001).

2.4 Demographic characteristics

2.4.1 Population size, density and projections

In 2000, the population of Lao PDR was 5.2 million with an annual growth rate of 2.4 percent (NSC 2001a). The overall density of 22 persons/km^2 is the lowest population density in Asia. Population density varies from 9 persons/km^2 in Xaysomboun Special Region to 152 persons/km^2 in Vientiane municipality. Despite the low population density, over 50 percent of the population live in the river plains along the Mekong where agriculture is most intensive. The limited cultivated cropland elsewhere results in Lao PDR having about 5,500 people per thousand ha of cultivated land, considerably more than the 3,000 in Thailand.

The current population projection sees the population reach 6.4 million in 2010 and 7.7 million in 2020 which indicates that population pressure will increase strongly even if density remains low. This situation may be exacerbated by migration flows due to rural exodus or to internal migration from the mountains to the lowlands (Sisouphanthong and Taillard 2000).

2.4.2 Rural-urban population distribution

Less than 20 percent of the population of Lao PDR resides in urban areas (Table 1). Subsistence farming is the overwhelmingly dominant activity – 75 percent in rural areas and 67 percent at the national level.

Table 1. Population distribution of Lao PDR by urban and rural areas

Year	Total Population (000s)	Urban (000s)	Urban (%)	Rural (000s)	Rural (%)
1995	4,574	782	17.1	3,793	82.9
1997	5,087	849	16.7	4,238	83.3

Source: NSC 1999

2.4.3 Population movements

Lao PDR has a recent history of major population movement. During the American War in Vietnam, approximately 730,000 people were displaced within national borders and about 414,000 people left the country. Between 1975 and 1979, 550,000 people were returned to their provinces.

Current movements are now on a much smaller scale, although national statistics do not reveal the complete situation. From 1985 to 1995, 3.6 percent of the population changed districts. Movements to and from the largest towns accounted for two thirds of all population movements and just under one third was from the largest towns to smaller towns or rural areas. However, intra-district movements were not included in these statistics. Consequently, they did not reveal the resettlement of ethnic minorities engaged in slash-and-burn agriculture in the mountains. Approximately one third of the population had been resettled in this manner in the preceding 20 years (Goudineau 1997).

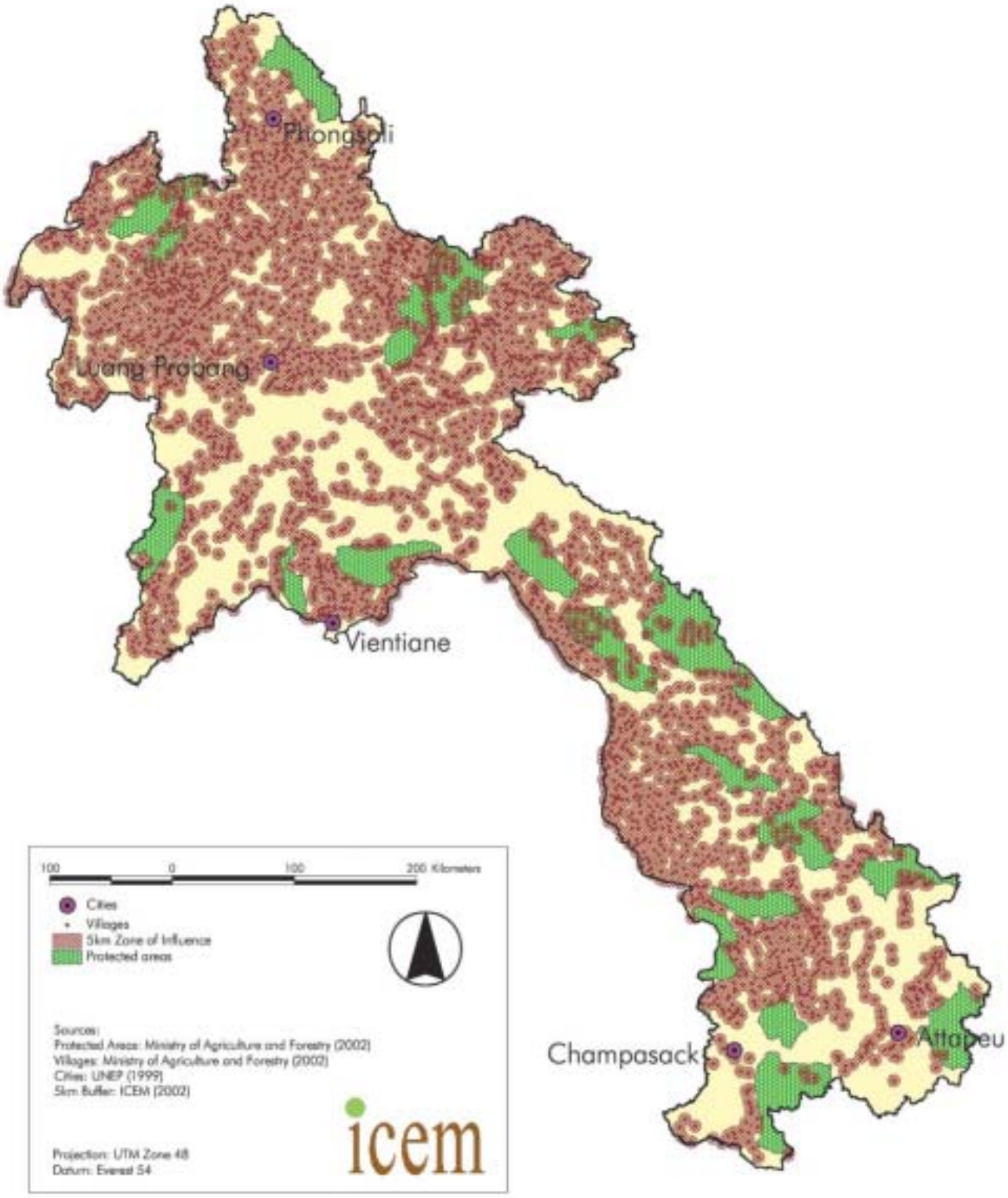
The consequence of this movement, which is from the least populated areas to the most populated areas, is increased land pressure in the plains and valleys, although densities are still comparatively low (Sisouphanthong and Taillard 2000).

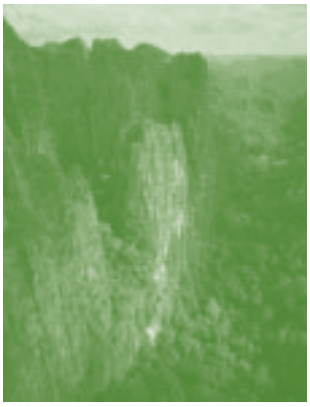
2.5 Implications for protected areas

Lao PDR's varied geography and climate has required an extensive system of protected areas to ensure that representative areas of all biogeographical units in the country are included. It is successful in this respect, with the exception of wetland habitats, which are under-represented, specifically the Mekong mainstream and undisturbed stretches of large, slow-moving rivers.

With approximately 80 percent of Lao PDRs population located in rural areas and the majority subsistence farmers, all protected areas are subject to traditional community use. Though with the low population density few protected areas, if any, are subject to great population pressure (Map 1).

Map 1. Villages and 5 km zones of influence





Part 2: Economic Development, Governance and Protected Areas

3 Government administration, reform, economic development and protected areas

This chapter provides an overview of the administrative structure and socio-economic development policy framework of the Government of Lao PDR (GoL) as a whole and then for protected area management.

3.1 Governance and administration in Lao PDR

Lao PDR is a unitary state[3]. Currently there are 16 provinces (and two equivalent administrative units – Vientiane Prefecture and Saysomboun Special Zone), 141 districts and 11,229 villages. There are four levels of state administration: central, provincial, district and village. The village is considered an administration of the people and is headed by an elected village chief – the chief being elected by a 'guided process' every two years.

The current system of government is organised on a typical centralised pattern with a strongly devolved administration at the provincial level and to a far lesser degree at the district level. The main feature of the Lao system is the typical balance between the vertical line – the central ministries and their field offices at the provincial and district level – and the horizontal line – offices, committees and mass organisations directly under the governor and the district chief. Thus any field office responds to the vertical line (central ministry) and a horizontal line (provincial governor and district chief).

3.2 Protected area administration

3.2.1 Institutional framework

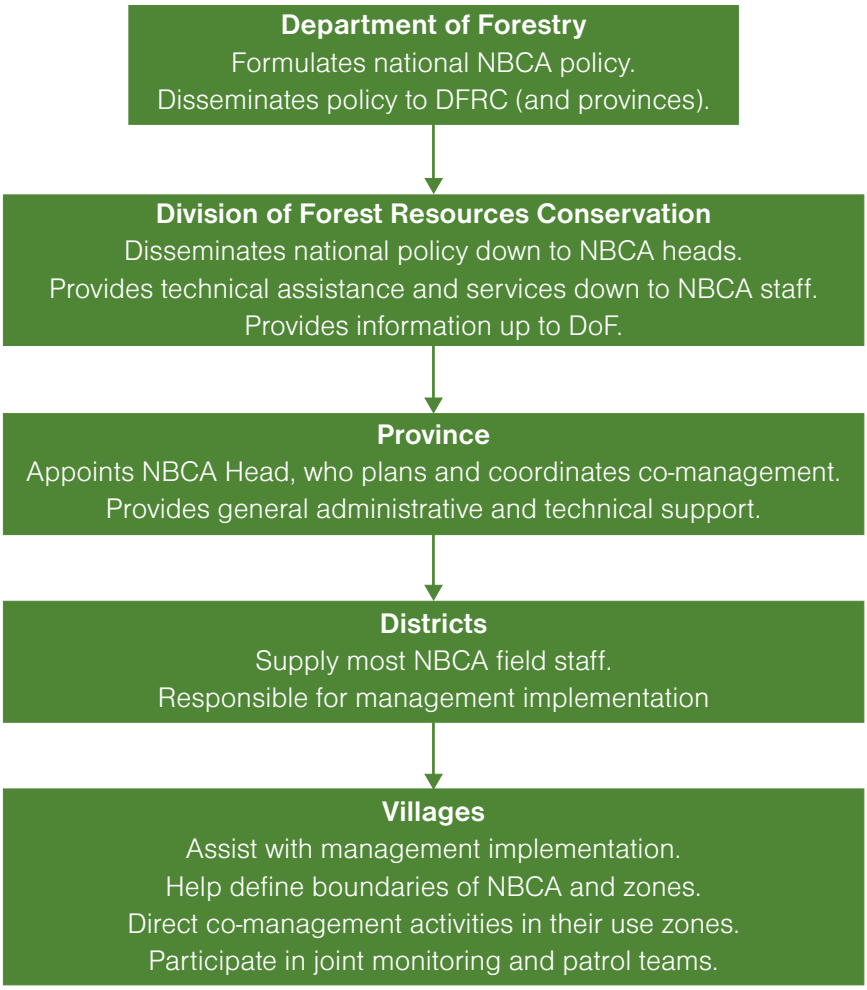
The management of most forests in Lao PDR, including those designated as NPAs, is the responsibility of the Ministry of Agriculture and Forestry (MAF)[4]. Responsibility for NPAs flows from MAF down through its Department of Forestry (DoF), DoF's Division of Forest Resources Conservation (DFRC), to Provincial Agricultural and Forestry Offices (PAFOs) and then to District Agricultural and Forestry Offices (DAFOs). Finally, in a co-management approach, villagers are officially involved in NPA management. Figure 3 summarises the management structure.

3.2.2 Central level

DFRC is the national focal agency for the coordination of NPA management. It was formed in 1999, but has had three predecessors within DoF in the past decade that were responsible for nature conservation and protected area management. The largest and most active was DFRC's immediate precursor (from 1994 to 1999), the Centre for Protected Areas and Watershed Management (CPAWM). In mid-1999, GoL undertook

3 This section is adapted from UNDP 2002.
4 This section is adapted from Robichaud et al. 2001.

Figure 3. National protected area management structure



Source: Robichaud et al. 2001

a wide-ranging reorganisation to decrease the central bureaucracy, improve efficiency and move staff from Vientiane to assist provinces and districts in the field. As a consequence, CPAWM was abolished and partially replaced by DFRC.

The principal responsibilities of DFRC are to:

- develop and implement strategic plans for the conservation of NPAs, wildlife and water;
- study and provide opinions on conservation initiatives;
- provide technical guidance down the vertical organisation to the local level and undertake periodic inspection of conservation activities;
- disseminate laws and regulations related to conservation; and,
- coordinate with international organisations under DoF's guidance.

DFRC is principally a service organisation, providing technical assistance to local levels, options and opinions to DoF, and coordination assistance to international organisations. Policy formulation occurs higher in government.

Currently DFRC has about 15 staff divided into a technical unit and an administrative unit. Technical staff have responsibility for coordinating the assistance of foreign conservation organisations (e.g., IUCN, WCS and WWF).

3.2.3 Local level

Long-standing GoL policy to delegate management authority for most national development to the local level was recently reiterated in Prime Minister's Advisory Note 01 (2000). NPAs are generally staffed and managed by staff from the relevant Provincial Agriculture and Forestry Office (PAFO) and their DAFOs. The most common arrangement is for the NPA Head to be assigned from the PAFO, and his core staff drawn from a mix of PAFO and DAFO staff. There are variations on this arrangement, but the preferred GoL model is for most of the NPA staff to be drawn from, and based in the districts. Part of the team might also be based at an NPA field office. Field offices are now established in nine of the 20 NPAs. An exception is Phou Khao Khoay NPA, which is managed by the Ministry of Defence with the provinces and districts having little involvement. The military also has a major presence in Nam Pouy and Phou Xieng Thong NPAs, for border security.

Staff levels vary widely among the provinces. However, overall staff numbers in a province do not appear to influence the number of staff assigned to an NPA. For example, Phongsaly Province in northern Lao PDR has fewer than 10 PAFO staff, and none assigned to the province's one NPA, Phou Dendin. Attapeu, a slightly smaller province in the south, has more than 60 PAFO staff but, likewise, none assigned full-time to its sole NPA – Dong Ampham.

The village, through its chief (elected by the villagers from candidates approved by the district), is part of the civil administration. Cooperation of village chiefs is critical for the success of participatory management. The responsibilities and rights of villages in regards to NPAs are evolving through the development of a Land Law, with its integral process of land allocation, and the development of participatory management in the NPAs as guided by the Forestry Law.

3.2.4 Other GoL agencies

Several other GoL agencies outside of MAF contribute to NPA management (Robichaud 2001, DoF 2000). Of these, the Science, Technology and Environment Agency (STEA) in the Office of the Prime Minister is the national focal point for GEF projects and has an important national policy role.

3.3 Policy framework

3.3.1 National policies

National development goal

The Lao PDRs all-embracing development goal or vision that inspires and guides all its development efforts is to graduate from the Group of Least Developed Countries[5] by 2020. This goal is to be reached by reducing poverty nationwide through sustainable resource management and equitable distribution of the

5 Least Developed Countries – currently 49 countries are designated in this manner on the basis of three underlying criteria: low income, weak human resources, and low level of economic diversification. UNDP reviews the list every three years.

benefits of economic growth, while safeguarding the social, cultural and political identity of the country (Round Table 2000).

Strategies and priority programs

The national development vision has been operationalised through four objectives, seven strategies and eight priority programs (UNDP 2002).

Poverty

The recent interest in poverty and poverty alleviation by governments worldwide and virtually all international development agencies has led to a great deal of thought as to what constitutes 'poverty'. There is by no means a consensus on a simple definition but all agree that an income-based index alone is insufficient. For Lao PDR, UNDP (2002) analyses poverty using four methods as listed in Box 1.

Box 1. Four methods for estimating poverty used in Lao PDR

1. **Human Poverty Index** – recognises the multi-dimensional nature of poverty to include: a short life; lack of education; lack of security; lack of participation, and lack of economic security;
2. **Poverty Lines** – calculated based on the basis of a food and non-food package deemed necessary for a minimum standard of living;
3. **Vulnerability** – households are vulnerable if they cannot sustainably provide for their liveli hoods. Generally involves the designing of vulnerability indices that combine income and non-income indicators.
4. **Poverty** as perceived by the poor themselves

Source: UNDP 2002

Those four methods for assessing poverty all find that it is a serious problem in the country and mainly a rural phenomenon. It is estimated that 40 percent of the rural population (which comprises 80 percent of the total population) live in poverty. These poor rural people, comprising about 300,000 households scattered in more than 6,300 villages, are generally small farmers depending on precarious livelihoods. The majority of these people belong to various ethnic minorities living in upland forested areas and practice shifting cultivation (UNDP 2000). The incidence of poverty is not only more common in rural than urban areas but varies between regions (Table 2). The Northern Region has the highest incidence of poverty followed by the Southern Region. In recent years, there appears to have been a significant decrease in poverty, especially in Vientiane.

Table 2. Incidence of poverty by regions (percent of population)

Region	1992/93	1997/98	Poverty Growth Rate
Vientiane Municipality	24.4	12.2	-13.9
Northern Region	58.4	52.5	-2.1
Central Region	39.5	34.9	-2.5
Southern Region	45.9	38.4	-3.6
Lao PDR	45.0	38.6	-3.1

Source: PPA 2001

Poverty alleviation permeates the entire spectrum of national development policy and planning and every international development agency appears to have embraced poverty alleviation as a central objective. Four sectors underpin the poverty alleviation policies:

- agriculture/forestry and livestock;
- education;
- health; and,
- road infrastructure.

Decentralisation

With the introduction of the New Economic Mechanism in 1986 (see section 4.2), the government aimed to transform the country from a centrally planned economy to a market-oriented economy. With the exception of certain sectors of national interest, provincial governments became responsible for planning and managing local resources and key social services were financed from the local budget. By mid 1989, the central government had lost operational links with local administrations and delivery of services deteriorated greatly (Keuleers & Sibounheuang 1999). In 1991 government vigorously moved to regain control by reinstalling a centrally controlled administration. In March 2000, after nearly a decade of centralisation policies combined with learning experience in bottom-up planning, rural development and improved delivery of services to the local level, the government again moved to decentralise development planning and budgeting functions. The government's intention is to increase the involvement of local communities in the formulation of development plans and in the collection of revenue to improve their socio-economic situation (UNDP 2002).

3.3.2 Protected area policies

The government has identified the following policies for NPAs (Robichaud *et al.* 2001):

- **Biodiversity conservation.** Long-term biodiversity conservation is the primary objective of the NPAs according to PM Decree 164 and the 1996 Forestry Law.
- **Maintenance of ecological stability.** This is the second stated objective of the NPAs, according to PM Decree 164.
- **Protection of scenic beauty for leisure and research.** This is the third objective stated in PM Decree 164 and Articles 18 and 42 of the Forestry Law. Ecotourism falls within this objective.
- **Protection of large, natural areas that have cultural significance.** The Forestry Law (Art. 18) mentions conservation of historical or cultural values as a role for NPAs. The addition of Phou Phanang and Dong Phou Vieng to the NPA system, for example, was due to their significant historical interest. They are areas of limited biogeographical value.
- **Watershed Protection.** According to the Forestry Law this is principally the role of Protection Forest, but MAF and DoF policy makers often stress watershed protection as one of the most important objectives of the NPAs. Watershed protection is considered vital for the long-term development of hydropower and lowland agriculture.

3.3.3 Management policy

By international standards the government has articulated a very progressive policy for NPA management, though this has not been enacted in law. The key ingredients are:

- **Management should benefit NPA residents.** Clear GoL policy is that NPA management should not take a confrontational approach with residents of NPAs, but instead should encourage local support for the areas. Rather than resettle people out of NPAs, GoL intends to send assistance in. The goal is to help local communities use the NPA resources in a sustainable manner; a policy also intended to build local

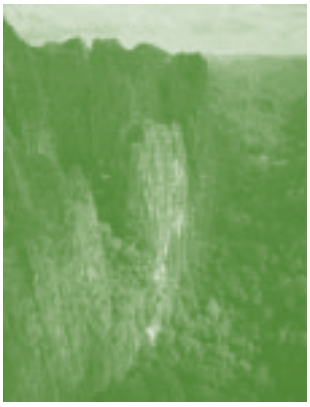
support for the areas and help avoid the sort of heated conflicts between local people and protected areas that have occurred in other Asian nations. While GoL recognises that residents of NPAs cannot hope to reach the same material prosperity as residents of towns or agriculture development zones, management of the NPA should result in a net benefit to them. Consequently, GoL has indicated a clear preference for the Integrated Conservation and Development Project (ICDP) management model.[6]

- **Management should proceed in collaboration with local residents**. GoL's approach to NPA management emphasises a participatory, non-confrontational approach (Southammakoth and Craig 2000b).
- **Delegation of management implementation to the local level**. GoL has devolved NPA management responsibility from the national level to the local level, through the District Agriculture and Forestry Offices.

The effectiveness of this progressive policy for NPA management centres on capacity - the ability of GoL to have:

1. a sufficient number of personnel at the local level who are appropriately trained in conservation and community consultation and development; and
2. an institutional framework which enables them to implement the policy.

6 The acronym for "integrated conservation and development projects" is "ICDPs", but "ICAD projects" is sometimes used.



4 Economic structure, management and performance

This chapter provides an overview of the structure, composition and performance of the national economy in Lao PDR. It describes how past, current and planned economic conditions influence the status of protected areas in the country.

4.1 Economic structure and composition

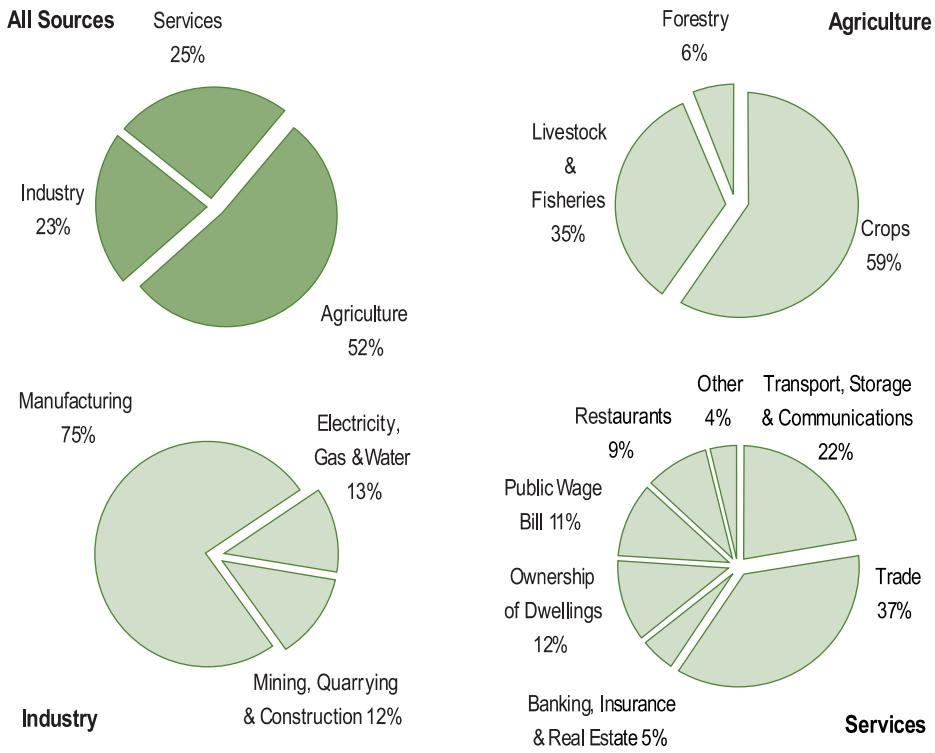
In 2000, Lao PDR's nominal GDP was estimated to be 13,483 billion kip or US$ 1.65 billion (IMF 2002). Although per capita GDP has risen from $114 in 1985 to US$ 330 in 2002, Lao PDR is ranked 140 out of 174 in UNDP's Human Development Index, making it one of the poorest countries in the Asia region (ADB 2001a). Although the incidence of poverty has fallen over the last decade, 39 percent of the population of Lao PDR are currently thought to be living in poverty (ADB 2001b). Key goals of the current development strategy are to graduate from least-developed country status by the year 2020, to reduce poverty by half by the year 2005, and to eradicate poverty completely by 2010.

The economy of Lao PDR can be divided into three broad sectors: agriculture, services and industry (Figure 4):

- **Agriculture,** including crops, livestock, fisheries and forestry. In 2000, agriculture contributed just over half of GDP, and absorbed more than 85 percent of the labour force. The sector is dominated by subsistence production, especially of rice. Although there has been some growth in the cultivation of cash crops, especially coffee, over recent years, the relative share of different crops in agricultural production has remained stable over the last decades (ADB 2001a). Major policy directions in the arable agriculture sub-sector include investment in expanding the area under irrigation, and controlling slash-and-burn cultivation. Forest production is also an important source of income, government revenues and foreign earnings, generating an estimated US$30-40 million a year in formal income. It is worth noting that formal estimates of GDP currently exclude most non-timber forest products.
- **Services,** including wholesale and retail trade, ownership and dwellings, non-profit institutions, public wages, banking, hotels and restaurants, transport, communications and post. In 2000, services contributed one quarter of GDP. Wholesale and retail trade dominate the sector, and have shown marked growth over recent years. The tourism sub-sector is also expanding rapidly, and is seen as an important source of future growth and foreign exchange earnings - revenue from tourism has increased from an estimated US$2.2 million in 1991 to more than US$97 million in 1999.
- **Industry,** including mining, manufacturing, construction, electricity and water. In 2000, industry contributed just under a quarter of GDP. Manufacturing activities play an especially important role in this sector, and have expanded over recent years. The hydropower sector continues to be an important source of investment, and sales of electricity have become one of the country's major exports, rising from US$ 58 million in 1998 to US$ 122 million in 2001.

Although the national economy of Lao PDR remains heavily reliant on agriculture and natural resources, and is likely to be so for the foreseeable future, the share of agriculture in GDP has been declining steadily, from 71 percent in 1985 to 52 percent in 2000. Meanwhile the share of industry has doubled from 11 percent to 22 percent over the same period, and the share of the service sector has increased by almost a half from 18 percent to 25 percent. Future growth strategies aim to diversify the economy further, targeting growth in industrial and service sectors.

Figure 4. Composition of GDP, 2000



From data presented in IMF 2002

4.2 Economic management and policy

The national economy was managed as a centrally planned system for the 10 years following the establishment of Lao PDR in 1975. Economic policy and planning was characterised by heavy state intervention in most sectors of the economy. Prices remained controlled, especially in key sectors such as agricultural production, energy and food, interest and exchange rates were set administratively and were relatively inflexible. Foreign investment and trade was limited, most large industries were state-owned and state-managed, and the private sector was undeveloped.

By the mid 1980s, the national economy was showing signs of stagnation. Agricultural production was sluggish; there was low mobilisation of domestic savings, and little private enterprise. In response to these economic conditions, the New Economic Mechanism was established in 1986. This set in place a series of reforms which aimed to effect a transition towards a more market-driven economy, including:

- Liberalisation of agricultural product prices and most retail prices;
- Phasing out of subsidies;
- Liberalisation of the exchange rate and abolition of the multiple rate system;
- The gradual privatisation of State Owned Enterprises and introduction of financial self-sufficiency in their operations;
- Guarantee of free participation of private enterprises in production and distribution;
- Separation of the Central Bank and commercial financial institutions;
- Treasury asset management and centralisation of budget expenditures and revenues;
- Liberalisation of most aspects of foreign trade;
- Rationalisation of the tariff structure and reduction of other trade barriers;

- Liberalisation of investment; and,
- Increased regional integration.

These principles continue to drive macroeconomic policy. Today, economic management is characterised by increasing market liberalisation, a growing private sector, and progressive devolution and decentralisation of central government functions.

4.3 Recent economic trends

Reforms effected under the New Economic Mechanism have contributed to a steady growth of the economy and progress of national output (UNDP 2002). Since 1985 GDP has registered an increasing growth rate of 5.0 percent between 1986-1990, 6.4 percent between 1991-1995 and 6.2 percent between 1996-2000 (IMF 2002). Positive growth rates have been recorded in most sectors of the economy, the exchange rate has remained relatively stable, inflation has been kept down and the foreign trade balance improved.

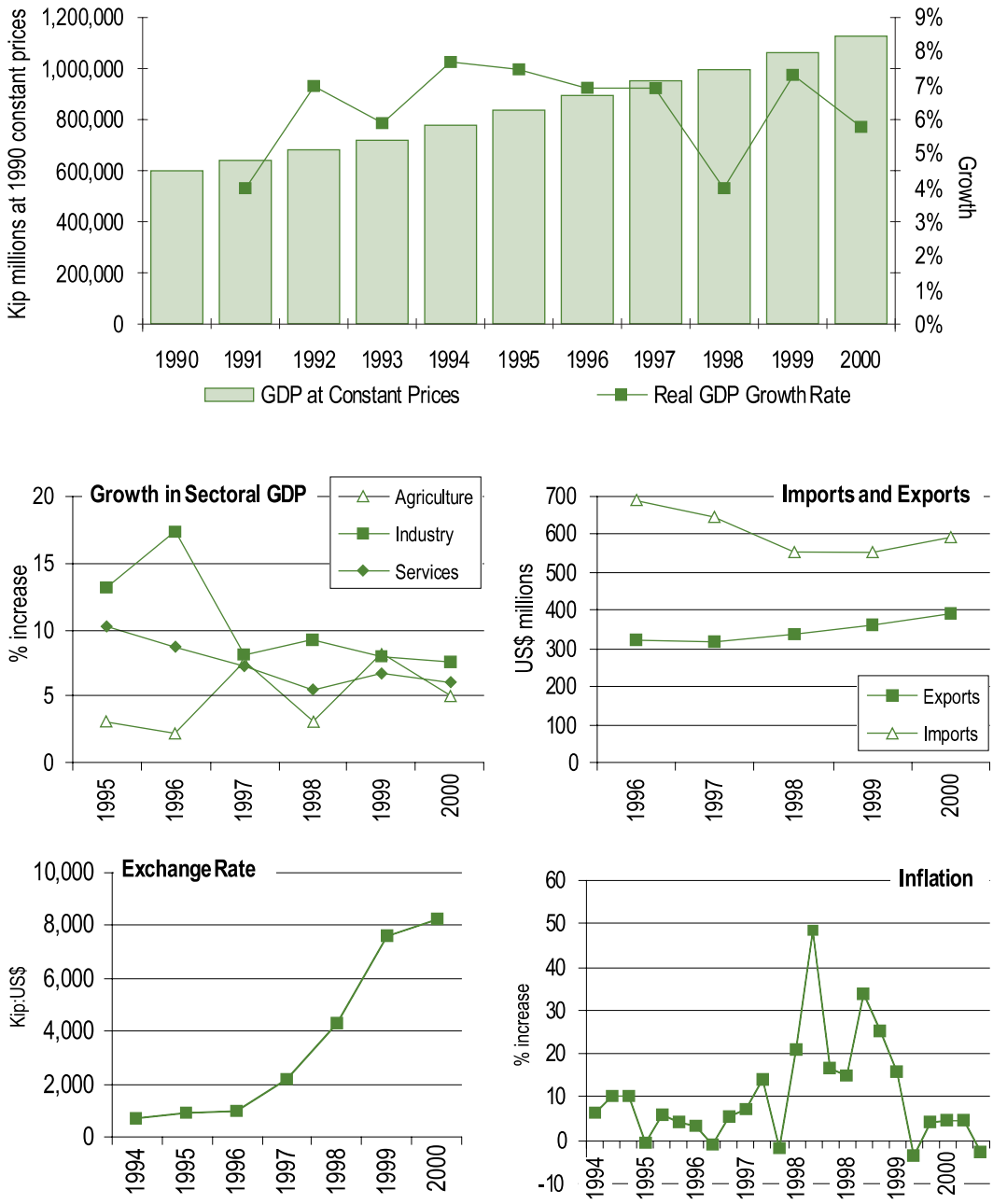
The positive developments in Lao PDR's national economy suffered a setback in the late 1990s with the onset of the 1997 Asian financial crisis (Figure 5). Although impacts were less severe in Lao PDR than in many other countries in the region, the vulnerability of the economy to such external shocks had already been mounting due to a slowdown in the momentum of reforms and resulting weakness in the economy.

From 1997 liquidity problems were registered in the banking system, there was an increasing budget deficit, and confidence in the economy declined. GDP growth rates, maintained at seven percent during 1997 due to favourable weather conditions that led to a strong performance by the agricultural sector, slowed to four percent in 1998. Because of its close links to the Thai baht, the kip was particularly vulnerable to the exchange rate volatility that shook the region, and the domestic currency devalued sharply from 954 kip to the US dollar in December 1996 to 7,600 kip to the dollar in 1999. Rapid inflation was also experienced over this period, growing from an annual rate of 14.4 percent in September 1997 through 61.2 percent in 1998 to 141.4 percent in 1999. Following the crisis, foreign direct investment fell by 91 percent in 1997.

Immediate measures were set in place to contain demand-led inflation, tighten monetary policy, restrict public expenditures, stimulate savings and maintain foreign exchange reserves. Although minimising the negative impacts of the crisis, the domestic economy remained weak for some time, exacerbated by inappropriate monetary and fiscal policies. Rapid monetary expansion was effected during and immediately after the crisis. Rather than the tightening of macroeconomic policy that was required, revenues fell short of expected levels and capital expenditures increased, resulting in a fiscal deficit that was higher than planned (ADB 2001a). Weakened monetary control and rapid monetary expansion fuelled the high inflation rates seen up to 1999. Meanwhile, negative real interest rates and expectations of devaluation also undermined confidence in the financial sector, keeping savings rates low and limiting monetary depth.

By the end of the 1990s, Lao PDR was experiencing macroeconomic instability. However, over the last two years there has been an upturn in the economy. Agriculture led the economic recovery process, strongly supported by growth in manufacturing and electricity production. Growth in GDP has been maintained and

Figure 5. Key economic indicators, 1990-2000



From data presented in IMF 2002

the government is taking steps to restore the balance between capital and recurrent spending and to contain public expenditures. The exchange rate has stabilised, the balance of payments deficit has been reduced as trade has improved and diversified, and foreign exchange reserves have increased. Monetary growth has also slowed down, and inflation has fallen. The private sector is playing an increasingly important role in the economy, and in 2000 decentralisation became a key strategy for future public sector operations, defining provinces as strategic units, districts as planning and budgeting units and villages as implementing units.

In 2001, the government entered into a poverty reduction and growth facility agreement with the IMF. The Fifth Five Year Socio-Economic Development Plan for 2001-2005 has a strong focus on poverty reduction, sustained economic growth, continuing liberalisation and macroeconomic stability, and specifies clear economic goals for this period, including:

- To achieve an overall GDP growth rate of between 7 percent and 7.5 percent a year, including 4-5 percent growth in the agricultural sector, 10-11 percent in the industrial sector, and 8-9 percent in the service sector;
- To change the composition of GDP so that 49 percent is represented by agriculture, 26 percent by industry and 25 percent by services;
- To contain annual inflation below ten percent;
- To manage the budget deficit at around five percent of GDP;
- To maintain the current account deficit at no more than six percent of GDP;
- To develop a stable exchange rate;
- To achieve balance of payments stability;
- To increase investment, especially from non-public sources, and to encourage private and foreign direct investment;
- To control public expenditures;
- To stimulate private domestic savings; and,
- To continue strict control of the money supply.

4.4 Implications of economic structure, management and performance for protected areas

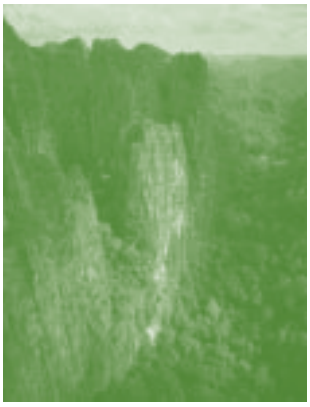
The economic policies and management strategies described in this chapter set the overall goals, context and framework within which economic activities take place in Lao PDR, and as such have a number of implications for protected areas. Some of the most important ways in which economic policies and management strategies affect protected areas are:

- Through influencing the general economic status and living conditions of the population, they affect the ways in which people use protected area lands and resources. For example, the current development policy focus on poverty alleviation has the potential to reduce significantly local dependence on forest products collection, including unsustainable or destructive harvesting.

- By prioritising or focusing on particular development sectors and goals, they encourage people to carry out economic activities at particular levels and in particular ways. Many of these activities influence protected areas. Examples are the current development policy focus on increasing the area under irrigated agriculture and expanding energy and transport infrastructure, both of which have the potential to encroach on or otherwise interfere with protected areas. Conversely, better control of slash-and-burn cultivation and attempts at rural income diversification may result in improved conservation of protected areas.

- The use of economic and fiscal instruments to achieve economic and development goals exerts a strong influence on price and market signals. Price and market liberalisation, especially in the agricultural sector, may help to overcome many of the distortions and subsidies that have in the past discriminated against protected areas. However prices remain distorted or non-existent for many protected area goods and services. For example timber prices remain unliberalised.

- Public spending and investment is determined according to the economic policy emphasis accorded to different development goals and sectors. Protected areas are not considered a high priority for government spending, especially in comparison to other sectors of the economy such as agriculture, health care and education, and budgets to PAs remain extremely low.
- On-going moves towards decentralisation and privatisation have the potential to influence the ways in which protected areas are managed and generate benefits. As well as increasing the degree of private participation and responsibility in protected area management, the devolution of revenue collection and budgeting to provincial and district levels opens up new possibilities for generating income from and allocating budgets to protected areas.



Part 3: Natural Resource Management, Planning and Protected Areas

5 Status, trends and management of natural resources, and implications for economic development

This chapter provides an overview of the status, trends and management of Lao PDR's natural resources, land, forests, water and biodiversity, and their significance for economic development. It describes the Government's initiatives that have, or are, influencing these resources with specific attention to their implications for protected area management.

5.1 Overview

Lao PDR has been described as a land of mountains, forests and rivers teeming with wildlife. This was clearly the case at the time of the 19th century European travellers whose journals "speak eloquently of the natural wonders of the landscapes through which they travelled and the cultural diversity of the people that they met. What they described in present day terminology was a rich and unique biological diversity" (Chape 2001). Much has changed in the intervening period. Yet Lao PDR still retains an outstanding natural resource endowment compared to its neighbours. It is a vital economic resource with major biodiversity values and it makes essential contributions to the livelihoods of the rural poor.

Increasingly, people, the government and investors are placing multiple demands on agriculture, forestry, fisheries, hydropower and irrigation and biodiversity resources. The demands need to be evaluated and balanced against the requirements of sustainable development - meaning sustainable use of natural resources, economic progress and the maintenance of natural systems, and improved livelihood for local people. Currently no complete planning framework exists for objectively analysing and integrating the diverse needs and trade-offs among the various resource sectors and stakeholders. The problem of competing demands on the resource base is particularly relevant at the provincial level because of its mandate for natural resource planning. It is here that the central government needs to provide strong guidance for planning the wise use of the country's natural resources.

Strategically directed natural resource management is a relatively new activity for Lao PDR. The government has introduced a series of policies and strategic approaches relatively quickly. In the main these strategies are closely inter-related, led by a social development imperative. The government's development goal for 2020 places great emphasis on the role of the province in natural resource management:

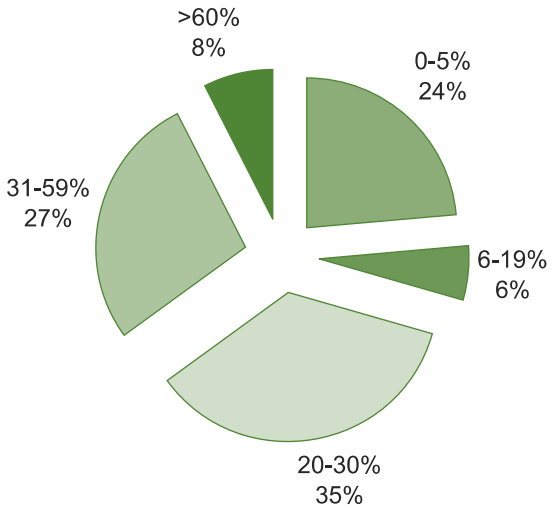
"The macro management remains at the central level, while micro management is transferred to the local level by making provinces into strategic units, districts into planning and budgeting units and villages into implementation units."

5.2 Land resources

5.2.1 Extent and trends

Lao PDR's mountainous terrain precludes expansive permanent agriculture. Only 24 percent of land area is below five percent slope, with fully 70 percent over 20 percent (Figure 6).

Figure 6. Slope classes and land area, Lao PDR



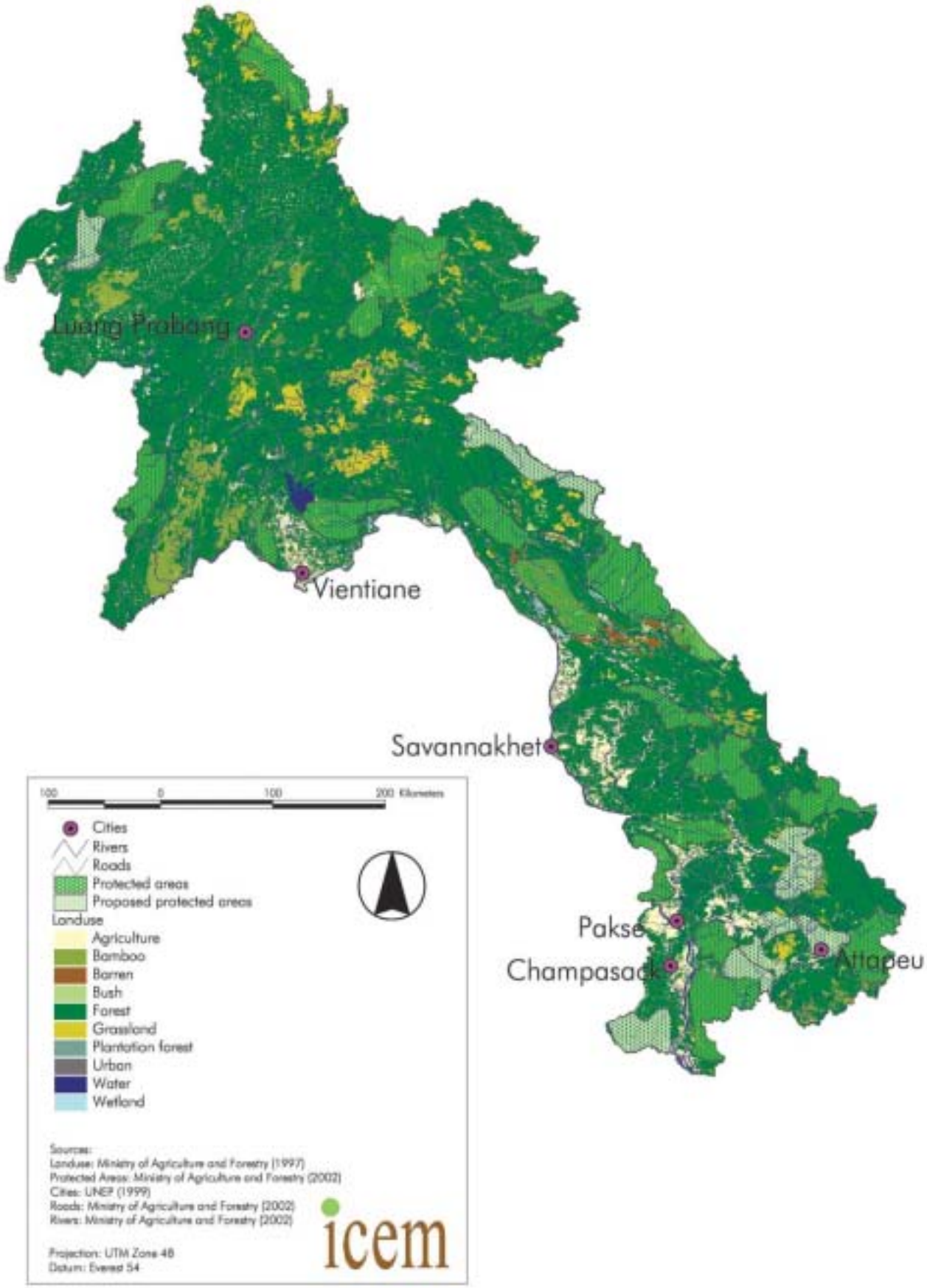
Source: DoF 1992

Lao PDR's potentially cultivable land is approximately 5.9 million ha or 25 percent of Lao PDR's land resources (FAO 2000). In 1998 the total crop harvested area (crops under lowland terrace or upland shifting cultivation) was 788,162 ha or 11 percent of the land under 20 percent slope. Rice, of various sorts, was grown on 78 percent of this land. Pastureland makes up another 15 percent of the cultivable land. The availability of agricultural land varies widely by region. In the more mountainous north there is significantly less potential agricultural land and the practice of shifting cultivation is more widespread (Map 2).

Lao PDR's climate, topography and soils combine to make most of the sloping land in Lao PDR susceptible to erosion, and land degradation is an issue of major concern. Currently large areas of the country's crop land, grassland, woodland and forest are now seriously degraded, to such an extent that land degradation is altering hydrological conditions (STEA 2002). Officially most land degradation comes from shifting agriculture and the government estimates that about 174,000 ha is cleared annually for cultivation.

A recent analysis of sedimentation data in the lower Mekong basin suggests that sediment rates in the southern parts of Lao PDR have increased substantially over the past twenty years. They are among the highest in the region, although the exact causes of the increase have not been determined (STEA 2000).

Map 2 Land use in Lao PDR



5.2.2 Economic aspects

The economy of Lao PDR is predominantly agriculture in nature. There has been a decline in recent years, but agriculture still accounts for over half of GDP and employs over four-fifths of the population. The share of agriculture to GDP fell from 60.7 percent in 1990 to 54.3 percent in 1995 and 51.8 percent in 2000.

Shortening fallow periods in shifting agriculture is seen to be the primary cause of on-going land degradation and one of government's major policies is the elimination of shifting agriculture by 2010. A considerable portion of government's development budget is spent on a wide variety of measures in pursuit of that goal – from land allocation to resettlement and from road construction to irrigation schemes.

Soil erosion and land degradation have many hidden costs never revealed by national statistics. These include reduced productivity through a drop in agricultural yields. Soil erosion diminishes the potential and productivity of both land and water resources through increased sedimentation and increased run off. There are additional impacts through the loss of forest resources, in terms of wood production and NTFPs, as well as biodiversity values.

5.2.3 Land resource management

Customary rights and state land

Traditionally most rural Lao have treated forest areas as communal property with loosely respected proprietary rights between neighbouring communities. However, in certain cases valued resources, such as yang trees, were individually owned. Some communities, especially ethnic minorities, had a closer association with land areas around their villages such as "spirit forests" and recognised specific and exclusive associations with them.

In 1991, Lao PDR adopted a new constitution enshrining the principle that all land belongs to the State, but villages, organisations and individuals are granted user rights. Land titles have not been distributed but the principle has been accepted and a land market exists. Customary rights are respected under the Forest Law, Customary Rights Order No. 54/MAF.

Focal sites

The principal element of the government's rural development program is the Focal Site Strategy introduced in 1998 with objectives to:

- alleviate poverty among rural populations in remote areas;
- provide food security;
- promote commercialisation of agriculture production;
- eliminate shifting cultivation; and,
- improve access to development sites.

While it is a general rural development program, the government focused it increasingly on upland development. The focal sites are envisaged to have a dual function. They will constitute growth poles for economic development and they will be test and demonstration sites for best practices in rural development. The main thrust of the program is on stabilising shifting cultivation in the upland areas. In principle, the selection of focal sites was based on two main criteria: relative disadvantage in terms of socio-economic status and high development potential. At the outset, it was foreseen that by 2000, 450,000 people (12 percent of rural population) would be involved in the development activities in the focal sites ranging from production and income-generation to development of social services. Infrastructure development figures prominently in the program and capital expenditure was foreseen to account for more than two thirds of total expenditure.

Initially the Focal Site Strategy was used to legitimise GoL's longstanding practice of relocating swidden-practicing upland communities in the lowlands with the hope that they would successfully adopt lowland paddy cultivation. When the donor community objected to the relocation of upland communities to the lowlands, the revised expression of the policy now includes "village consolidation" (Dennis 1999).

Land allocation

Since 1986, the Government of Lao PDR has placed a high priority on providing secure agricultural land use rights for farm families and access to forest products for village communities. This is undertaken through a program of land use planning and land allocation (LUP/LA) which, while providing the rights of forest and land use to families and village communities, has the primary objectives of ameliorating shifting cultivation practices and facilitating stable and sustainable use of forest and agricultural lands. Land allocation is undertaken by a team of trained provincial officers through a well-documented process of eight steps. The program has been implemented widely and rapidly and is undertaken within NPAs that have villages located in or adjacent to them. Approximately 1,100 villages are inside or within five km of the 20 NPAs (Southammkhot 2000) as shown in map 1.

Recently, considerable problems have been reported with land allocation. These point not so much to a failure of the policy or process as a whole but more to field implementation – in certain cases attributed to a lack of trained personnel and funding or the need to meet ambitious implementation targets. More fundamental criticisms have also been reported. The Participatory Poverty Assessment (NSC 2001b) found that poor villages cited it as a major cause, not a solution to poverty. Families which may have been working 15 hectares on a shifting cultivation basis were allocated 4 hectares for sedentary cultivation but without the skills, equipment and extension supports to achieve the same level of productivity.

The Lao-Swedish Forestry Program (LSFP) developed the original methodology adopted by the government in the mid-nineties, and then continued to refine the methodology over the next five years. During this time some of the problems were identified with the on-going government's LUP/LA process including:

- Quality of the outcome of the LUP/LA process diminished by too rapid implementation;
- Lack of flexibility in implementing LUP/LA;
- Family access to land in upland areas is reduced by LUP/LA;
- Limitations of the inspection and control approach to monitoring;
- Inadequate security and storage of LUP/LA information and data;
- Emphasis on land allocation at the expense of land use zoning;[7]
- Inadequate assessment of LUP and LA programs; and,
- Forest and land use categories defined by village LUP and LA are being compromised by commercial timber harvesting operations.

The issue of poorly implemented LUP/LA in or close to NPAs is of concern. The LSFP model for LUP/LA in NPAs has developed adaptively, through experience. A principal distinction from standard practice is its longer duration with additional steps to ensure that the process integrates with NPA management. Ideally, it incorporates a longer phase of monitoring and follow-up. LSFP has tested the model in primitive to fairly refined forms in selected villages in or near four NPAs. Done properly, completion of participatory village land allocation in all NPAs will be a huge task. An average of seven trained extension workers need one week to properly complete land allocation in one village. If preparatory activities, travel to and from the village and reporting take another week, then 300 person-years of trained input will be required to complete the process for all NPAs (Sawathvong et al. 1999; P. Jones, LSFP, as quoted in Robichaud et al. 2000).

7 "...efforts should be made to concentrate on demarcating village boundaries instead of reallocation of fallow lands among individual farmers ... Once village boundaries have been delimited, the community and local organisations should be responsible for allocating fallow land to respective groupings and individual farmers according to the customary practice found in each respective village." Parisak (1998), see also Jones (2000).

Provincial natural resources management

Provincial natural resources management is a recent initiative of the government with the LSFP, which assists the GoL at the provincial level in developing sustainable use of natural resources. The idea was born through dialogue between LSFP and the governor's office in Savannakhet Province. It was recognised that the province lacked a comprehensive system for natural resources management, although there were numerous ongoing initiatives through government bodies and projects.

To date provincial natural resources management has only been undertaken in Savannakhet Province - under the auspices of the LSFP.

5.3 Forest

5.3.1 Extent and trends

Forest cover

Close to 68 percent of Lao PDR was originally covered in evergreen forest, with 23 percent under mixed deciduous and 7 percent under dry Dipterocarp forest (MacKinnon and MacKinnon 1986). The government's current figure for forest cover is 47 percent, derived from a 1992 evaluatoin (STEA 2002; Table 3). However, conflicting data, alternative definitions and changes in the resource base hamper discussion of the extent and condition of the Lao forest resource. The World Bank estimates that 80 percent of Lao is forested but more than half of this area is extremely degraded and does not constitute 'forest cover' (World Bank et al. 2001). The land-use map (Map 2) provides another perspective on forest cover and demonstrates the difficulty in making definitive assessments given the varying working definitions of forest.

Table 3. Forest types and extent, 1992

Forest Classes	1992 Evaluation	
	Area (ha)	% Land Area
Dry Dipterocarp	1,207,680	5.1
Lower Dry Evergreen	94,720	0.4
Upper Dry Evergreen	1,065,600	4.5
Lower Mixed Deciduous	852,480	3.6
Upper Mixed Deciduous	7,459,200	31.5
Gallery Forest	94,720	0.4
Coniferous	118,400	0.5
Mixed Coniferous/Broadleaved	284,160	1.2
Sub-Total Forest Cover	**11,176,960**	**47.2**
Sub-Total Non-forest Cover	**12,503,040**	**52.8**
Total Land Area	**23,680,001**	**100.0**

Source: National Office of Forest Inventory and Planning 1992

The government is completing a fresh assessment of forest cover based on satellite imagery from 2000-02. This initiative is welcome given the uncertain status of current estimates. The Draft National Forest Strategy 2020 distributed in mid-2003 estimates cover at around 41.5 percent down from 70 percent in the mid-1960's, but this figure and the 1997 estimate of 39.7 percent forest cover by the MRC/GTZ (World Bank 2001) is not endorsed by government.

More certain is that the 21 percent of the country under both national and local protected areas of various kinds include close to 50 percent of the nation's forests.

Non-timber forest products

For the majority of rural Lao households, NTFPs are by far the most important resource from the forest. They constitute a wide variety of subsistence and income commodities including food, medicines, construction materials, firewood and a variety of tradeable items. A rural family consumes US$280 equivalent per year in NTFPs including fuelwood, providing on average 55 percent of family cash income (World Bank et al. 2001). The poorest households in rural villages rely most heavily on NTFPs (IUCN 2001; ICEM 2003a). They are critical for subsistence needs, sustaining communities through rice deficits and potentially play a major role in poverty alleviation (IUCN 2001). However, there are many indications that the NTFP resource is declining (Foppes and Dechaineux 2000; Foppes and Ketphanh, 2000; Dechaineux 2001). NTFP status can be summarised as follows:

- Although the deforestation rate has slowed, it is continuing to lead to depletion of NTFPs and loss of biodiversity;
- As pressure on agricultural systems increases, farmers turn even more to NTFPs as a source of supplemental food and income to buy rice, resulting in over-harvesting and accelerated depletion;
- Increased market demand is another factor leading to accelerated exploitation and further depletion of some NTFPs, e.g. rattan and orchids. Export volumes for commercial NTFPs increase but the price given to collectors are unstable or falling;
- Forest dwelling communities are getting poorer and increasingly marginalised as outside interests move in to control the trade in NTFPs (UNDP 2002).

5.3.2 Logging

The Government is responsible for almost all logging in Lao PDR through an "annual allowance cut" which is defined for different categories (production forests and infrastructure development areas, and until recently, associated with conversion for agriculture or rural development). Such quotas were issued on an *ad hoc* basis, not in any way based on sustainable criteria but in October 2000 the government introduced new policies leading to a gradual phasing out of logging quotas and a requirement for proper management plans for production forests. However, the lack of growth models for most species and the inadequate information on growing stocks is hindering the effectiveness of such plans.

5.3.3 *Economic aspects*

Forestry (including the harvesting of timber and NTFPs) accounts for slightly more than five percent of GDP but its economic significance is much larger. Much is informal subsistence utilisation and, as such, is unmeasured in government statistics. Forest resources play a critical role in social development and poverty alleviation, providing the main or only source of economic activity for many of Lao PDR's poorest households. Lao PDR's 800,000 rural families may consume the equivalent of US$224 million per year in NTFPs, providing some 40 percent of total rural family income, equivalent to 20 percent of GNP.

Forestry also contributes greatly to industrial development – 12 percent of manufacturing and forest products make up 34–40 percent of national annual exports (World Bank et al. 2001, Duckworth et al. 1999).

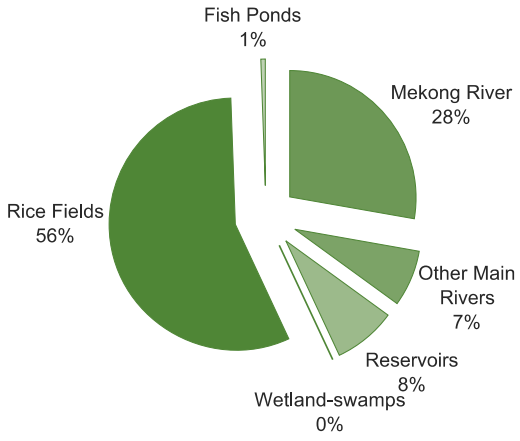
5.4 Water resources

5.4.1 *Extent and trends*

Lao PDR has a major water resource endowment with significant untapped potential. The major uses are potable water, irrigation, hydropower and fisheries.

Approximately 80 percent of the country drains to the Mekong River and with Lao PDR's annual rainfall averaging 1,600 mm, some 270,000 million m^3 flows annually to the Mekong, supplying 35 percent of its total flow. This figure represents in excess of 54,000 m^3 of water per capita (1998 population) – the annual current demand of 228 m^3/person is only a small fraction of supply (STEA 2000). The estimated area of inland water resources is 723,500 ha (Figure 7).

Figure 7. Area of water resources



Source: STEA 2000

The ground water resources of Lao PDR are poorly known, as they have not been surveyed on a national scale. Nonetheless, ground water resources remain the main source of potential rural and small town water supply (STEA 2002). Despite having the highest per capita availability of renewable freshwater resources in Asia, in 1996, only 60 and 51 percent of Lao urban and rural populations respectively had direct access to a good water supply (WRI 1998).

Irrigation and hydropower are the two water resource uses that the government is developing most intensively. Since 1975, irrigation infrastructure has been expanding at the rate of five to six percent per year with 22,240 schemes in 2000. In that year, 280,000 ha or 35 percent of the cultivated land was irrigated during the wet season. This is only one third of the predicted 800,000 ha of potentially irrigable land which would utilise 3,140 million m^3 annually, approximately one percent of the theoretical potential (STEA 2002).

In Lao PDR about 18,000 MW is technically exploitable through hydropower development, with 12,500 MW found in the major Mekong sub-basins and the remainder in minor Mekong or non-Mekong basins. There are nine major hydropower plants providing a capacity of 624 MW, and in addition, many small hydropower plants that provide another 3 MW and bring the total capacity to 627 MW. This capacity which has been developed over the last thirty years represents less than 5 percent of the country's hydropower potential (DANIDA 1998). With government now undertaking feasibility studies for at least 21 other hydropower projects, the rate of development is expected to increase markedly.

Despite the increasing concentration of settlement on the Mekong mainstream and its widespread use to remove both solid and liquid waste, monitoring results generally show good water quality in the Mekong system (STEA 2000), a reflection of the vast water volume, flow and area within the river.

5.4.2 Water resource management

The role of PAs in water resource management is well and widely appreciated and improved protection of upland catchments is a prominent feature of GoL policy for a variety of downstream benefits. NPAs are strongly connected with the role of catchment protection because they tend to be forested and are, in the main, located in upper catchments. This is by no means an exclusive association, however, as many other catchments are nominally protected either at the provincial level or for other reasons, for example, border security.

The Government has made significant progress in water resource management at the policy and strategy level. It has enacted the Water Law, prepared a national water sector profile as well as a Water Sector Strategy and Action Plan (WSSAP). The Government has approved the WSSAP. A coordinating body, the Water Resources Coordinating Committee has been established in STEA. Water resource management is divided into two levels – the national and river basin level. At the national level a National Water Resources Plan will be prepared, which will be followed by River Basin Plans.[8]

The Lao National Mekong Committee in coordination with line agencies and provincial authorities will formulate both the national plan and the river basin plans. The Government is undertaking the first water basin approach to management in the Nam Ngum catchment, north of Vientiane.

5.4.3 Economic aspects

The aquatic life of the Mekong River, its tributaries and wetlands is remarkably diverse. Whilst the role this biodiversity plays in the livelihoods of the majority of rural dwellers is well appreciated, it remains poorly quantified and mostly escapes socio-economic indicators and measures. However, fish and other aquatic fauna comprise approximately 50 percent of the total animal protein consumed and play a key role in poverty alleviation and social development of the poorer rural households (ICEM 2003a; IUCN 2001; Foppes and Ketphanh 1997).

8 Based on Decree 204/PM, Decree to Implement the Law on Water Resources (2001).

Extending the irrigation system is a major objective of government in its desire to improve self–sufficiency in rice production and food security for rural households. In recent years, public investment in the irrigation sector has been about 40–50 percent of the total public investment within the agriculture and forest sectors. The share of public investment in the irrigation sub-sector increased from 35 percent in 1991–1992 to 64 percent in 1994–1995, of which 3.7 percent was allocated for operation and maintenance (ADB 2000a).

Hydropower represents one major comparative advantage of Lao PDR and currently accounts for about 25 percent of total foreign exchange earnings. Hydropower will remain a major driver of economic growth relative to all other sectors (MIH 1998).

5.5 Biodiversity

5.5.1 Extent and trends[9]

Lao PDR still harbours a rich fauna, with many species populations and their habitats less depleted than in other countries of the region. Information on local distribution, habitat uses and population status is most complete for birds and large mammals. Even within these groups several new species have been discovered within country in recent years. Bats have also been surveyed extensively since 1995, but coverage remains uneven. Reptiles, insectivores and rodents are still relatively poorly documented on a national scale.

A total of 319 of the 1140 species reviewed by Duckworth et al. (1999*)* are of national or global conservation significance, specifically 67 percent of the large mammals, 53 percent of the bats, 6 percent of the insectivores, 14 percent of the murid rodents, 22 percent of the birds, 25 percent of the reptiles and 2 percent of the amphibians.

Over harvesting is by the far the greatest immediate threat to these species. Large areas of most of the ancestral habitat-types in Lao PDR remain, yet within them populations of quarry species are at very low density or absent. Unless issues of over-harvesting are addressed, the future in Lao PDR for most species of medium and large bodied mammals, birds and reptiles is bleak. Many species (13 large mammals, ten birds and two reptiles) are close to extinction and some waterbirds are already extinct as breeders. Only immediate and effective action with the highest level of political support will preserve remaining populations of these species and their habitats. Timely action could ensure that viable populations of most key threatened species remain in the country.

The most efficient and perhaps the only effective way to protected them is to maintain large intact wilderness areas with limited human activity, although as yet habitat degradation is currently a direct factor in the declines of only a few key species. Most of the last remaining large habitat blocks fall within NPAs. If they are degraded and fragmented, entire wildlife communities will become at risk with far-reaching repercussions for local and national development.

Similarly, botanical diversity is known to be high but comprehensive surveys need to be undertaken as a priority, as the last records were made in the 1950s (Vidal 1960).

9 Adapted directly from Duckworth et al, 1999.

5.5.2 Biodiversity resource management

Long-term biodiversity protection is the primary function of the NPAs.[10] Decree 1074 (MoA) prohibits wildlife trade and hunting of protected species, while the 1996 Forestry Law extends and amplifies these provisions. However, there is little institutional development to manage biodiversity resources *per se* other than the management of NPAs themselves.

Currently the National Biodiversity Strategy and Action Plan is being and will provide a blueprint for biodiversity management within and outside NPAs.

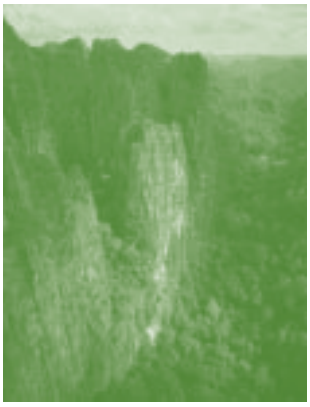
5.5.3 Economic aspects

Biodiversity resources in the form of NTFPs (including wildlife) are a traditional and important component of the subsistence livelihoods of the majority of Lao's rural population, most of who live in poverty. Since the opening up of the Lao economy, the pressure on NTFPs and wildlife has increased greatly because of burgeoning trade demands. The wildlife trade is now so large and pervasive that it is threatening the very existence of certain species and natural communities. Possibly more significant are the long-term threats to forest ecosystems through the disruption of ecological processes (Duckworth et al 1999; Nooren and Claridge 2001).

It is becoming increasingly common to find villagers using wildlife sales as a means of obtaining rice, their staple food, in addition to the more normal household and other cash requirements. Unfortunately, villagers and rural dwellers - the agents of this trade - receive a very small part of the profits, which go to the middlemen, often in neighbouring countries.

Management in PAs has not progressed to a point where there is any effective curb on hunting and wildlife trading.

10 According to PM Decree 164 and the 1996 Forestry Law.



6 Protected areas and environmental management

While there are a few protected areas with a history extending back to colonial times, the majority are recent, in particular the National Protected Areas (or as previously termed National Biodiversity Conservation Areas). In addition, there are a significant and increasing number of Provincial and District PAs, though these have an uncertain legislative framework. This chapter looks at the origin of Lao PDR's National Protected Areas, their current management and integration with regional planning.[11]

6.1 National Protected Areas

6.1.1 Historical context and basis for establishment

The founding of Lao PDR's NPAs is recent with its origin less than 15 years ago and legal establishment only in 1993.

The NPA system was created on two foundations:

1. Policy came from GoL's commitment to forest conservation, especially as expressed in the Tropical Forestry Action Plan of 1990. GoL's goal was to bring 25,000 km^2 of forest under conservation protection (i.e. 10.5 percent of country).
2. Design philosophy and criteria for site selection were based on the biogeographical analyses of MacKinnon and MacKinnon (1986).

Two principles guided the assessment of suitable sites (Salter and Phanthavong 1989):

1. Protection needs to be provided to the full range of ecosystems and species communities occurring within the country;
2. The total area under protective management needs to be adequate to prevent or minimise species extinctions.

Specifically, the goal of the design process that started in 1988 was to "provide effective protection to 5-20 percent of the original area of each habitat type within each biogeographical sub-unit" in Lao PDR. The approach assumed that protection of adequate, representative areas of habitat would also protect the majority of plant and animals species, so individual species requirements were not considered.

The search for appropriate protected areas started by assessing 68 sites that had been proposed for protection in Lao PDR by various sources. Analyses of the sites (both individually and as a potential system) were based on:

- extent of remaining natural vegetation - 50,000 ha was the minimum area for selection;
- completeness of original cover - priority given to more intact areas; extent of representation in biogeographical sub-unit, based on contributions of altitude classes and habitat types;
- regional priority - according to MacKinnon and MacKinnon (1986) by biogeographical sub-unit, size and regional importance of habitat; and,
- degree of threat - priority given to high threat areas identified by MAF.

11 Much of the material in this chapter is adapted from a thorough management review of the National Protected Area system by Robichaud *et al.* 2001.

The coverage assessments were based on topographic and forest cover maps. The process identified 29 of the 68 sites as potentially suitable for protected areas (and rejected the others). By 1991, ground assessments of most of the 29 were completed and 17 suitable sites identified. In 1993 the process culminated in the establishment by Prime Minister's Decree 164 of the 17 recommended protected areas, plus Phou Phanang near Vientiane, added for its historical value.

Two more areas were added by Ministerial Decrees in 1995 and 1996, making a system of 20 areas. Some additional areas have been recommended for NPA status but not yet legally gazetted.

Uncertain boundaries mean that the precise area of the NPA system is not known. But based on the figures from Decree 164 and the NPA Fact Sheets (DoF in preparation.), the probable range for the system's area is 28,600–33,500 km^2, or 12–14 percent of the nation's land area.

6.1.2 Legal framework

Three pieces of legislation underpin the NPA system – Prime Minister's Decree 164 (1993), the Forestry Law 1996 and the NBCA Regulations 2001.

Prime Minister's Decree 164

PM Decree 164 established the NPA system in 1993. According to the Decree, the areas (and the two added later to the system) have three objectives:

1. protection of forests, wildlife and water;
2. maintenance of natural abundance and environmental stability; and,
3. protection of natural beauty for leisure and research.

The Decree places prohibitions on the following activities in the NPAs:

- cutting and removal of any timber except for research purposes;
- hunting, fishing or NTFP collection without specific authorisation each time from MAF/DoF; and,
- mining, and construction of reservoirs or roads without GoL permission.

Forestry Law (1996)

The Forestry Law attempted to define in more detail the legal status of all forests in Lao PDR. It made the "Conservation Forests" (NPAs) one of five legally defined forest types in Lao PDR. The other four are "Protection", "Production", "Regeneration" and "Degraded" Forests.

The Forestry Law defines the role of "Protection Forests" as watershed protection, erosion control, national security and prevention of natural disasters. They are more or less unmanaged and vaguely defined areas in steep terrain along international borders.

English translations of the Forestry Law define "Conservation Forests" as follows:

Article 18: Conservation Forest is forest and forest land set aside for the purposes of conservation of fauna, flora, nature, and various things of historical, cultural, touristic and environmental value and for scientific study and research.

Map 3 National Protected Areas of Lao PDR

Conservation Forest can be designated at the village, district, provincial and national level. NPAs are the national-level Conservation Forests.

The Law also provides for zonation within NPAs:

Article 42: Preservation of Conservation Forest:

In order to maintain the richness as well as to preserve the flora and fauna species and biodiversity to self-maintain and reproduce, and at the same time to make available forest with natural, aesthetic scenery for developing national parks appropriate for tourism and scientific research, it is necessary to preserve conservation forest which is divided into 'absolutely prohibited zone', 'management zone' and 'linking zone'.

Absolutely Prohibited Zones are defined by the Law as areas where no extractive use is allowed, and entry will be by permission only. This corresponds to what is more commonly called in English a "Totally Protected Zone" (TPZ).

Management Zones are defined as areas contiguous with TPZs, but where limited and regulated extractive use is allowed by "the people". This corresponds to the more common term "Controlled Use Zone" (CUZ).

Linking Zones connect protected areas to one another or to other types of forest, for the enhancement of wildlife conservation. No hunting, tree cutting or other damaging activities is allowed. They correspond to "corridors."

Management of NPA, Aquatic and Wild Animals Regulations, June 2001

Important provisions in the Regulations are:

- Article 5 – Procedures in establishing NPAs.
- Article 9 – Classification of NPAs – National Parks and Nature Conservations.
- Article 10 – Zoning within NPAs – Restricted and Management Zones.
- Articles 18, 19 – Lists of Restricted and Controlled Species.
- Article 20 NPA Development Fund.

6.1.3 Lao PDR's National Protected Areas in the international context

NPAs are the only managed, national-level areas devoted to nature conservation. Although National Parks are enabled in the NPA Regulations 2001, none have been nominated. There are no separate national parks, national wildlife sanctuaries, or similar areas. However, there are a variety of Provincial and District Protected Areas.

In view of the 'multi-use' objectives and roles of the NPAs, GoL has indicated that most NPAs are closest to IUCN Category VI Protected Areas: Managed Resource Areas (IUCN 1994, Southammakhot 2000).

6.1.4 Provincial and district protected areas

Provincial protected areas

In addition to the NPAs, some 276 areas of locally significant conservation or watershed value have been designated as conservation or protection forests at provincial and district level. For instance:

- Louang Prabang currently has two forms of protected areas – 46 provincial protected areas comprising 34,810 ha and 47 protection forests comprising 40,709 ha (IUCN 2000a);
- Oudomxay currently has three forms of protected area: two provincial protected areas comprising 230,000 ha; 24 district protected areas comprising 85,000 ha; and six protected watershed areas whose areas have not been delineated (IUCN 2000b);
- Bolikhamxay has seven provincial protected areas comprising 72,100 ha and one Provincial Conservation Forest (Box 2, IUCN 2000c).

Provincial protected areas (including Provincial Conservation Forests) have no national legal framework and variable provincial legislative framework. The recent history of PA development shows that there has been almost no assistance or development of provincial and district PAs. They have not been considered in the general discussion on or in ODA projects for protected areas, which appears to focus solely on the NPA system. This is a shortcoming because there are some very important provincial protected areas and they are likely to play an increasingly vital role in local conservation and development.

Box 2. Nam Chat/Nam Pan Provincial Conservation Forest

This important area in the Annamite Range extends to the border with Vietnam. There have been several faunal surveys and one brief botanical survey of the area which show that it has unique biodiversity and ranks as an area of high national importance (Ling 1999).

District protected areas

As with their provincial counterparts, District Protected Areas have no national legal status and there appears to be no central compilation of their condition. The best known are more accurately described as community protected areas. In the most successful initiative of its kind, 63 villages in Siphandone district of Champassak province have introduced their own “Fish and Frog Conservation Zones” (Baird 1999; 2000a). Fish and or frog conservation PAs are now found in many parts of Lao PDR. They have proved to be the most clearly demonstrable examples of the benefits of PAs and sustainable harvesting for rural communities.

More formally established District Protected Areas also occur. IUCN 1999 describes the significance of the 13 km^2 Phou Den Mouang PA in Boulapha District Khammouane Province.

6.2 National Protected Areas – management status and strategies

6.2.1 Management status and resources

Once the NPAs were established, biodiversity surveys and initial management measures proceeded rapidly. All NPAs have been surveyed, mostly with strong local participation. In the absence of GoL resources, donor-assistance has usually been necessary in initiating field management. To date, eight NPAs have received major financial and technical support over several years, eight others have received intermittent management support and four have received little or no support.

Relying on donor support for NPA management has the serious shortcoming of short periods of elevated management attention with sudden withdrawal of resources. In 1999 there were eleven ongoing management projects but by mid-2001, there were only three or four. In certain cases such as the Phou Hin Poun and Dong Hua Sao, there has been ineffective management following the completion of the project.

6.2.2 Strategies

NPA management strategies strongly reflect GoL's policy, which require attention at the local level, participation and benefit sharing. As such Integrated Conservation and Development Projects (ICDPs) as well as Participatory Management Projects have been piloted in at least nine NPAs.

Integrated conservation and development experience in Lao PDR

Traditionally, governments considered conservation and development as distinct entities, to be planned and managed separately. It is now widely accepted that development projects need to consider their environmental consequences and conservation projects are most likely to be effective if considering the needs of local people, and/or empowering them with some management responsibility (Sutherland 2000).

The first NPA projects in Lao (with GEF and bilateral donor support) were amongst the first in the world to completely embrace these concepts, now generally termed Integrated Conservation and Development Projects (ICDPs) (Box 3).

Box 3. ICDPs in Lao PDR

Protected area ICDPs:

- Forest Management and Conservation Program (funded by the World Bank – GEF) which operated in four NPAs in south and central Lao PDR – Phou Hin Poun, Dong Phou Vieng, Xe Sap, Xe Pian;
- DoF-IUCN Biodiversity Conservation Project funded by the Netherlands, which operated in two NPAs in southern Lao PDR – Dong Hua Sao, Phou Xian Thong;
- Nam Ha Ecotourism Project (funded by UNDP) which operates in and around the northern NPA of Nam Ha (Box 11);
- Lao Swedish Forestry and ADB project in Phou Khao Khouay; and,
- DoF-IUCN Nam Et/Phou Loey NPA Project (funded by DANIDA).

Non-timber forest product ICDPs:

- DoF-IUCN Non-Timber Forest Product Project funded by the Netherlands, a five-year project that undertook several ICDP initiatives (Box 7) .

The first generation of ICDPs in the NPAs has not been successful in developing a sustainable model. The reasons for the lack of success are diverse and include limited capacity, poor project design, short project duration, poor implementation procedures, and an absence of post-project commitment. Box 4 summarises lessons learned from one of the most intensively reviewed NPA projects.

Box 4. Lessons learned – the FOMACOP ICDP.

Preparation of a World Bank-funded forest management project began in 1991, following the development of GOL's Tropical Forestry Action Plan. Simultaneously, a "Wildlife and Protected Areas Conservation Project," to be funded by the Global Environment Facility (GEF), was appraised. Subsequently, a decision was made to combine these two concepts into one project, the Forest Management and Conservation Program (FOMACOP). The project commenced in June 1995, worked in four NPAs and was concluded in September 2000. The project review provided the following lessons learned.

1. Combining two significantly different components, biodiversity conservation, and forest management proved a mistake;
2. Great attention in project design needs to be given to clear and unambiguous objectives;
3. Where a flexible process-oriented approach is required, as in ICDP projects, project design must make structured allowance for reformulation of sub-objectives and outcomes;
4. Projects should not be designed with direct reference and apparent linkage to unconfirmed future funding;
5. If a project involves the drawing up and adoption of Government policy and legal framework, project formulation needs to include resources to assist this process and milestones which will reflect on-going government commitment;
6. National execution of an NPA ICDP project may be very inflexible and inefficient, independently executed projects are likely to be far more suitable for the complexities of ICDP processes;
7. In piloting ICDP processes, less attention should be paid to the academic and philosophic intricacies of ICDP conceptual models and more attention be paid to winning the confidence of community and local government through a limited number of short-term ICDP initiatives;
8. Much greater awareness of the needs of, and need for, biodiversity conservation is required at both the government and community level.

The UNESCO-NTA Lao Nam Ha Ecotourism Project is an ICDP focusing on ecotourism and strongly though not completely linked to the management of an NPA appears to be working well (Box 11).

6.2.3 Threats

In spite of the impressive achievements in the institutional establishment of the NPA system and other PAs, there remain a variety of pressing challenges and issues in realising the conservation potential of Lao PDRs PAs for both national development and the benefit of local communities. Box 5 provides an overview of the principal management issues.

Box 5. National Protected Area management pressures

Management pressures: NPAs are under diverse and in some cases critical development pressure. Field observations suggest that Lao forests are becoming increasingly "empty". Important issues are:

- Habitat degradation:
  - Shifting cultivation;
  - Community growth and aspirations for economic improvement;
  - Forest fires;
  - Infrastructure development (hydropower, roads and irrigation construction); and,
  - Livestock grazing.
- Resource Exploitation:
  - NTFP collection;
  - Hunting and Fishing; and,
  - Timber extraction.

6.3 Environmental management and protected areas

6.3.1 Coordinating responsibility

Following the United Nations Conference on Environment and Development in 1992, the Lao government established the Science, Technology and Environment Organisation (STENO) within the Office of the Prime Minister. However, in 1999 PM Decree No. 68 (known as the "environment law') changed STENO to the Science, Technology and Environment Agency (STEA) and enacted its mandate for determining national environmental policy and implementing it in conjunction with line ministries. Although STEA has an implementation role and envisages devolving to provincial level, it currently lacks capacity and works mainly in a coordinating role and in defining national policy. STEA's limited capacity is acknowledged in the State of the Environment Report as an obstacle to progress in environmental management which government needs to address (STEA 2002).

6.3.2 Other agencies involved in environmental management

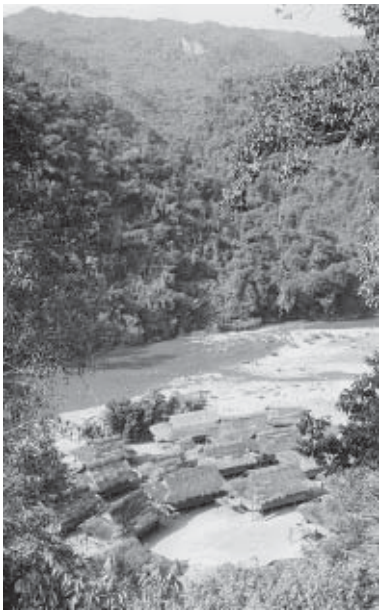
Several other agencies have important environmental management responsibilities (Table 4). The Department of Roads and the Hydropower Office have established Environment Units working in coordination with STEA. The Hydropower Office has issued three environmental standards of high quality: Environmental Policy, an Environmental Impact Assessment Standard and an Environmental Management Plan Standard.

Table 4. Government agencies dealing with environmental issues at policy, planning, and management levels

Agency	Responsibilities
Science, Technology and Environment Agency, Office of the Prime Minister	Overall coordination; oversight of environmental affairs; environmental management (setting policy and regulatory framework, monitoring state of the environment and compliance with policies and regulations).
Ministry of Agriculture and Forestry	Forest resource use and management; biodiversity conservation and management; soil resource management; water resource management; fisheries, livestock and crop production.
Ministry of Industry and Handicrafts	Hydropower development; industrial environment development; mineral resources.
Ministry of Communications, Transport, Post and Construction	Development and management of infrastructure.
Ministry of Public Health	Public health and sanitation; medicinal plants.
State Planning Committee	National development planning; development project and approvals.

6.3.3 Conventions and treaties

Lao PDR is party to key international environmental instruments, although not all that might be relevant to its environmental management needs (Table 5). Lao PDR's absence from the CITES[12] is particularly significant as wildlife trade is a major concern confronting the country and PAs in particular. However, the Lao government position is realistic, that it will join the convention when it has the capacity to implement it. Given the importance and extent of its wetlands, acceding to the Ramsar Convention would appear to be useful, however, as with CITES, lack of capacity to implement the convention is a valid reason not to accede for the time being, although the international community is pressing Lao PDR to join. The fact that China has been a member of CITES since 1981, yet remains a regional "sink" for illegal wildlife trade and consumption highlights the ineffectiveness of many international conventions and treaties in the absence of national capacity and commitment. It is symptomatic that Cambodia's joining of CITES has made no difference to the illegal flow of wildlife out of the country, much of it brokered through agents in fellow CITES member and neighbour Vietnam, en route to China (Nooren and Claridge 2001).



Although Lao PDR has listed Louang Prabang on the World Heritage List, it is a cultural site. There has been no move to list any sites on the Natural World Heritage List although recommendations have been made.[13] Most of the options for doing so involve large forested areas, and the World Heritage Convention places stringent conditions on conservation and management of listed properties.

The Convention on Biological Diversity requires that State Parties prepare Biodiversity Strategies and Action Plans and Lao PDR is undertaking this process with the assistance of UNDP and bilateral donors.

12 CITES – Convention on International Trade in Endangered Species binds signatories to monitor and manage the trade in species listed in two appendices. To meet obligations under CITES requires significant management and enforcement capacity.

Table 5. International conventions and Lao PDR's accession

Convention/Instrument	Year of Accession
World Heritage Convention	1987
Conservation of Biological Diversity	1996
UN Framework Convention on Climate Change	1995
Vienna Convention on the Ozone Layer and Montreal Protocol	1998
Convention to Combat Desertification	1996
Agreement on Cooperation for Sustainable Development of the Mekong River Basin	1995
Ramsar Convention on Wetlands	Under consideration
Convention on International Trade in Endangered Species (CITES)	Under consideration
Stockholm Convention on Persistent Organic Pollutants	Under consideration
ASEAN Agreement on the Conservation of Nature and Natural Resources (Adopted but not yet in force)	Under consideration

6.3.4 Environmental legislation

The principal legal instruments and their key provisions addressing the environment in Lao PDR are shown in Table 6.

6.4 Implications for protected area management

GoL has moved steadily to create a sound policy and legal framework for NPA and environment management. However, the reality is that technical capacity for implementation remains inadequate.

STEA's capacity to deliver the outputs specified in Decree No 68 remains limited, despite considerable donor assistance over the years. Its ability to devolve and bring environmental management to the provincial level is similarly constrained; only 15 percent of the population of Lao PDR has advanced educational training (Tan 1998). In the short term, the line ministries are more likely to be able to effect environmental management of their own activities should they decide to do so. The Department of Roads and the Hydropower Office have developed an environmental management capacity.

Integration of PA and provincial planning is a key priority for PA management. However, despite encouraging signs of local government commitment in some provinces and districts, it is too early to judge how the major changes anticipated from decentralisation will influence protected areas. Two issues are likely to stand out clearly as a result of this process:

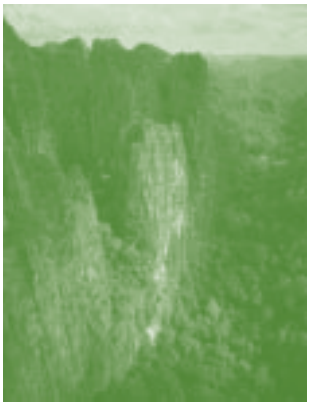
- Lack of technical, institutional and administrative capacity for NPA management at the PAFO and DAFO level.
- Uncertain support for NPAs at the provincial level because of their national role and designation.

13 The Nakai Nam Theun and adjacent areas on the Vietnamese side of the border, including the small adjacent Vu Quang Protected Area straddle the Sai Phou Louang (Annamites) and have been recommended for nomination as a World Heritage Site (IUCN 1997b)

At the local level a critical first step is the physical definition of PA boundaries with community involvement. In most cases, communities are uncertain of PA boundaries and unless action is taken quickly, the steady encroachment by local communities will threaten the viability of many PAs. This was a key issue of concern raised by participants at the second PAD Review national round table in June 2002.

Table 6. Principal legal instruments addressing the environment in Lao PDR

Decree of the Council of Ministers No. 185/CCM, in Relation to the Prohibition of Wildlife Trade, 21 October 1986 ♦ Prohibits export of all wildlife
Decree of the Council of Ministers No. 47/CCM, on the State Tax System, 26 June 1989 ♦ Lists types of natural resources, including various species of wildlife, aquatic animals and parts thereof and their associated resource tax rates and special fees; 67 species or species groups of wild animals are listed
Decree of the Council of Ministers No. 118/CCM, on the Management and Protection of Aquatic Animals, Wildlife and on Hunting and Fishing, 5 October 1989 ♦ Defines wildlife as state property and local people to use it pursuant to regulations ♦ Allows import/export of wildlife with specified authorisation ♦ Prohibits hunting and breeding of protected or endangered species except where human life is endangered ♦ Prohibits hunting by means of mass destruction (explosives, poisons, etc.)
Decree of the Prime Minister No. 164, 29 October 1993 ♦ Establishes protected areas and states that to chase, hunt or fish any species within them is illegal
Order 54/MAF on the Customary Rights and the Use of Forest Resources, 7 March 1996; followed by recommendations 377/MAF on the Customary Use of Forest Resources ♦ Secures legal right for local people to use forest resources for subsistence, including the hunting and fishing of non-protected species ♦ Customary rights may be recognised by signed agreement or by law, and local people shall be compensated for loss of customary means of livelihood
Decree 1074 of the Ministry of Agriculture and Forestry, 11 September 1996 ♦ Prohibits wildlife trade, hunting of protected species, prohibits hunting during a closed (breeding) season, and/or by dangerous methods, and/or by the use of weapons in protected areas and towns
Water and Water Resources Law (Law 126), 11 October 1996 ♦ Defines the system of use and management of national water resources
Declaration of the President No. 125/PO on the Forestry Law approved by the National Assembly No. 04/NA on 11 October 1996 ♦ Classifies forests into five use types and provides for management approaches ♦ Article 46, Part 5, establishes by law Wildlife Day on 13 July annually
Mining Law No. 04/97/NA, 1997 ♦ Defines the system of management, preservation, exploration, exploitation and processing of minerals for local consumption and export with the use of natural resource potential in the industrial process and upgrading the population's quality of life.
Decree of the Prime Minister No. 68 on the Establishment and Activities of the Science, Technology and Environment Agency, 21 May 1999 ♦ Establishes fundamental principles, and makes provision for regulations and other measures for the protection, conservation, mitigation and restoration of the environment, including environmental impact assessment. ♦ Article 3.9 endorses STEA's role in cooperating on, negotiating and signing international instruments.



Part 4: Sector Development and Protected Areas

7 Sector development and protected areas

This chapter introduces the role economics can and should play in providing information on the full value of PAs and the contributions they can make to development at the local, provincial, national and global levels. Also, it examines the relationships between protected areas and development on a sector by sector basis.

7.1 The Total Economic Value approach

In general, development planners in government agencies have not appreciated the full value of PAs as productive units within the economy. Because PAs are perceived as having little economic or development value and generate few obvious financial benefits or public revenues, they have been given low priority in development plans. All too often, PAs are regarded as areas that "lock up" valuable resources, deprive local communities of livelihoods, and drain national and local budgets to cover management costs (ICEM 2003b).

In reality, PAs are important contributors to development. More thorough economic analysis of the functions of PAs – using techniques of environmental and natural resource economics developed in recent decades – can assist the policy and planning process in several important ways:

- Demonstrating PAs as productive assets in the economy;
- Identifying and assessing the economic values of PAs and biodiversity;
- Integrating PAs in economic development planning at national level;
- Improving the coordination of PAs with sectoral plans and development projects;
- Specifying incentive and financing mechanisms for PAs;
- Encouraging sustainable management of PAs and economic activity at the local scale; and
- Defining institutional arrangements for planning, implementation and follow-up actions.

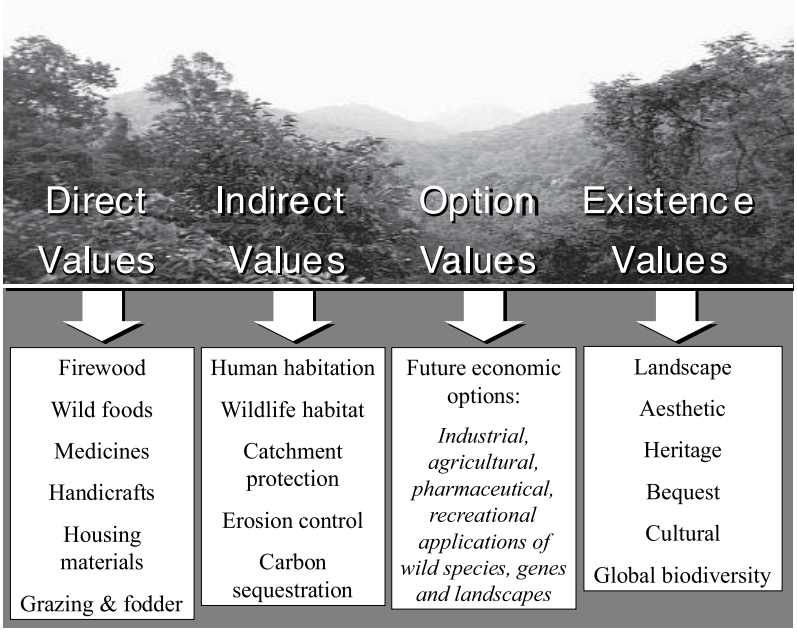
Traditional economic approaches have under-valued PAs and had serious negative economic and conservation implications. The main function of protected areas is the conservation of wild species and natural ecosystems to maintain the flow of (largely unaccounted for) goods and services that will secure wider social, economic and environmental benefits. Under-valuation has resulted in these wider benefits neglected in development policy, planning and management practice, often leading to damaging exploitation of protected areas (CNPPA 1995).

7.1.1 Economic and development linkages – the Case of Nam Et-Phou Loei NPAs

The PAD Review chose the Nam Et-Phou Loei NPAs as a case study to examine the economic and development linkages (ICEM 2003a).

Together, Nam Et and Phou Loei NPAs yield a wide range of economic values (Figure 8). These economic values include physical products that can be consumed directly (direct values), environmental and ecological services which perform vital life support functions (indirect values), resources and landscapes that allow for the possibility of future economic uses and services (option values), and have intrinsic economic significance, regardless of their use (existence values).

Figure 8. The economic value of Nam Et and Phou Loei NPAs



Some of the most important economic values associated with Nam Et and Phou Loei NPAs include:

- Plant-based forest products are widely used for household subsistence and income by NPA villages, and also form a component of District, Provincial, national and cross-border trade and commerce.
- Wildlife are consumed by families living inside and around the NPAs, and various wildlife products collected in NEPL are also traded commercially at District, Provincial, national and cross-border levels.
- Fish comprises a major component of the diet of villagers living inside and around the NPA.
- Fuelwood is used for cooking and heating by all the families living inside and around the NPAs, and is also used in the preparation of animal feed and distilling alcohol.
- Handicrafts are produced using raw materials sourced from NPA plants and animals.
- Grazing, forage and fodder resources, inside Nam Et and Phou Loei are used by almost all the villages in and around the NPAs.
- Construction materials are used by almost all families living inside and around the NPAs.
- Commercial logging, although not taking place on a large scale, has existed in the past.
- Rivers rising in NEPL, including the Nam Et, Nam Neun, Nam Khan and Nam Xuang and their tributaries, provide supplementary dry season water supplies for Xam Neua and Luang Prabang towns.
- Hydropower facilities utilise water resources rising in the NPAs, including both run-of-river micro-units (less than 150 kW) and medium-sized schemes (more than 150 kW).
- Irrigation schemes utilise water resources rising in the NPAs, both for individual households and as part of larger small holder schemes in areas downstream of the NPAs.
- Water mills, utilising water resources rising in the NPAs for grinding rice and animal feed.

- River navigation and travel takes place along water courses rising from the NPAs, especially the Nam Et, Nam Khan, Nam Xeuang and Nam Neun.
- Atmospheric regulation services are provided by forest and grasslands in the NPAs, and may include carbon sequestration, oxygen release and micro-climatic stabilisation.
- Human habitation occurs on NPA land, supporting over 100 villages.
- Wildlife habitat is provided to a wide range of birds, mammals and reptiles, many of which are threatened or have special conservation significance.
- Future options for economic activities may be supported by the NPAs, such as the development of tourist and recreational activities, future water resources development, and the application of wild species and genetic resources for a range of village and commercial-level domestication and improvement, pharmaceutical and industrial uses.

The goods and services from Nam Et and Phou Loei NPAs underpin development activities in surrounding areas - at village, district, provincial and even national levels. Unlike many other forest areas in Lao PDR, Nam Et and Phou Loei NPAs do not support a wide range of industrial and commercial sectors such as large-scale hydropower, logging or tourism. Their main value lies in subsistence-level forest products harvesting, in certain non-marketed ecological services, in their potential to support future economic activities, uses and markets, and in their intrinsic or non-use economic values (Box 6). The development linkages between Nam Et and Phou Loei NPAs and surrounding economies can be grouped into four major categories, according to the types of values they generate, and the different groups, sectors and levels of scale they benefit.

Box 6. Developing linkages between Nam Et - Phou Loei NPAs and surrounding economies

1. Village and District level benefits - Economic linkages based on NPA forest land and resources make a direct contribution as raw materials to household subsistence and income for commu nities living in and around the NPAs.
2. District and Provincial level benefits - Economic linkages based on NPA watershed catchment protection services provide clean and regular water supplies which enable economic consump tion and production for local and downstream human populations, and support both small-scale and commercial production in agricultural, energy and industrial sectors.
3. Provincial and National level benefits - Economic linkages based on NPA option values, which provide the means of ensuring local, regional, national and international economic growth and prosperity in the future - for example through tourism development, commercial applications of wild species and gene pools, and water resources development.
4. Global level benefits - Economic linkages based on NPA atmospheric regulation services, which accrue at the global level to the international community, primarily through mitigating the effects of global warming.

Source: ICEM 2003a

7.2 Forestry and protected areas

7.2.1 Status

Production forestry (logging, plantations and NTFPs) and conservation forestry (watersheds and protected areas) are managed alongside one another within one department in the same ministry – MAF, at national, provincial and district levels. While the policy and institutional framework integrate the two, almost all the resources are channelled to production forestry with conservation forestry receiving few resources and little support. Management in NPAs is, with one or two exceptions, reliant almost entirely on donor support (Robichaud et al. 2000).

Logging

Forestry, specifically log harvesting, is very important to the national economy and this importance has intensified in recent years following the regional economic crisis. However, the World Bank et al. (2001) reports that Lao production forestry, one of the country's few potential sources of sustainable economic growth, is in "disarray" and that the current level and extent of undisciplined exploitation has eroded production forest resources and put pressure on the NPAs. Illegal logging within several NPAs has been reported within the last two years. Since NPAs contain significant resources of timber (World Bank et al 2001), the issue of illegal logging and legitimised logging within NPAs is very serious for the integrity of the NPA system.

The logging pressure on the NPAs may well increase. Over the last five years, almost two-thirds of timber production has come from clearance associated with infrastructure or development projects (such as roads and dams). In some cases, the availability of timber was an influential factor in site selection for such projects. Currently, there is major over-capacity in the log processing sector and owners are actively seeking new timber resources (World Bank et al 2001).

While GoL is aware of this trend and is moving to address the situation, the level of exploitation and the dynamics of the forest production sector are not sustainable at the present time.

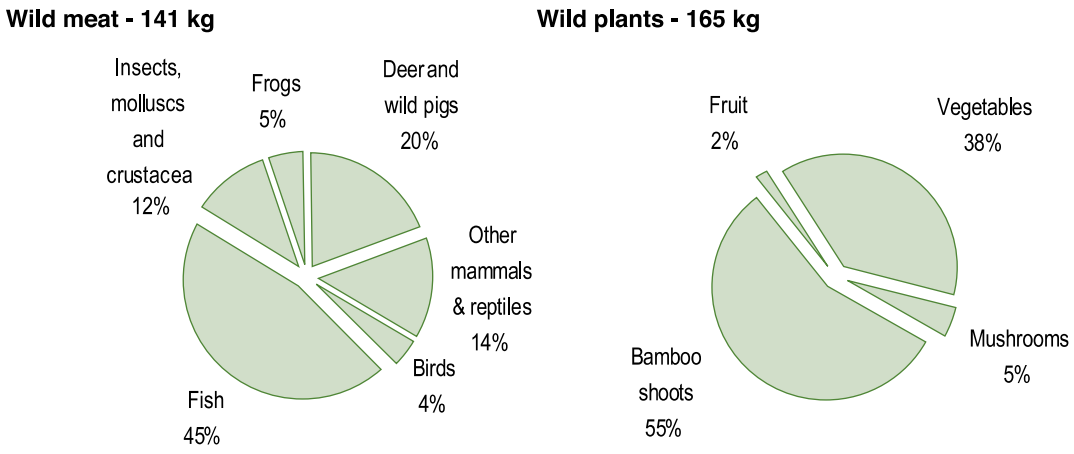
Non-timber forest products

Several recent studies in Lao have confirmed that NTFPs play vital roles in both subsistence needs and cash income opportunities for many of the poorest people in the country (Foppes and Ketphanh 1997; Foppes and Dechaineux 2000). The two uses need to be analysed separately – food security and life support on the one hand and potential for improved livelihoods on the other.

Food security and life support. Conservation and sustainable harvesting of NTFPs and wildlife can contribute greatly to food security and thus, poverty alleviation. Nam Et and Phou Loei NPAs are good examples. Over 40 species of trees, 15 bamboos, 6 palms, 34 wild vegetables, 7 grasses, 4 vines, 12 wild fruits, 56 medicinal plants and 13 mushrooms are used by villagers in Viengthong District (MAF and IUCN 2001b), most harvested from the NPAs. It is estimated that each NPA household consumes an annual average of 165 kg of wild plant products and 141 kg of wild meat (Figure 9).

Valuing these home-consumed items at local market price equivalents suggests that the total subsistence value of NPA resources for Vienthong District households ranges between 1.9 million kip for NPA-adjacent villages to 4.6 million for villages that are inside the NPAs, with an average household value of 3.1 million kip a year across the District (Table 7; ICEM 2003a).

Figure 9. Forest products – household annual consumption by weight



Calculated from Schlemmer 2001.

Table 7. Value of Nam Et/Phou Loei NPA resources for home consumption

	Value (kip '000 per household per year)			
	Viengthong District	Village inside NPA	Village on NPA boundary	Village adjacent to NPA
Housing materials	159	183	165	138
Firewood	707	992	680	560
Bamboo shoots	64	74	66	55
Wild vegetables	32	37	33	28
Mushrooms	26	30	27	23
Wild fruits	3	3	3	2
Deer and wild pigs	304	350	315	263
Other mammals and reptiles	174	200	180	150
Birds	99	114	103	86
Fish	575	662	596	497
Insects and molluscs	72	83	75	62
Frogs	92	107	96	80
Agricultural home consumption	789	1,794	935	–
Total home consumption	3,096	4,628	3,274	1,942

Source: ICEM 2003a

The relationship of community use of NTFPs and PAs may be closer for certain items than others. Improving productivity of traditional wild foods is a case in point. In Nam Et-Phou Loei as elsewhere in Lao PDR, the most important wild foods are fish, frogs and aquatic invertebrates, and it can be more advantageous for both an NPA and the food security of its residents to improve the supply of these, than attempting to increase village livestock or aquaculture.

NTFPs have a major potential role in providing food security for some of Lao PDR's poorest people. This will be of continuing benefit only if harvesting is sustainable.

Box 7. Na Khom – bitter bamboo shoots, community harvesting and trading

Bitter bamboo is a unique species of bamboo of the evergreen forests above 400 m in the northern part of Lao PDR. The bitter bamboo does not clump and the young reddish-black shoots are located underground growing off mature root stock. Unlike other bamboo species, which produce shoots during the rainy season, bitter bamboo shoots are the only species available during the dry season from December to April. Thereafter they become too bitter to eat and from this they receive their name.

Bitter bamboo shoots are in high demand both for markets in Lao PDR and in Thailand and China. Like many NTFPs, prices secured by the resource owning communities were generally unfavourable and this stimulated over-harvesting of the bitter bamboo through removal of crucial one year old stems.

Since 1998, IUCN in conjunction with the PAFO-DAFO and the Cham community of Namphaeng village, La District have been working on a sustainable harvesting regime and improving the income for the village community.

Currently the 515 ha bitter bamboo forest area at Namphaeng is divided into two harvesting blocks, with one rested each year. All community members sell to a village organised Trade Committee at a currently agreed price of 1,800 kip/kilo which is nearly twice what they usually received before and, in addition, 100 kip/kilo is put into a Community Development Fund. The Trade Committee sells the total stock each day to selected buyers on a rotational basis. Another community committee, the Monitoring Committee, has the duty to check finances, accounts and monitor the implementation of regulations for members.

The 1998-99 bamboo shoot-harvesting season was the most successful the village ever experienced, the community received over 48 million Kip and a 5 million Kip Community Development Fund was used to part build a village school. The IUCN project matched the funds contributed by the community to the construction of the school.

The project has demonstrated that simple community organisation can dramatically improve the income earned by villagers for natural resources, while ensuring sustainable harvesting of the resource and providing for community development. Organising harvesting groups is now being undertaken by PAFO-DAFO in many other Oudomxay communities where bitter bamboo shoots are found.

Source: IUCN 2000b

Potential for improved livelihoods. This use of NTFPs indicates that livelihoods are not merely supported but improved. It is the point of entry for many ICDP initiatives. However, Fisher (2002) in a wide-ranging review was able to find "very little clear evidence of people receiving significant economic benefits from NTFP enterprises associated with outside interventions based on the incentives approach". One of the few clear successes came from Lao PDR (Box 7).

7.2.2 Issues

Deforestation. Deforestation is an on-going and serious issue. Increasing pressure is destabilising upland swidden agriculture in many parts of the country but particularly in the north and this cause of deforestation is of great concern. GoL has been actively working to stabilise swidden practices for many years, but they persist in many NPAs.

Unsustainable production forestry. The lack of a sustainable forest production sector is a serious potential threat to the NPA system, as in these circumstances there will always be interests attempting to secure the significant timber reserves within NPAs.

Declining NTFPs. There has been much valuable work done by NAFRI and associates in the NTFP sector and nearly all reports indicate that NTFPs are being over harvested and need considerable attention to ensure sustainability. All studies have found that NTFPs play a key role in the lives of most of Lao PDR's rural population and are particularly important in times of adversity for the poorest people in the country. A sustainable NTFP sector would play a significant role in poverty alleviation although difficult to achieve because of the challenges in implementing sustainable management of the many different types of NTFPs, and the variable information base on NTFP management. A much-improved knowledge of NTFP management is a priority need as is a standard methodology for determining to what degree NTFPs contribute to socio-economic development.

Decentralisation of NPA management. Decentralisation has potential to assist in NPA management because it brings the focus closer to the local level and makes more evident the development-conservation strategies needed. Yet, in the short to medium term it is likely to result in weak NPA administration. NPAs have an over-arching national role and value that is not a priority at the provincial level. Provincial support is difficult to sustain when there are no immediate development benefits recognised or to be realised through investment in NPA management. Of immediate concern is the almost complete lack of administrative capacity not just at the DAFO level but also at the PAFO level. These offices will not be able to meet the complex requirements of conservation, especially participatory conservation under the ICDP approach, unless they are the focus of a major long-term institutional strengthening program.

Regulatory framework. There is a need within the forestry sector, not just in PA management, to clarify responsibilities and strengthen the enforcement of regulations, especially at the provincial level. The process of decentralisation has required the establishment of a new institutional framework. The regulatory framework needs to be reviewed and expanded. Defining and reinforcing roles in the enforcement of regulations should be a high priority.

Conservation forestry receives minimal resources. The lack of capacity throughout government is a major constraint on GoLs ability to achieve its development goals. The administrative units for conservation forestry and NPA management in particular suffer a chronic lack of trained manpower and technical and financial resources. In contrast, production forestry sections are relatively well manned and much better resourced.

"Unproductive" protected areas. PAs are seen to generate few obvious financial benefits or public revenues and so are given low priority within the Department of Forestry and its ministry.

7.2.3 Achievements and challenges

Achievements:

- Lao PDR has established one of the world's best designed and most extensive protected area systems – the NPAs. It continues to add areas to the system and there is significant addition of protected areas at the Provincial and District level;
- A Forestry Law and NPA regulations have been enacted;
- In the absence of national capacity, GoL has been very successful in attracting international support in initiating NPA management; and,
- Addressing deforestation through stabilising unsustainable upland agricultural systems is central to many GoL policies and management initiatives.

Challenges:

- To establish a sustainable production forestry sector;
- To arrest the decline in NTFP resources and establish sustainable levels of use specifically for villager livelihoods and food security;
- To provide PAFOs and DAFOs with the technical and administrative resources to undertake the conservation mandate of NPA administration and management;
- To strengthen the regulatory apparatus at the provincial and district level in the forestry sector including the legal framework for PAs; and,
- To establish a better balance of manpower and resources between production and conservation interests within the Department of Forestry and in the provincial development planning system as a whole.

7.2.4 Strategies

Sustainable forestry sector

The World Bank et al. (2001) have studied the forestry sector in depth and in summary, the proposed strategic responses relating to NPAs include:

- National rather than provincial or district objectives for the management of specific areas (such as NPAs);
- Reconciliation of overlap in PAFO-DAFO responsibilities;
- Long-term institutional building program for PAFOs;
- Strengthening of the forestry regulatory apparatus;
- Improving the land allocation process; and,
- The establishment of watershed management authorities, or agencies with independent area-specific authorities like Nam Theun.

Sustainable NTFP management and poverty alleviation

A large proportion of Lao PDR's rural poor derives some part of their livelihood inputs from NTFPs. For many, the dependence on NTFPs is a function of their poverty, because they lack better alternatives. Helping meet subsistence and food security needs of the poor through sustainable NTFP management is of more immediate importance than supporting those able to increase their incomes through forest activities. Yet, there is a need to avoid encouraging forms of forest dependence that could lock the very poor into poverty.

Zoning in NPAs is intended to confirm the traditional rights of villages to NTFP collection in proscribed areas and to introduce sustainable harvesting regimes there.

Internationally, programs to devolve forest use and management rights to local users have often improved access by the poor, but their impact has frequently been limited by government failure to transfer full or effective rights, and by regulations and actions that restrict access by small producers to equitable markets for forest products. In addition, weaknesses in the institutional arrangements for devolved forest management and control have often resulted in transfers favouring those who are better off and outside users (Arnold 2001).

The role and significance of NTFPs for poverty alleviation is discussed by Foppes and Kethpanh (2001) who argue:

"NTFPs are uniquely essential for the Lao national economy, both for subsistence and trade. NTFPs are key elements in poverty alleviation, forest and biodiversity conservation, land use planning and allocation, substitution of shifting cultivation and industrial development. Every project or program aimed at rural development or biodiversity conservation in Lao PDR should have an NTFP strategy, similar to the way each project should have a gender/equity strategy".

7.3 Water resource management and protected areas

7.3.1 Status

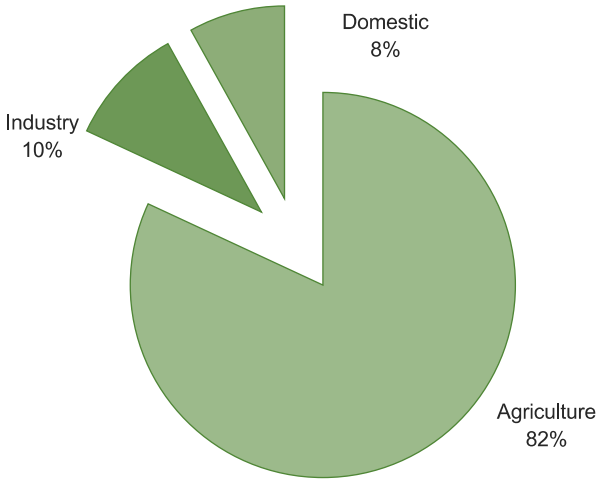
Lao PDR is well endowed with water resources and has no expectation of water shortages, except at the local level. Nonetheless, the government is well aware of the need to husband its water resources, as one of the nation's few comparative advantages for economic development. In recent years, GoL has moved significantly to develop its water resource management capacity. The role of PAs in water resource management is widely appreciated and improved protection of upland catchments is a prominent feature of policy for a variety of downstream benefits especially agriculture and hydropower. NPAs are strongly connected with catchment protection, because they tend to be forested and in the main are located in upper catchments. This is by no means an exclusive association, however, as many other catchments are nominally protected either at the provincial level or for other reasons, for example, border security.

Although there are exceptions, the benefits of watershed protection measures, i.e. a sustained clean water supply, are not acknowledged through investment by water users in management of protected areas. Water supply from protected areas is treated as a free service.

Water usage

The principal uses for water in Lao PDR are agriculture (especially irrigation), fisheries, industry (power) and drinking water. Subsidiary uses include transport, tourism, education and research. Total water withdrawal is estimated at 1,000 million m^3 per year, less than one percent of the available resource, with the major uses shown in Figure 10.

Figure 10. Water withdrawal by sector



Source: FAO 1999a

About 60 percent of urban areas receive potable water while 40 percent of the rural population have access to potable water, although only about half of the supply systems actually function (STEA 2000, 2002). Domestic water charges in urban areas are on a volume basis but the tariff structure fails to cover the direct financial costs of the water supply systems.

Expanding irrigation is a key goal of government's rural development policy and the area under irrigation has expanded rapidly in the past 25 years; 35 percent of agricultural land is irrigated. The emphasis is on small-scale irrigation schemes and about 20 percent of the Lao population enjoy free use of irrigation water (MIH 1998).

Table 8. Irrigation in Lao PDR

Type of System	No. of Systems	Wet Season Irrigated Area (ha)	Dry Season Irrigated Area (ha)
Small dam (concrete weir)	631	53,744	27,294
Storage reservoir	170	18,550	12,578
Pumping	3,176	138,203	135,860
Watergates	53	6,430	4,388
Traditional weir	18,150	60,894	16,121
Gabion weir	60	2,179	929
Total	22,240	280,000	197,130

Source: STEA 2002

Hydropower

The government supports watershed protection as a fundamental part of its strategy to develop the country's hydropower potential, to provide a source of energy for export sales to neighbouring countries as well as to supply domestic needs. This issue is discussed in the next section on energy.

Water at the local level

The water sources originating in the Nam Et-Phou Loei NPA provide a good representative example of the wide range of domestic, agricultural and industrial water uses in a poor upland area. The uses include hydropower and irrigated agriculture and are valued at nearly 6,000 million kip/year (Box 8).

Box 8. Uses of water from Nam Et-Phou Loei NPA in Houaphan Province

In Houaphan Province alone, NEPL rivers and their tributaries are known to provide for:

- At least three medium-scale hydroelectric schemes, with a combined installed capacity of more than 360 kW, and at a total investment cost of more than US$2 million. A 80 kW scheme on the Nam Et supplies power to at least 9 villages, a 250 kW scheme on the Nam Sat supplies power to Viengthong District Centre and at least 10 villages, and a 36 kW scheme on the Nam Peun supplies power to at least 5 villages.
- In excess of 850 micro-hydro units, serving more than 1,000 households.
- At least 1,000 ha of irrigated rice production, including two large-scale schemes, and utilising weirs and gabions, pumps and wooden water wheels.

Value of production in Houaphan Province supported by NEPL watersheds

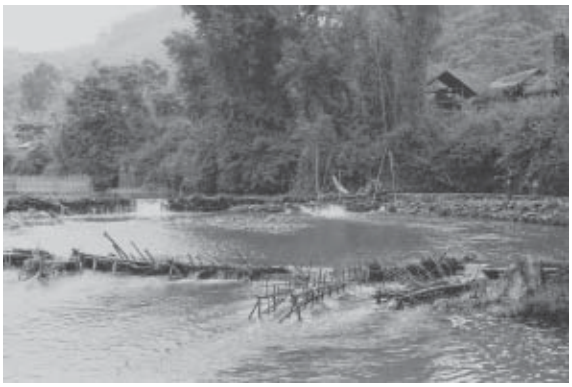
Economic activity	Direct beneficiary population	Gross value of output (million kip/year)	
Medium hydro	24 villages, one district centre	235	Traded value of electricity
Micro-hydro	> 1,000 households	410	Traded value of electricity
Irrigated agriculture	1,000 ha of paddy rice	5,130	Gross returns to production
	Total	5,775	

Source: ICEM (2003a)

Water use conflicts are increasing at the local level. In Nam Bak and Xay Districts, Oudomxay, water diversion and water abstraction schemes are causing increased competition between upland and lowland stakeholders in water use, e.g. upstream irrigation systems in Xay District have resulted in reduced hydropower capacity downstream for Xay township (IUCN 2000b; RETA 2001).

7.3.2 Issues

Water is not a free resource. Despite its abundance in Lao PDR, water should not be treated as a free good. Currently the costs of protecting the nation's water resources are borne by MAF through its general agriculture and forest management functions. Where they do occur, water tariffs and other economic instruments to manage water supplies are used as a sector revenue stream, with no payments returned for PA watershed services.



Appropriate recognition of the value PAs play in sustaining quality water supplies would greatly assist in addressing the resource constraints now faced by PA managers.

7.3.3 Achievements and challenges

Achievements:

- GoL has made significant progress in water resource management at the policy and strategy level. It has enacted the Water Law, prepared a National Water Sector Profile as well as a Water Sector Strategy and Action Plan;
- GoL has recognised the potential linkage and mutual benefits between PAs and hydropower projects.

Challenges:

- Official recognition through revenue sharing of the crucial role NPAs can play in sustaining quality water supplies.

7.3.4 Strategies

Valuing watershed protection

Until such time as water supplies from PAs are officially valued, they will be treated as a `free resource'. Once official 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 revenues channelled back to PA management.

Water tariffs

Water tariffs are generally introduced to recover costs of the service provision and to improve efficiency of use. Tariffs should also cover the management of the water supply itself, thereby contributing to PA and associated watershed management costs.

7.4 Energy and protected areas

7.4.1 Status

Lao PDR has major energy reserves, principally in hydropower potential but also major lignite deposits. Currently energy use is dominated by household consumption of traditional fuels, wood and charcoal. In 1999, fuelwood met 90 percent of energy consumption needs, electricity five percent and petroleum products five percent (MIH 2000).

Three subsectors are examined below, fuelwood and charcoal; lignite and petroleum products; and hydropower.

Fuelwood and charcoal

Fuelwood from wild-grown sources is the main source of energy consumed in Lao PDR. With only eight percent of rural households connected to the electricity grid, rural communities rely almost entirely on fuelwood and/or charcoal. Communities inside or adjacent to NPAs mainly use firewood extracted from inside NPAs, as illustrated in the case of Nam Et-Phou Loei (Table 7).

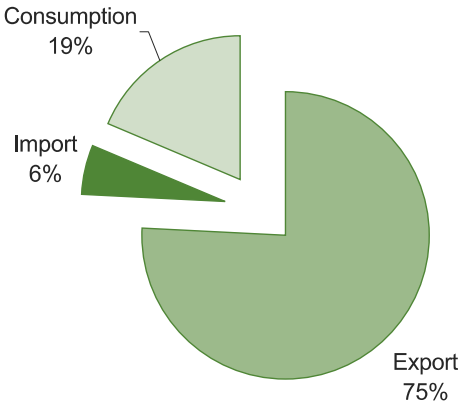
Lignite and petroleum products

Lao PDR has major lignite deposits at Hongsa in the northwest with proven reserves of about 810 million tonnes of which 530 million tonnes are exploitable. However, under current demand and with cheaper gas options available, export from a lignite-fuelled power station to Thailand is not economically feasible. Use of petroleum products is increasing rapidly in Lao PDR, from 76,000 tonnes in 1987 to 968,000 tonnes in 1997 (MIH 1997). Since all petroleum products have to be imported overland, their use places a major burden on the Lao economy.

Hydropower

Hydropower supplies 97.4 percent of Lao PDR's electricity (1999) with the remainder generated by diesel fuel. In 1999 electricity production was 2,890 GWh (Figure 11).

Figure 11. Electricity consumption, export and import in 1999



Prior to the Asian economic downturn in 1997, Lao PDR was pursuing an ambitious scheme to build an additional 21 hydropower dams with an installed capacity in excess of 7,000 MW by 2009, with a commitment to supply Thailand with 3,000 MW by that time. Only three of these hydropower schemes have been completed: Houay Ho (150 MW), Theun Hinboun (210 MW) and the small Nam Leuk (15 MW). Although the first two dam structures are not located within NPAs, the catchment for Theun Hinboun is partly in Nakai-Nam Theun NPA and partly in the proposed northern extension of that protected area (Box 2) and its downstream impact greatly affects water flow through the Nam Kading NPA. Nam Leuk is within the Phou Khao Khouay NPA. Currently GoL has Concession Agreements or equivalent for eleven projects and MOUs with a further 12, many of the latter inactive. One Concession Agreement on the Nam Mang in the Phou Khao Khouay NPA has commenced construction with Chinese contractors but construction has been halted by STEA pending approval of a revised EIA and Environmental Management Plan. In a recent evaluation of candidate hydropower projects, 11 of 31 projects impacted existing or proposed NPAs (ADB 2001).

Government has recognised the need for hydropower projects within PAs to be supportive of both conservation and development goals. A part of the PA is used for water storage in exchange for some of the power revenues being levied for conservation management of the PA. Given Lao PDR's lack of resources, hydropower levies provide an attractive and sensible source of funds for PA management and GoL has pioneered this approach in the region. Hydropower revenues provide major benefits at the national level while a small hydropower levy can ensure that PA management is able to protect the water flow conditions and reservoirs.

One hydropower project is already providing funds for the PA in which it is located and another is committed to doing so:

- The Nam Leuk scheme in Phou Khao Khouay PA currently provides one percent of gross revenue from power sales to Thailand to assist PA management. This is a requirement of an Asian Development Bank loan for the project;
- The proposed Nam Theun 2 hydropower project will provide US$1million + 50 percent CPI each year for management of the Nakai–Nam Theun NPA.

Hydropower levies for PA management are not GoL policy *per se* but are considered on a case by case basis[14].

7.4.2 Issues

Fuelwood and charcoal collection. Except in isolated cases of especially high population density, this is unlikely to be a significant issue in the short term and is very much within the `benefits' which NPAs would be expected to provide for internal or adjacent communities under current GoL policy. Fuelwood location and supply would be one of the first items included in zonation of PAs for collaborative management. In this respect PAs have a major role in sustaining the subsistence needs of internal or adjacent villages.

Hydropower and environmental impact. The severe potential environmental and social impact of hydropower projects, especially large schemes, is well known. In Lao PDR hydropower projects will be closely associated with 11 or more existing or proposed NPAs, as well as other `protected' watersheds. They may also affect distant local fisheries protected areas.

The World Commission on Dams (2001) has reported the underestimation of environmental, social and economic impacts of large dams worldwide. The true economic costs of large hydropower schemes are often greater than the economic benefits over the life of the dam. Advanced levels of environmental impact assessment including regional and strategic environmental assessment are required if large hydropower projects are to be assessed properly.

In Lao PDR, in response to requests from the government and the Nam Theun 2 hydropower consortium for international loan guarantees (for sovereign risk), the World Bank has undertaken one of the most comprehensive – and standard setting - environmental and social assessment processes completed anywhere in the world for dam construction (Chape 2001a). In addition, the Lao government has drawn up comprehensive environmental standards and regulations for the environmental assessment and management of hydropower dam projects while social assessment standards are under preparation.

Hydropower impact assessment and mitigation. GoL has had the experience of state-of-the-art hydropower project impact assessment and has the requisite standards and regulations in place. Whether it has the capacity to undertake them in the absence of leverage from the World Bank or Asian Development Bank remains to be seen. This is currently being tested at the Nam Mang hydropower scheme in the Phou Khao Khouay NPA that is under construction.

Sufficiency of hydropower levies. The hydropower levy for the Nam Leuk scheme is one percent of annual gross export revenues. The government has taken a different approach to the NT2 scheme, which has agreed to pay $1million (+50 percent of the increase in the CPI) per annum. Although by Lao standards this is a large amount of money for PA management, it represents less than half of one percent of gross revenues.

14 Milattanapheng, Hydropower Office MIH, *personal communication*

In neither case was the levy set on the basis of a thorough analysis of what is actually needed to protect the internationally important NPAs affected by the schemes. It is unclear whether the NT2 levy will be used solely for NPA and catchment management or for the livelihood improvement and stabilisation of 24,000 villagers associated with the Nakai-Nam Theun NPA. Unless the purpose of the levy is clarified within a legal framework, then there is no guarantee that it will be used for the management of the NPA and its inherent catchment values.

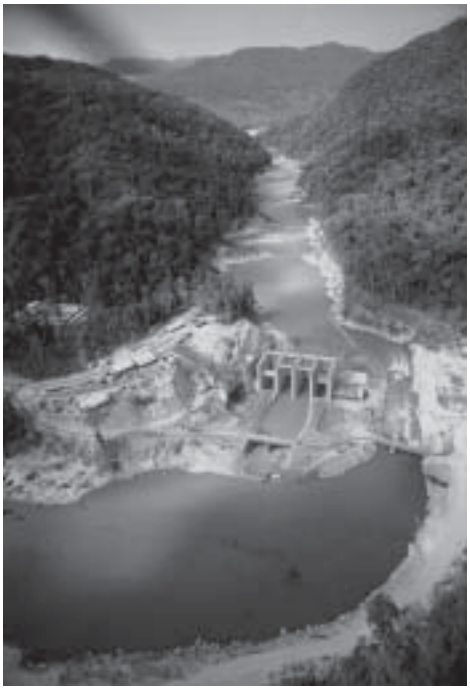
7.4.3 Achievements and challenges

Achievements:

- GoL policy for PA management recognises the need for them to provide subsistence necessities such as firewood for local communities and a legal framework has been established in which this can take place.
- GoL has recognised the potential linkage and mutual benefits between PAs and hydropower projects and has pioneered the use of a hydropower levy for PA management.
- GoL has introduced comprehensive EIA and EMP Standards for hydropower projects and has enacted them in regulations.

Challenges:

- Sustainable use regimes for fuelwood and other NTFPs need to be practiced within NPAs if these products are to sustain the livelihoods of the local communities. Developing and managing sustainable regimes is a difficult and intensive undertaking.
- GoL needs to ensure hydropower levies for PA management and catchment protection are adequate and used by the correct authorities to meet these needs, and not for general rural development purposes.
- GoL needs to develop the capacity to ensure that environmental assessment, management and mitigation of hydropower dams are undertaken to an appropriately high standard, including thorough assessment of all development values of the affected NPAs.



7.4.4 Strategies

Institutionalising hydropower water catchment levies

As there are at least eleven potential hydropower projects which impact existing or proposed NPAs, and more which may affect other forms of protected area, the use of hydropower levies to assist in PA management is a critical consideration for GoL.

In the region, GoL has pioneered the use of hydropower levies to finance catchment protection through PA management. Current practice is for the levies to be set on a case by case basis. This approach raises many concerns – why should one hydropower project be the subject of a levy and not another and why should the amount of the levy differ? Why should a levy be applied only in the case of existing PAs? It is important to protect the catchment of every hydropower project. Levies should become a standard policy tool in all hydropower schemes affecting protected areas with revenues going directly to conservation management.

These issues have been addressed in other developing countries. There are examples where far larger revenue-sharing levies are applied to hydropower producers than those so far levied in Lao PDR and in several cases countries have legislated for their systematic application. For example Colombia's Urra 1 hydropower project where a national park covers most of the water catchment, three percent of revenue is paid to the single municipality and watershed agency responsible (Milewski, Egre and Roquet 2001). Colombia has legislated requiring every hydropower facility over 10 MW pay a levy of six percent (Box 9). Brazil has enacted similar legislation. Legislation ensures transparency and ensures that every hydropower producer is treated similarly and according to established conditions and standards.

In Lao PDR, it is unlikely that the government alone will construct large dams. They will be joint ventures or build, operate and transfer arrangements. A clear expression of the government's requirements in respect of water catchment protection is an essential ingredient in all future hydropower schemes associated with protected areas.

As a first step, an open review of Lao PDR's experience or intentions with respect to hydropower levies (i.e. relating to Nam Leuk and NT2) would help determine an appropriate national policy.

Box 9. International hydropower levies for watercatchment protection and management.

Colombia:

- Under National Law 99 promulgated in 1993, for all new power generation plants of more than 10 MW installed capacity, power producers must transfer part of project revenues to local watershed agencies and concerned municipalities.
- Decree 1933 promulgated in 1994 specifies the percentage and destination of such transfers, for hydroelectric plants greater than 10 MW.
- Three percent of project revenues must be transferred to the watershed agencies that have jurisdiction in the region where the project is located. The amounts must be used for the protection of the environment in the watershed upstream of the dam and in the area of influence of the project, in accordance with a watershed management plan.
- 1.5 percent of project revenues must be transferred to the municipalities bordering on the reservoir.
- Another 1.5 percent of project revenues must be devolved to the municipalities located in the watershed upstream of the dam.

Costa Rica:

- La Esperanza Hydroelectric Project pays approximately $10/ha ($30,000) annually to the Monteverde Conservation PA to conserve the 3,000 ha of forest above the La Esperanza power station.

7.5 Agriculture and protected areas

7.5.1 Status

Lao PDR is predominantly a rural country with less than 10 percent of the population living in urban areas. Agriculture is the dominant employment activity and contributes the greatest proportion to GDP.

Only ten percent of Lao PDR's land area is suitable for intensive agriculture and in 1998 about 788,162 ha of land was under cultivation, of which 617,538 ha or 78.4 percent was devoted to rice cultivation (MAF 1999). Three forms of agriculture are readily distinguished: lowland, which is predominantly irrigated rice cultivation; highland, which is predominantly rotational swidden farming; and, an expanding commodity crop sector. In 2001, agriculture accounted for 16 percent of total public investment. 70 percent of the Governments Public Investment Program was allocated for irrigation.

Upland catchment areas including many NPAs and other PAs are responsible for sustaining a steady supply of good clean water for downstream agriculture. Although some swidden farming is sustainable and well suited to the highland environment, much of it is unsustainable and a primary cause of degradation of these upper water catchments. For many years, it has been GoL's policy to discourage this form of agriculture in favour of permanent cultivation.

Communities practice swidden agriculture either well inside or on the edges of many NPAs. In many cases this practice has continued over generations and is a sustainable use of land in the absence of population growth. However, the type of pioneering swidden practiced by one Lao Soung group, the Hmong, involves repeated cultivation of land until its fertility is completely exhausted and a process of severe degradation of catchment and biodiversity values is initiated.

In certain PAs, cash crops – coffee in the case of Dong Hua Sao NPA in Champassak province – are being grown to such an extent that encroachment is a threat to the integrity of the protected area. In other cases, cash crops, such as Job's Tears, are being introduced into swidden agricultural systems to which they are generally not adapted and degrade the rotational system.

The role PAs play in preserving genetic resources of traditional agricultural cultivars and NTFPs with potential for domestication is frequently undervalued or ignored. As modern agriculture methods and hybrids are introduced, government will need to consider establishing protected areas to safeguard the areas of origin and representative samples of local agriculture genetic resources and ecosystems.

7.5.2 Issues

Loss of agrobiodiversity. PAs, both formal and informal, provide important services for agriculture. These include the obvious - a sustained source of water and protection of cultivated land from excess runoff, and the less obvious - habitat for crop pollinators and for crop pest predators. Bats, wild bees, and other insects are the principal pollinators of fruit trees and major staple crops including potato, cassava, yam, sweet potato, taro, beans, coffee and coconut (McNeely and Scherr 2001). While many staple foods are wind pollinated, at least one-third of the world's agricultural crops require insect or animal pollination. Pollination is an environmental service and it is provided by PAs and by relict areas of natural vegetation (ICEM 2003d).

Degradation of upper catchments. Pioneering swidden and short fallow rotational swidden are both unsustainable and continue to cause degradation of large areas of upland catchments in some PAs. Apart from loss of biodiversity values, this practice also results in the loss of water catchment values with repercussions for downstream users, in particular irrigated agriculture and in certain cases hydropower projects. GoL has tried a wide variety of policies and programs to stabilise upland agriculture, including extensive resettlement of villages, but with little overall success. This continues to be a major issue for GoL and for the PAs in which it is taking place.

Cash crop cultivation. The increasing cultivation of cash crops has direct impacts in some NPAs – direct encroachment such as coffee planting in Dong Hua Sao NPA, and indirect impacts when cash crops disrupt traditional swidden cycles for which they are not adapted. It is GoL's policy for NPA management to incorporate the subsistence needs of its communities, but this becomes very difficult when cash crops are involved because they are often grown for outsiders. Zonation of NPAs needs to be undertaken quickly to clarify planting rights and areas and the zonation needs endorsement and enforcement assistance from the district and provincial authorities.

Land allocation. Land allocation around NPAs has potentially important positive as well as serious negative implications for NPA management and requires careful application. The issue requires specific attention so that it is consistent with the primary goal of NPAs - biodiversity conservation.

7.5.3 Achievements and challenges

Achievements:

- GoL has tried and continues to try many ways of stabilising unsustainable upland agriculture and it attracts considerable donor assistance for this purpose.
- Lack of land tenure is frequently cited as a major impediment to sustainable agriculture and for over harvesting of NTFPs. GoL's program of land allocation is a significant move to address the tenure issue and has the potential to greatly assist NPA management.

Challenges:

- Finding equitable solutions to the problem of unsustainable upland agriculture remains a major issue which is particularly serious for NPA management since biodiversity values will continue to be lost until solutions are found.
- Ensuring that land allocation is undertaken fairly and without prejudice to villagers' livelihoods.

7.5.4 Strategies

Sustainable upland agriculture

Unsustainable upland agriculture has been and continues to be the subject of policy, strategy and action, and is not the principle focus here except as it applies to protected area conservation and management. Concentrated attention is needed to eliminate unsustainable upland agricultural practices within and adjoining protected areas.

Cash crop encroachment and land allocation

For NPA management, the two issues of cash crop encroachment and land allocation are strongly intertwined, the latter specifically in the form of zonation which is a legal requirement within NPAs. Ensuring that the NPA management and land allocation teams undertake the process together is essential if the outcome is to be fair to the villagers and at the same time to respect the primary goal of NPAs – biodiversity conservation and the maintenance of natural systems which provide development benefits.

DoF and the LSFP have refined the GoL land allocation methodology for use in NPAs. It has been tested in four areas so there is a model and considerable experience that can be used for this purpose.

Land zoning based on land capability

If land allocation is to result in a successful move from swidden to sedentary farming, a critical requirement is zoning based on land capability assessment. The current zoning practice during land allocation and provincial planning is too arbitrary and approximate leading, for example, to land suitable for agriculture being zoned for forestry and fragile critical habitat that should be conserved going to agriculture. The expertise exists within the country to undertake scientific land capability assessment, as does the basic information, i.e. aerial photographs.

Conserving agricultural biodiversity

There is a need to establish protected areas for the purpose of conserving agrobiodiversity. Such PAs would cover centres of origin of agricultural species and key sites of genetic diversity of agricultural crops, as well as cultivated NTFPs, which are not formally included in the agricultural sector. In addition, the key contribution of pollinators and agents of agricultural pest control should be recognised and enhanced by protecting associated habitats. Such PAs need not be formal and not necessarily large but strategically located to form networks throughout the agricultural landscape.

7.6 Fisheries and protected areas

7.6.1 Status

Capture fisheries and aquaculture

Fish contribute approximately 40 percent of the animal protein in the diet of the people of Lao PDR. Capture fisheries are believed to have undergone serious decline over the last two decades. In 1990, DLF reported that the capture fishery had declined 24 percent from 36,000 tonnes since 1970. This perception of a serious decline has been a major factor in the government's interest and investment in aquaculture (Chanphengxay 2002). In 2000, the estimated total fish production was 71,316 tonnes of which 29,520 tonnes (40 percent) was from capture fisheries and 42,066 tonnes (60 percent) from aquaculture. In 1990, the figures were 26,000 tonnes and 1,400 tonnes respectively (Chanphengxay 2002) (Table 9).

Table 9. Capture fishery and aquaculture statistics in Lao PDR, 2000

	Water resources	Total areas (ha)	Productivity (kg/ha/yr)	Estimate total production (tons/yr)	% of total catch
Capture fishery	Mekong river and 14 tributaries	254,150	70	17,790	25.0
	Reservoirs	57,025	60	3,421	4.0
	Irrigation and small reservoirs	34,460	150	5,169	7.4
	Swamps and wetlands	95,686	30	2,870	4.0
Ponds, pools and aquaculture	Fish ponds	10,300	1,000	10,300	15.0
	Rice-Cum-Fish	3,050	150	475	0.6
	Rain-fed rice and irrigated rice field	477,176	50	23,850	34.0
	Small natural pools, oxbows and irrigation weirs	12,934	573	7,441	10.0
	TOTAL	944,781		71,316	100.0

Source: DLF 2001

Throughout Lao PDR, wild caught fish and other wild aquatic products provide an even more important role in the diet of rural communities, commonly over 50 percent of animal protein (Dechaineux 2001; Baird 1999; Foppes and Ketphanh 1997). Forest catchment PAs sustain fisheries both within the PAs and for downstream users through the consistent provision of good quality water and sanctuaries for breeding and juvenile stages.

The establishment of protected areas covering local rivers have been shown to sustain local fisheries. In the most successful initiative of its kind, 63 villages in one district of Champassak province introduced their own "Fish and Frog Conservation Zones" (Baird 1999; 2000a). Improved yields were quickly recognised by the communities and led to the zones being maintained and adopted in neighbouring villages. Fish and Frog Conservation PAs are now found in many parts of Lao PDR. They have the added advantage of being clear demonstrations of the benefits of PAs through improved yields and sustainable harvesting for rural communities (IUCN 2001; Dechaineux 2001; Foppes and Dechaineux 2000).

Baird (2000a, 2000b) argues strongly the suitability of wild capture fisheries interventions as participatory co-management activities for NPA projects. Yet, GoL and international donor-assisted interventions rarely, if ever, support wild capture fisheries. Instead they tend to promote aquaculture or alternative protein sources such as livestock. However, wild capture fisheries and associated protected areas management may be more suitable for a variety of reasons:

- Unlike livestock, wild fisheries are a direct contribution to biodiversity, and benefit other species important to maintaining natural systems (e.g. otters and kingfishers).
- Reliance on aquatic resources should stimulate villagers to protect streams from poaching and depletion by outsiders.
- Livestock and aquaculture are more difficult and expensive to manage from an economic and environmental perspective.
- Livestock and aquaculture species are a less secure food source, subject to catastrophic loss through disease, predation and theft.
- Livestock require the expense of vaccines, feed and pens.
- Villagers may be stimulated to kill wildlife predators to protect livestock.
- Small livestock generate little trade income for remote villages, because eggs and the meat of pigs and poultry cannot be preserved for later transportation to market. Fish, however, can be preserved for later sale.

Wetlands as protected areas

Wetlands are very important to Lao people, particularly for the harvest of fish and other aquatic sources of protein (Claridge 1995). They are also important biologically, supporting unique communities, including some highly threatened species that are absent from forests, e.g., Siamese Crocodiles and large waterbirds. Currently wetlands are the most important under-represented habitat in the NPA system. Included in this omission is the Mekong River itself and its large slow-flowing tributaries.

This under-representation combined with ongoing conversion of wetland-swamps has profound implications for capture fisheries but also, for biodiversity. The Mekong is one of the most significant ecosystems for conservation in Indochina, supporting high fish diversity and a number birds specialised to large river environments. Hydropower pressure on other Lao rivers heightens the conservation importance of the Mekong.

7.6.2 Issues

Inadequate recognition of the value of wild capture fisheries. Wild-caught fish provide rural people with their most important source of protein. In Lao PDR's mountainous terrain many communities have little or no opportunity to undertake aquaculture. Yet, official measures to sustain the wild caught fishery are clearly inadequate. There is very little enforcement of regulations banning destructive fishing techniques and, until recently, collaborative management initiatives with villagers for the conservation of wild-capture fisheries were virtually unknown. Possible reasons for this are the complexity of the wild-capture fisheries and a lack of technical knowledge in natural aquatic resource management (Baird 1999). However, recent work has shown that co-management conservation initiatives of wild-capture fisheries involving local PAs can be very successful in stimulating communities to appreciate the role and potential of conservation in general. There is a great need for capture fisheries to receive greater official recognition from the government and multilateral support agencies.

Unbalanced promotion of aquaculture. Over the last ten years, aquaculture has received massive promotion from GoL and from multilateral, bilateral and ODA agencies, partly because it is believed to be a major potential contributor to food security for rural communities. However, it questionable whether aquaculture has lived up to expectations, especially given the considerable international funding it has received (Baird 1999). Aquaculture appeals to development planners because it is highly visible, technically advanced and the results are generally easy to quantify. A more balanced promotion of aquaculture vis-à-vis wild capture fisheries would bring greater development returns, especially when the multiple values of wetlands within protected areas are taken into account.

Exotic species. Although some indigenous species are cultured, the majority of readily cultured fish are exotic species, some with serious biosafety implications. Common carp and tilapia are extremely fecund and hardy species known to naturalise easily and to cause serious environmental degradation through habitat alteration and predation of indigenous species of fish and other aquatic animals.

7.6.3 Achievements and challenges

Achievements:

- Some highly successful examples of co-management conservation initiatives for wild capture fisheries and/or frogs have been undertaken in Lao PDR which demonstrate their suitability for ICDP initiatives.

Challenges:

- To obtain greater official recognition of the importance of the wild-capture fisheries and so obtain greater development and management assistance for protected areas.
- To minimise the establishment in natural aquatic systems of cultured exotic species.
- To minimise the on-going conversion of swamp-wetlands in the Mekong plains and to establish NPAs covering representative wetland systems.

7.6.4 Strategies

The sector would benefit from a policy and strategic re-orientation leading to:

- Official status for wetland protected areas;
- Increased assistance for community co-management and conservation;
- More balanced approach to aquaculture development; and,
- A specific program for capture fisheries and frogs in upland areas.

Establishing official protected area status for wetlands at the national, provincial and district levels with a legal and institutional framework could have a significant trickle down or multiplier effect. It would facilitate

the establishment of community co-management initiatives and the attraction of more official development and management assistance. This would rectify the current unbalanced approach to fisheries with aquaculture receiving an unwarranted investment at the expense of capture fisheries.

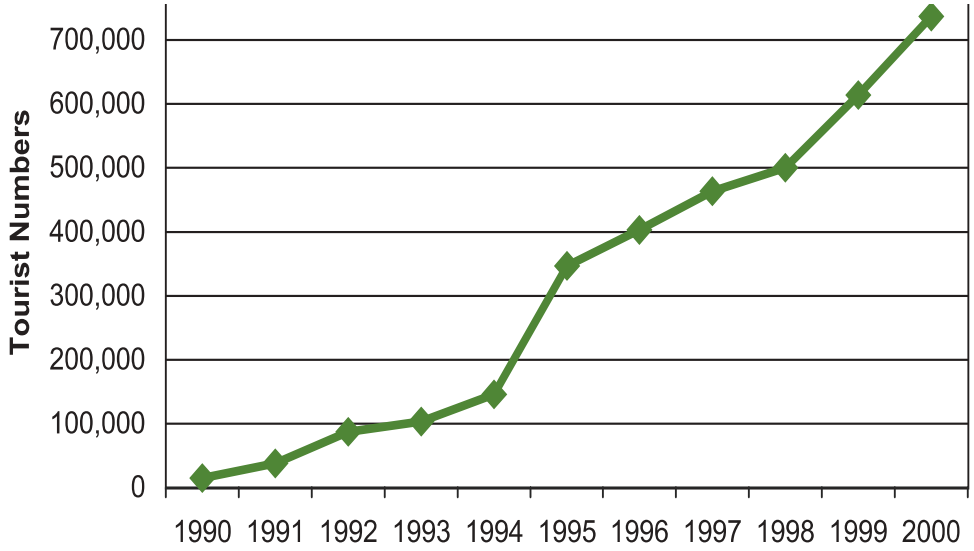
7.7 Tourism and protected areas

7.7.1 Status

Tourism growth in Lao PDR

Lao PDR is currently enjoying a major tourism boom growing at more than 30 percent annually (Figure 12). Implementation of the "Visit Laos Year 1999-2000" provided a major impetus for tourism development. Since 1998, tourism has been the largest foreign exchange earner in the Lao economy. In 2000, tourism revenues were close to US$114 million.

Figure 12. Growth in tourist numbers in Lao PDR



The principal tourist attractions for international visitors are the nation's rich natural and cultural heritage. The former capital, Louang Prabang is entered on the World Heritage List and nearly half of the country remains forested with over 20 percent of its landmass under protected areas. In addition to retaining one of the highest country forest covers in South East Asia, Lao PDR is home to 47 distinct ethnic groups, speaking over 230 different languages. The vibrant traditional culture of these ethnic groups remains largely intact, and complements the country's natural beauty. Together, they represent two key resources for the development of sustainable community-based and nature based tourism (Manivong 2002, Schipani and Marris 2002).

GoL has also moved to develop a strategic framework for tourism, which includes "ecotourism". The strategy identifies it as one of four basic tourism categories:

1. Conventional tourism based on sightseeing of major scenic areas and cultural sites – targeting international tour groups and usually linked to multi-destination tours.
2. Ecotourism, village tourism, special interest and adventure tourism for small tour groups and independent tourists.
3. Border and transition tourism of short-stay relaxation and sightseeing for visitors from neighbouring countries.
4. Domestic tourism for Lao citizens within their own country.

Ecotourism

In conjunction with Lao PDR's NPA system ecotourism has great potential to assist in both conservation and rural development. Community-based ecotourism is a participatory activity increasingly used as a central component in ICDP projects. When used correctly, ecotourism offers a number of benefits. It can:

- provide an initial entry point and community organisation framework for other ICDP activities;
- provide an additional income source for local communities;
- give them an economic stake and a vested interest in conservation; and,
- increase community awareness generally concerning the importance of natural resource conservation.

Despite its potential advantages, ecotourism *per se* does not necessarily contribute to improved conservation. Indeed, poorly planned or inadequately controlled nature tourism activities can impact negatively on conservation and biodiversity values. As a consequence, precautions have to be taken during the planning stages of ecotourism development in any locality. To this end, GoL with the LSFP has prepared a "Manual for Community-based Ecotourism in Protected Areas" (Box 10, Craig and Southammakoth 2001).

Box 10. Extract from Manual for community-based ecotourism in protected areas.

In partnership with the Department of Forestry, the Lao Swedish Forestry Program (LSFP) has been working in four protected areas on the development of a Participatory Protected Area Management System appropriate to the current and future needs of the Lao PDR. The system embodies three major components and a variety of methods, tools, case studies and manuals which are described in an inter-related series of documents as follows:

Information provided in this document

- The goals and objectives of community-based eco-tourism.
- How to go about planning and developing a community-based eco-tourism program in a protected area.
- The steps and procedures involved in community-based eco-tourism development.

Source: Craig and Southammakoth 2001

There are several ecotourism ventures operating or about to commence in NPAs including Phou Khao Khouay, Phu Xang He, Xe Pian, Phou Hin Poun and Nam Ha. The Nam Ha ecotourism initiative is providing a successful demonstration for other communities considering setting up ecotourism with local community and conservation benefits (Box 11).

Box 11. Lessons from the UNESCO- NTA Lao Nam Ha Ecotourism Project

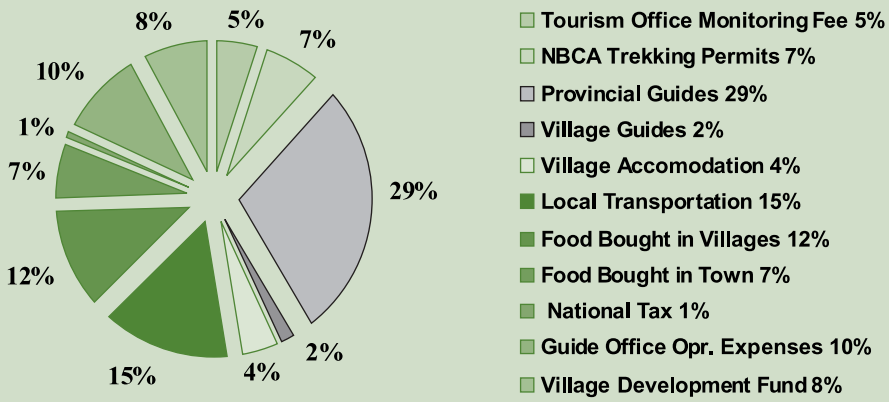
Ecotourism at Louang Namtha - a growing business

- Ecotourism in Louang Namtha has evolved from a "single guest house with activities", to a multi-faceted initiative with a variety of accommodation and activities including trekking and river trips and around the Nam Ha NPA.
- Tourist arrivals increased from 4,732 in 1995 to over 24,700 in 2000.
- 37 guesthouses and hotels have been constructed in four Districts.
- International tourists visit the province for its natural and cultural landscape with 74 percent interested in overnight treks to the NPA with trained local guides and 82 percent interested in guided river trips.
- Based on the survey data, one, two and three-day treks in and around the Nam Ha NPA were developed; currently three treks operate regularly and there is also a one-day boat trip on the Namtha River.
- The Nam Ha Ecoguide service runs the non-profit trekking and river trips, under the supervision of the Louang Namtha Provincial Tourism Office.
- All tourists that go on treks must pass the local "gatekeeper" - the Nam Ha Ecoguide service and hire local guides to ensure that predetermined carrying capacities, environmental, cultural and village operational guidelines are followed.

Revenue Distribution

- All revenue the Nam Ha Ecoguide service generates from the trekking operations is retained in Louang Namtha. Profits are re-invested in small-scale development activities or to expand community-based ecotoursim in the province.
- The gross revenue generated by trekking and river tours from October 2000 – February 2002 was US$ 34,400. Over 2,000 tourists from 38 countries went on treks and boat trips during this 16 month period.

Distribution of Gross Revenues Generated by NHEP Ecotours



Box 11 (continued). Lessons from the UNESCO- NTA Lao Nam Ha Ecotourism Project

Conservation gains from the Nam Ha Initiative

- Conservation advocacy: two road proposals in NPA not authorised by provincial authorities;
- Trekking permit fees: US$3,000 from trekking fees for NPA Mgmt. Unit over 16 months;
- Wildlife threat, resource use monitoring: Guides work with WCS-NPA Mgmt. project;
- Village wildlife and tourism reserves: Ban Nammat Kao has set up a 100 ha reserve, local Akha hunter-guides lead visitors on interpretive trail;
- Ecotourism as a deterrent to outsiders conducting illegal activities in the NPA;
- Ecotourism – Conservation contractual agreements;
- Conservation education and awareness raising; and,
- Potential long term changes in resource use patterns linked to ecotourism income generation.

Source: Schipani and Marris 2002

National Parks and World Heritage Sites

Although the NPA Regulations 2001 allow for national parks, none have been nominated. Lao PDR's NPAs are currently classified as IUCN Category VI – Managed Resource Areas, a label that does not attract immediate interest from tourists or tourism development. In contrast the designations National Parks and World Heritage Sites usually gain the attention of tourists. The phenomenal increase in tourist arrivals at Louang Prabang over the last few years can be, in part, attributed to its inclusion on the World Heritage List. Consideration might be given to reclassifying certain areas as national parks and promoting them as tourist attractions. Similarly a natural area site on the World Heritage List would certainly gain major international interest.

7.7.2 Issues

Ensuring tourism benefits local communities. Tourism has a bad reputation internationally for "leakage" – with much of the payment and profit being made away from the tourism site, even in different countries for international group travellers. Frequently tourist operations import experienced staff from outside the area instead of training local staff. Transport to and from the tourist site is usually undertaken by outside operators. Minimising this leakage is important if local communities are to benefit to the maximum. This is especially important for ecotourism operations in areas where local communities might rely on PA resources for subsistence livelihoods.

Ensuring PA ecotourism benefits conservation. Where ecotourism is associated with a PA or NPA, there is a need to ensure that conservation interests are not devalued, further there should be tangible conservation gains from the presence of the tourist operation.

Capacity. Tourism is growing so fast in Lao that there is an understandable lack of local trained personnel, resources, operating systems, regulations and other basic capacities. For ecotourism associated with NPAs, it is important that capacity is raised at all levels. Community members need training to participate

fully, staff require operations and systems training, the Tourism Authority needs to develop its regulatory capacity, and the NPA management units require capacities to manage and monitor ecotourism activities to ensure that they are compatible with biodiversity conservation.

Carrying capacity. Every nature based tourism operation has an appropriate scale of operation after which it becomes progressively less attractive to visitors. The carrying capacity of ecotourism operations in PAs is an important factor to be determined and then regulated. This is not an easy management undertaking but is important if ecotourism is to be sustainable and continue to provide benefits for local communities and conservation.

7.7.3 Achievements and challenges

Achievements:

- Lao PDR has experienced a major growth in international tourism.
- GoL has moved quickly to draw up a policy and strategy framework for tourism and ecotourism.
- GoL has recognised the potential for NPAs to attract ecotourism operations and for them to contribute to local community livelihoods.
- Ecotourism operations have been established in or associated with several NPAs dispersed over the whole country.

Challenges:

- The need to ensure that tourism benefits the area where it is taking place and that ecotourism operations benefit not just the local community but also engender conservation benefits for any associated NPA as well.
- To ensure that ecotourism operations do not become too successful or too many are established in one area such that they exceed the nominal carrying capacity.

7.7.4 Strategies

Review of Lao PDR ecotourism Initiatives

Ecotourism development is a government priority and there are several initiatives underway, in addition to the well-known Nam Ha project. A review of the lessons learned would provide practical guidance to provincial governments in promoting PAs as tourism destinations.

Regulatory framework for ecotourism

Sustainable tourism development is about balancing growth with the use and conservation of resources in such a way that those resources remain intact and available for succeeding generations. Governments, and particularly small governments, can be subjected to pressure from developers to choose projects at scales inappropriate to local conditions. In most countries the success of tourism is measured by indicators such as numbers of tourist arrivals, length of stay, hotel rooms built, restaurants opened and money spent. Yet, there is a growing awareness that sustainable nature based tourism requires a broader range of indicators concerned with community welfare, bringing local benefits and maintaining natural attributes.

The PAD Review regional report sets out important strategies for consideration in the planning and management of ecotourism ventures associated with NPAs in Lao PDR (ICEM 2003e).

7.8 Road development and protected areas

7.8.1 Status

Extent of road network

An Infrastructure Development Program is one of GoL's eight priority programs for national development. Improving communication is seen as a priority component of alleviating poverty. Roads and secondarily rivers are the important means of transport within the country. The total length of the road network is not great. In 2000, the total was 25,090 km of road, of which 3,897 km were tar-sealed, 5,315 km gravelled and 15,877 km seasonal earthen road (NSC 2001a). While the primary inter-provincial network is relatively well developed, the secondary intra-provincial network is poorly developed. For example, in 1998 nearly 70 per cent of villages in the relatively well developed province of Louang Prabang had no road access (IRAP 1999).

Road access to remote areas

Many isolated rural communities and most government officials consider roads as synonymous with development and eagerly promote them in development plans. Yet in PAs and remote communities in undeveloped and resource-rich areas, often the experience with roads has been negative and inequitable for the communities themselves and for conservation values (Box 12). According to a recent GoL study, the poorest rural residents ranked the value of "roads/access to markets" only 8th out of 12 potential measures to relieve their poverty (NSC 2001b).

The communications needs in remote parts of Lao PDR including PAs should be carefully assessed before commitments to road infrastructure are made. For example, it was found that all the villages near the Vietnam border in the Nakai Nam Theun NPA and the proposed Northern Extension (Box 2) did all their trading across the border and not to their district town (IUCN 1997b).

Box 12. Consequences of roads in protected areas and remote resource-rich areas.

Most roads can have serious negative impacts on biodiversity, and often on PA residents through:

- Increased extraction of forest products by outsiders;
- Increased export of forest products by PA residents;
- Increased likelihood of illegal logging and agricultural plantations;
- Increased conversion of forest to cash-crop agriculture by PA residents, in response to market access;
- Increased settlement in PAs along the roads;
- Loss of habitat from construction and subsequent erosion;
- High maintenance costs;
- Improved access for hunting by outsiders;
- Affect on local peoples' perception of government commitment to conservation of the area;
- Increased burden on PA staff in controlling access and use.

Source: Adapted from IUCN 2000a; Robichaud et al. 2001

Roads for logging, security, communication or development projects increasingly affect NPAs in Lao PDR (Flint and Chantavong 1998). Some are proposed or constructed by the central government (e.g. a planned national road through Phou Dene Din NPA in Phongsaly), while others are constructed by provinces, military or parastatal development companies. Local roads have been built into some NPAs without consultation with either DoF or the NPA Head (Robichaud et al. 2001).

Cross-sectoral initiatives

The Ministry of Communications, Transport, Post and Construction (MCTPC) acknowledged cross-sectoral planning and management responsibilities in setting up an Environment Unit within the Department of Roads which has developed EIA and EMP Guidelines. Also, the Department has drawn up four provincial environmental inventories to assist in planning its road construction program (IUCN 1997, 2000a, 2000b, 2000c).

7.8.2 Issues

Need to improve the road network for development needs. There is a major requirement to improve access and communications to remote villages. If done properly this can bring major benefits to remote and poor communities and play a major role in poverty alleviation. Much more attention needs to be paid how to do this without negatively effecting local communities and associated PAs or resource rich areas.

Inadequate road planning. Ill-conceived or inadequate road planning often brings undesired results (Box 12). This is partly because development that follows ad hoc road construction is itself ad hoc (induced development rather than planned development) and therefore more likely to have negative consequences than positive.

Roads need to be seen as a facility which serves carefully considered, integrated development plans and which are designed to a standard appropriate to the local situation. This concept of roads as "serving" well planned development, rather than roads "driving" ad hoc development needs to be widely adopted if sustainable development is to be achieved.

Sediment-laden run-off to streams and rivers. Road construction and poorly maintained roads are major contributors of sediment to rivers and streams and thus poor water quality. This is especially so in mountainous terrain where only well engineered and maintained roads avoid generating sediment-laden run-off.

Absence of, or inadequate Environmental Impact Assessment. Environmental Impact Assessment of road proposals is being introduced but is not yet widespread in Lao PDR. EIA is usually limited to primary roads and when development aid is involved. Even then, the standard is often below what is needed to fully assess indirect impacts and to implement appropriate mitigation. Major roads require a strategic or regional environmental assessment rather than the conventional EIAs that tend to be narrowly focused on-site specific concerns.

7.8.3 Achievements and challenges

Achievements:

- MCTPC has established an environment unit, is developing EIA and EMP guidelines, and in four provinces has drawn up environmental inventories to assist its road construction program.
- Environmental Impact Assessments of road construction and road upgrades has been introduced.

Challenges:

- Provision of roads to PAs and remote, resource rich areas that benefit both the PAs and local communities while avoiding the usual negative impacts of new roads to such locations.
- Establishing well engineered and well maintained roads in difficult terrain, which minimise sediment-laden runoff.
- Institutionalising adequate EIAs and a high standard of environmental management of construction and mitigation activities.
- Appropriate mitigative actions will often raise the cost of roads considerably.

7.8.4 Strategies

Integrated infrastructure development planning

Roads to remote areas and especially to or near PAs should not be undertaken for the sake of providing the road, but only as a component of an integrated development plan by provincial and district authorities. Such plans need to be designed to minimise or prevent the negative impacts, which have commonly been associated with such roads.

Appropriate specifications

Not all roads in remote areas need be built for heavy transport or indeed cars. Where roads must be built in vulnerable areas, their impacts can be limited by ensuring that the road is designed and built to meet its specific objectives. Thus where facilitation of local communication and administration is the main objective, a road may need to accommodate only motorcycles and two-wheeled tractors, with the limitations being enforced by the width of culverts and the sharpness of corners.

Improved environmental assessment and mitigatory action

A component of a good integrated development plan will be an EIA of a high standard which has a regional perspective and which assesses the indirect impacts of new roads. For instance the possibility of villages relocating to be immediately adjacent to roads – a common problem in certain parts of Lao PDR (Box 13). Mitigatory measures such as the provision of spur roads to villages, completion of land allocation prior to construction and the identification of suitable alternative village locations need to be considered and enacted as part of road development. Another example - appropriate mitigation for a road into an important PA is the provision of additional PA staff and forest police necessary to protect the newly accessible resources. The cost of mitigation and the manner in which it is implemented should be agreed prior to approval of road construction.

Box 13. Road induced impacts: Highway 13, Oudomxay

Forest encroachment has increased rapidly since the upgrading of Highway 13. A cluster of villages are now located immediately alongside the road on both sides that did not exist as recent as three years ago. Further to the north there is a group of villages where Moung ethnic groups have resettled from their original home area in Dien Bien Phu in Viet Nam some 50 years ago. The Village Council Leader in Tha Bou village confirmed that the road construction has led to several environmental impacts, including the decrease in freshwater fishery stocks through direct and indirect effects – freshwater riverine fishery no longer plays any major role in the food security capacity at the village level.

Source: RETA 2001

7.9 Trade, industry and protected areas

7.9.1 Status

In 2000, industrial activities (manufacturing, construction, electricity and mining) accounted for 22.4 percent of GDP and were growing at 7.6 percent annually. Currently, industry has limited or no implications for NPAs. Trade, however, specifically wildlife and NTFP trade, has major implications for all PAs and their long-term biodiversity and development values (Robichaud et al. 2001).

Baker et al. (2000) give a concise overview of the dynamics of NTFP exploitation in Lao PDR and neighbouring countries (Box 14).

Box 14. The dynamics of NTFP and wildlife exploitation

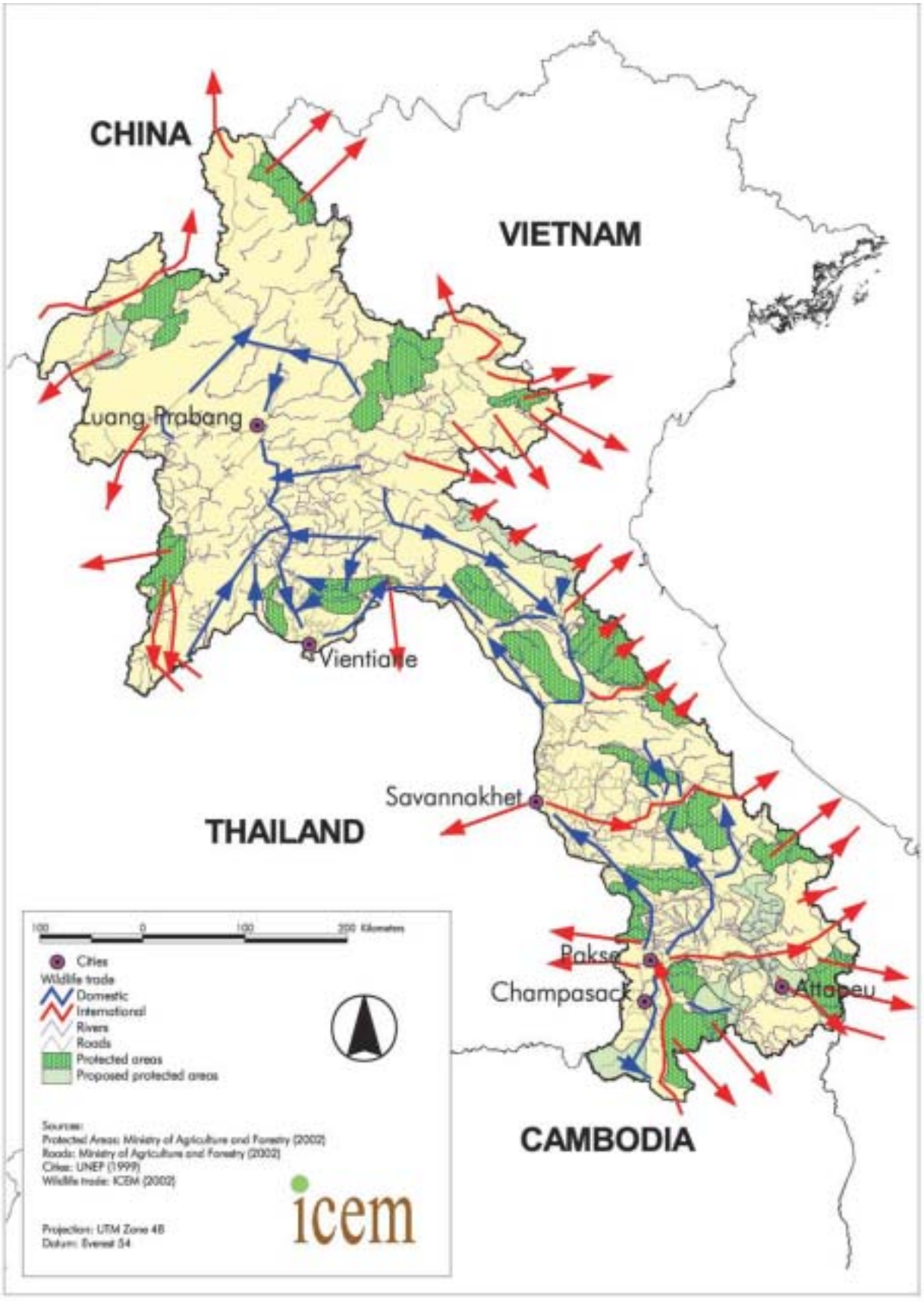
"Non-timber forest products, such as rattan, Eaglewood (*Aquilaria*) and wildlife, have already been severely depleted...and in many cases local residents did not benefit from the exploitation of these resources. High levels of demand for NTFP products and improved transport access over the past decade have facilitated greater organisation and commercialisation of NTFP harvesting and trade. In addition, increasing government control over access to these resources has facilitated unsustainable practices... In cases where traditional use of natural resources is threatened by increasing competition for those resources (e.g. poaching wildlife, increased NTFP collection), local residents often abandon their traditional use guidelines in an effort to benefit from the resources before outsiders deplete them. A perception by local residents of even minor erosion of their mid- or long-term stewardship of natural resources often precipitates unregulated harvesting. This dynamic has resulted in significant pressures on wildlife and NTFPs. In addition, exhausting these resources effectively deprives local residents of their safetynet and any opportunities to benefit from more sustainable management of these resources. This effective 'displacement' often forces local residents to venture further into the forests."

Source: Baker et al. 2000

Numerous NPA survey reports have cited the harvest of wildlife for trade, often by outsiders, as one of the main threats to the biodiversity of NPAs. Some species are almost lost from Lao PDR, e.g. rhinos and the turtle *Cuora trifasciata*; (Robichaud et al. 2001; STEA 2002). Duckworth et al. (1999) report that "trade-driven hunting is the major factor pushing wildlife species in Lao PDR to extinction. Among such species, very few of the mammals and reptiles are not traded internationally".

The trade targets animals valued in traditional Chinese medicine. Wildlife valued for meat is also killed for sale to Thailand. Consequently, the problem tends to be most severe in NPAs on or near international borders. Proximity to a border makes it easier to move animals out of the country to markets in China and elsewhere, and it also allows direct poaching by foreigners who cross the border on forest trails (Map 4; Nooren and Claridge 2001).

Map 4. Known wildlife trade flows from Lao PDR



7.9.2 Issues

Wildlife trade. The wildlife trade is highly significant and increasing. It seriously threatens the natural systems that NPAs were established to conserve. NPA staff have virtually no control over trade through lack of capacity.

Convention on International Trade in Endangered Species. Lao PDR is not a signatory of CITES. Refer to table 5 and sections 6.3.3 and 6.4 for discussion on this issue.

7.9.3 Achievements and challenges

Achievements:

- GoL has introduced regulations identifying two classes of protected species.
- GoL is undertaking a comprehensive Biodiversity Strategy and Action Plan, which is addressing wildlife trade.

Challenges:

- To address the wildlife trade issue in a way that does not impinge on the subsistence needs of villagers and before trade drives species to extinction and irreversibly degrades the natural systems of NPAs.

7.9.4 Strategies

Cross-border cooperation

While domestic trade and use of wildlife is significant, the cross-border wildlife trade is far more serious in its extent and impact. It has been the practice to address this issue by calling for better cross-border cooperation between PA authorities and there have been several initiatives in Lao PDR fostering this approach. However, now it is generally agreed that scarce resources and manpower are better used in:

- strengthening PA management;
- enforcing regulations; and,
- strengthening border patrol and control in remote forested areas.

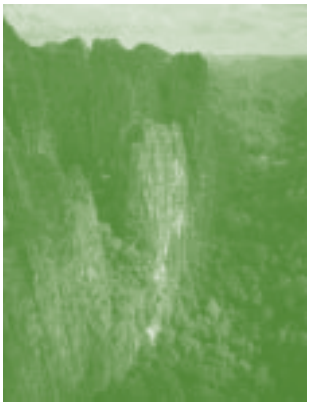
The last of these strategies calls for military involvement in NPA management, which already exists in certain NPAs.

Regional trade cooperation

The wildlife trade in the lower Mekong region is a regional issue requiring greater regional recognition and collaborative action. There are several regional trade initiatives, sponsored by ASEAN and others intended to foster and increase trade between neighbouring countries. These agreements should be extended to deal with the problem of wildlife trade.

CITES

Lao PDR should join CITES but not as an immediate priority. Each of Lao PDR's neighbours are parties to CITES and will need to introduce domestic regulations to meet CITES obligations whether or not Lao PDR is a member. So Lao PDR should concentrate resources on combating the trade as a domestic issue. This will require more resources for traditional PA management – including additional staff, training, regulations and enforcement.



Part 5: Protected Areas as Productive Assets for Economic Development

8 Priorities for action

This concluding chapter focuses on four issues of particular significance to the management of Lao PDR's PAs. These are:

1. the crucial need for properly coordinated rural development and with it the important difference between integrated conservation and development needs at the local and provincial levels;
2. hydropower, one of Lao PDR's few resources with major development potential;
3. the capacity constraints facing PA management; and,
4. the key role of donor assistance.

8.1 Integrated conservation and development – The local and provincial distinction

8.1.1 Villager livelihoods and protected areas

Experience over the past decade in Lao PDR is replete with examples of the close relationship between rural livelihoods and natural resources whether they be forest or wetlands. The more remote and impoverished the village, the closer the relationship and, for the poorest in the village, the greater the dependence. What is just as clear is that unless the relationship is founded on sustainable harvesting levels, the safety net of natural resources will be lost. And this is happening in many parts of the country where forests, wetlands and NTFPs are in serious decline. There are many reasons for the negative trends - growing aspirations in a time of peace after many years of upheaval, fallout from the South East Asian economic crisis, significant improvements in road access, and cross-border market demands are some. The repercussions will be felt most seriously by the poorest of the rural poor at a time when Lao PDR is desperately trying to alleviate poverty.

Protected areas, if managed properly, have a major role in sustaining village livelihoods and providing a natural resource safety net in times of hardship. In the Lao context, protected areas are critically important, as `vulnerability' becomes a key measure of poverty. This essential development role of the national protected areas system relates to any area where communities and outsiders respect conservation measures to sustain natural systems. NPAs are certainly important. Over 1100 villages (or around 18 percent of all the villages in Lao PDR) are within 5km of an NPA boundary. Yet, it is the other forms of protected areas which are expanding to effect increasing numbers of rural communities – from the traditional village forests of some ethnic minorities to the Frog Conservation Area of Thonglunoi village, Salavan; from the Fish Conservation Zones in Champassak to the Protected Fish Pools of the Khammou in Oudomxay, and from the Malva nut groves in Dong Hua Sao NPA to the individual Yang trees *Dipterocarpus alatus* of Champasak.

In Lao PDR, the immediate issue for conservation is not improving living standards through incentives and increasing income generation, rather it is the maintenance of a safety net for vulnerable sections of the community. There is a belief in some quarters that sustainable harvesting of natural resources, specifically NTFPs, will be the engine for propelling impoverished rural communities out of poverty into the economic mainstream. For most rural communities there is little chance of this happening. The vision is too optimistic. On the other hand, the reality is that, if natural resources are not harvested sustainably, then rural

communities will become hopelessly more vulnerable and impoverished. The emphasis is subtle but important and underpins management of all types of protected areas in Lao PDR. It provides a framework for ICDPs and determines the critical significance of co-management of natural resources by communities.

8.1.2 ICDPs – Site-specific local solutions

PAs in many developing countries have been established and managed to the detriment of local communities. The clear intent of Lao PDR's policy has always been for NPAs to contribute positively to the livelihoods of local communities and stakeholders with an emphasis on cooperation, rather than marginalisation, confrontation or resettlement.

While the vision has been clear, achieving the vision through pilot projects and the introduction of implementing policies and management has faced considerable difficulties. Even with generous ODA, only stuttering progress has been made in identifying promising initiatives and there is no sign of replicable models for NPA management. In the most successful ICDP/co-management initiatives, NPA management has not been the main focus but NTFPs, local fisheries and ecotourism. In principle, the potential to underpin PA management through the ICDP approach should be made easier following decentralisation now that the focus of management is at the local level. In practice, the challenge will be the acute capacity constraints, especially at the PAFO and DAFO levels.

The difficulty of establishing district and provincial level institutions which can foster direct linkage between conservation and development in Lao's evolving administrative system has been pervasive. There have been some successes in co-management, such as those in the Biodiversity Conservation Project in Dong Hua Sao and Phou Xian Thong, but the main innovations have not been sustained and have had no influence on the national system.

Following the regional financial crisis and severe macroeconomic problems within Lao PDR, GoL's policy concerning NPA projects appeared to harden. Those projects with international assistance were expected to focus more on the development of affected communities than on conservation, in spite, or perhaps because of the lack of ICDP success in meeting conservation objectives of NPAs. However, Lao PDR's experience with ICDPs is not an isolated case. Similar problems with achieving conservation goals through local development have been experienced in many parts of the world, including Indonesia, which had the advantage of a longer established PA system (Box 15).

Box 15. ICDPs – the Indonesian experience

During the 1990's, ICDPs were the favoured approach to conservation in Indonesia. While some individual ICDPs have been promising, they have not had any significant impact on conservation success, and they did not prove sustainable. The main problem lies in a seemingly incomplete approach to PA management. Indonesian ICDPs focused on local communities as the primary threat to protected areas and biodiversity, whereas in fact, the major threat is from large-scale provincial plans such as road construction, mining, logging concessions and resettlement. At the same time, ICDP efforts to establish incentives for conservation by investing in local development were often frustrated by inadequate law enforcement and expropriation of natural resources by outsider interests.

Based on Wells et al. 1999

ICDP approaches are certainly an important conservation management tool, but they are only ever likely to work in specific circumstances. ICDPs have not targeted the most serious issues confronting NPA management found at the provincial or national level. More attention needs to be focused on developing and/or strengthening some of the conventional PA management tools. Essential among these are institutional development and enforcement, and equally important, inter-sectoral coordination and regional planning.

8.1.3 Integrated conservation and development planning – a provincial imperative

The focus of ICDPs worldwide and especially in Lao has been at the local level, in bringing development benefits to needy communities in exchange for conservation benefits, but the primary need is for ICDPs at the provincial level, in the form of inter-sectoral conservation and development planning.

There are three basic reasons why it is especially important at this time in the development of the country to integrate conservation and development at the provincial level:

1. It is at this level (or higher) where the principal threats to the NPA system are likely to originate – for example, roads, hydropower and timber or NTFP concessions.
2. If PAs are to be acknowledged by government as productive assets for economic development, it is at the provincial level where this acknowledgment will likely pay significant dividends.
3. It is a pragmatic response to the current major capacity constraints in the government's administrative system. Developing a highly trained and motivated NPA management team will be ineffective if there is no capacity and support at the provincial level – this has been a key lesson of recent experience (ICEM 2003c).

Most, if not all provinces have Provincial Rural Development Committees which have an increasingly important role in coordinating and implementing development, supported by provincial planning offices, and these can deal directly with protected area, buffer zone and biological resource issues (Chape 2002). These Committees could play a major role in facilitating integrated provincial development planning.

Traditionally, Lao PDR's main line ministries have been very hierarchical and narrowly focused on their goals and production targets. In these circumstances, cross-sectoral planning tends to be difficult to achieve, especially at the provincial level where some line ministries have a revenue generating mandate and where PAs are relatively new management concerns. Plans to establish and/or manage PAs may overlap with sectoral development plans at many different levels of planning. Factors which need to be taken into account include spatial constraints on permitted activities (e.g. land use zoning); restrictions on exploitative activities within PAs and surrounding areas (e.g. logging operations, mining permits, river flow regulation and NTFP collection); and on the location and scale of infrastructure developments (such as dams, roads, power transmission systems and pipelines; ICEM 2003b).

To integrate all these factors, appropriate planning mechanisms are required. Given the broad values of PA resources and systems for national, regional and local development (including water, energy, genetic resources, NTFPs, timber and tourism) and their extensive spatial coverage, PAs could provide the impetus for initiating the necessary landscape wide planning processes with provincial government taking a leading role.

8.1.4 Population movement

Lao PDR has a history of a relatively mobile population for a variety of reasons including spontaneous movement, infrastructure projects, government direction and civil unrest (Sisouphanthong and Taillard 2000). Demographics are critical to the success of protected areas and development policies and policies on migration are increasingly important. The size and density of populations in any local area will determine the set of management policies needed to conserve a PA, and what is feasible in terms of levels of

community use. ICDPs have attracted migrants to the target areas and in so doing, defeated their conservation and sustainable use objectives. Currently the government does not have a population policy dealing with growth, migration and regionalisation. It needs one that caters to the maintenance of PA development values.

8.2 Capacity constraints and protected area management

If there is one issue in Lao PDR that dominates a review of this kind, it is the lack of capacity. At the provincial and district level, the lack of capacity takes the form of:

- lack of personnel assigned to PA and conservation management;
- very low individual skills relative to PA management needs, especially in linking conservation and development objectives;
- lack of equipment, transport and facilities; and,
- lack of recurrent and development funding.

This lack of capacity is by no means restricted to PA management but extends to all arms and levels of the government. Given the circumstances of Lao PDR's under-development, its position as one of the poorest countries in Asia, and the government's priority requirements in other sectors, attracting a greater budget and staffing allocations can be achieved if PA's can be shown to be productive assets that sustain economic and social development. This is the crucial area of advocacy needed if PAs in Lao PDR are to avoid piecemeal disintegration and decay.

Provision of equipment and improving personnel skills are fields in which the donor community must continue to play a significant role. However, donors need to learn from some important lessons of the considerable assistance provided for NPA and natural resource management in Lao PDR in recent years.

8.3 Donor assistance

From the outset, donors have played a key role in assisting GoL in PA development and, despite a lull in support in the past two years, will continue to be an essential partner in this field. Yet, there is little chance of protected area management progressing unless donors and government seriously address the lessons of past ODA supported projects to NPAs and natural resource management in Lao PDR.

A thorough review of aid to the environment and natural resource sectors would be revealing and should be undertaken, even though many of the problems are already known. Criticisms levelled at ODA in Lao PDR are common to aid projects the world over, yet they are constantly ignored. They include, for example, selection of projects to satisfy the agenda of donors rather than of recipient governments, short project duration, over design and too technical, too heavily reliant on expatriate input and reliant on models developed elsewhere without due cognisance of the practicalities in Lao PDR.

The most successful projects have been focused at the local or provincial level, modestly funded and modestly reliant on expatriate technical expertise, designed to be adaptive (i.e. project design is not an inflexible blueprint) and targeting capacity strengthening through human resources rather than "hardware" (such as technical equipment, facilities, and transport). A review of the ODA to PA and natural resource management would bring the necessary attention to these issues and a greater concerted effort in addressing them.

In the absence of adequate resources, Lao PDR will need to be innovative in attracting international financing if PAs are to be maintained. Among the most promising approaches are:

- trust funds;
- greenhouse gas emissions and carbon sink agreements under the Climate Change Convention;
- export of water; and,
- debt for nature swaps.

8.4 Hydropower

The government supports watershed protection as a fundamental part of its strategy to develop the country's hydropower potential, to provide a source of energy for export sales to neighbouring countries as well as to supply domestic needs. In so doing, GoL has pioneered the use of a hydropower levy to assist in PA management where the catchment is within a PA. This is a wise move not merely as a source of funds for PA protection, but as an insurance and investment in the long-term operation of the hydropower project.

Independent or joint venture partners will construct many of Lao PDR's hydropower projects. The nation will usually inherit full ownership and revenue collection after 20 or 30 years. Therefore, to safeguard Lao PDR's own development interests, concession agreements need to have the long-term efficient functioning of the dam as a key objective. The interests are not solely hydropower but include the other benefits which dams can contribute, such as irrigation, flood amelioration, reservoir fisheries and municipal water supplies. The need is to ensure optimum catchment management. Sedimentation is a real issue (for instance in the case of the Nam Ngum) and the nation is vulnerable where Build-Operate-Transfer projects are concerned. The negative effects are always likely to be felt after the 20-30 year period when handover to the government is made.

Collection of hydropower levies can greatly assist in ensuring good catchment management and it is an appropriate method of acknowledging (or paying for) the environmental services being provided. The challenge is in setting payments at levels appropriate to the need and managing them in a fair and transparent manner which ensure they go to catchment protection. Lao PDR needs to provide a legislative basis for this "user pays" arrangement applying it to all forms of protected area and catchment conservation practices.

A fixed percent of the hydropower revenue being dispersed to the provinces or districts involved would be a sensible approach, provided there is clear guidance in the legislation or its dam-specific regulations, for how the levy can be used. PA management would be an important recipient in such cases. Currently, the NPA Regulations 2001 make provision for a Development Fund specifying NPA-associated activities in a general manner. This is a clear indication of how GoL wants these funds to be spent.

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Abbreviations and Acronyms

ADB	Asian Development Bank
ASEAN	Association of South-east Asian Nations
BCP	Biodiversity Conservation Project
BSAP	Biodiversity Strategy and Action Plan
CBD	Convention on Biological Diversity
CF	Conservation Forest
CITES	Convention on International Trade in Endangered Species
CNPPA	Commission for National Parks and Protected Areas
CPAWM	Centre for Protected Areas and Watershed Management
CPI	Consumer Price Index
CUZ	Controlled Use Zone
DAFO	District Agriculture and Forestry Offices
DANIDA	Danish International Development Agency
DFRC	Division of Forest Resources Conservation
DLF	Department of Livestock and Fishery
DoF	Department of Forestry
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
FAO	United Nations Food and Agriculture Organisation
FINNIDA	Finnish International Development Agency
FOMACOP	Forest Management and Conservation Project
GDP	Gross Domestic Product
GEF	Global Environment Facility
GNP	Gross National Product
GoL	Government of Lao PDR
GSD	Geological Survey Department
GWh	Giga Watt Hour
ha	Hectare
ICDP	Integrated Conservation and Development Project
ICEM	International Centre for Environmental Management
ILO	International Labour Organisation
IMF	International Monetary Fund
IRAP	Integrated Rural Access Project
IUCN	The World Conservation Union
LSFP	Lao Swedish Forestry Project
LUP/ LA	Land use planning and land allocation
MAF	Ministry of Agriculture and Forestry
MCTPC	Ministry of Communications, Transport and Post
MIH	Ministry of Industry and Handicraft
MoA	Ministry of Agriculture
MOU	Memorandum of Understanding
MRC	Mekong River Commission
MW	Megawatt
NAFRI	National Agriculture and Forestry Research Institute
NBCA	National Biodiversity Conservation Area
NEPL	Nam Et Phou Loei National Protected Areas
NGO	Non Government Organisation

NOFIP	National Office of Forest Inventory and Planning
NPA	National Protected Area
NSC	National Statistics Centre
NTFP	Non-timber forest product
NUOL	National University of Laos
ODA	Official Development Assistance
PA	Protected Area
PAFO	Provincial Agriculture and Forestry Offices
PDR	People's Democratic Republic
PM	Participatory Management
PPA	Participatory Poverty Assessment
RETA	Regional Environmental Technical Assistance (ADB)
Sida	Swedish International Development Cooperation Agency
STEA	Science, Technology and Environment Agency
STENO	Science, Technology and Environment Organisation
TEV	Total Economic Value
TPZ	Totally Protected Zone (of an NBCA)
UN	United Nations
UNDP	United Nations Development Programme
WCPA	World Commission on Protected Areas
WCS	Wildlife Conservation Society
WRI	World Resources Institute
WSSAP	Water Sector Strategy and Action Plan
WWF	World Wide Fund for Nature

Annex: Map data derivation and sources

Protected Areas	Ministry of Agriculture and Forestry (2002)
Proposed PAs	ICEM (2002). Digitised by ICEM from Duckworth J.W., Salter R.E. and Khounboline K. compilers (1999). *Wildlife in Lao PDR 1999: Status report.* IUCN, WCS and CPAWM.
Cities	UNEP (1999)
Roads	Ministry of Agriculture and Forestry (2002)
Rivers	Ministry of Agriculture and Forestry (2002)
Land use	Ministry of Agriculture and Forestry (1997)
Population	Ministry of Agriculture and Forestry (2002)
Provinces	Ministry of Agriculture and Forestry (2002)
Villages	Ministry of Agriculture and Forestry (2002)
5-km buffer zone of influence	ICEM (2002)
Poverty	Poverty indices data was supplied by UNEP based on work performed by the Stockholm Environment Institute. Indices were developed at district level using "consumption-based" poverty measures. Refer to the SEI report for further details: *Strategic Environmental Framework for the Greater Mekong Subregion.* PP57 Volume 1. SEI, ADB. March 2002.
Wildlife trade	ICEM (2002). Digitised by ICEM from Nooren and Claridge, 2001.

Land use

Land use categories for each country have been generalised to achieve cross-country land use categories, as detailed below:

Old land use	New land use
Agricultural hill fields	Agriculture
Agricultural land	Agriculture
Agricultural plantation	Agriculture
Agricultural wetland rice	Agriculture
Bamboo	Other vegetation
Barren	Barren
Barren land	Barren
Cloud	Unclassified
Coniferous forest	Forest
Cropping mosaic, cropping area <30%	Agriculture
Cropping mosaic, cropping area >30%	Agriculture
Deciduous	Forest
Deciduous forest	Forest
Deciduous mosaic	Forest
Dry dipterocarp	Forest
Evergreen forest	Forest
Evergreen mosaic	Forest
Evergreen, high cover density	Forest
Evergreen, medium-low cover density	Forest
Forest plantation	Plantation
Grassland	Other vegetation
Habitat mosaic	Other vegetation
Industrial crops	Agriculture
Inundated	Wetland
Inundated mosaic	Wetland
Limestone forest	Forest
Limestone karst without forest	Barren
Lower mixed deciduous forest	Forest
Lower-dry evergreen forest	Forest
Mangrove	Wetland
Mangrove plantation	Plantation
Melaleuca forest	Forest
Mixed (evergreen and deciduous) medium-low cover density	Forest
Mixed (evergreen and deciduous), high cover density	Forest
Mixed broadleaf and coniferous forest	Forest
Mixed mosaic	Other vegetation
Mixed timber and bamboo	Other vegetation
Natural mangrove	Wetland
Natural regenerating forest	Forest
Other	Unclassified
Other agriculture	Agriculture
Plantation forest	Plantation
Plantations	Plantation
Pure bamboo	Other vegetation
Regrowth	Other vegetation
Regrowth, inundated	Wetland
Rice paddy	Agriculture
Rocks	Barren
Sand dunes	Barren
Savannah	Other vegetation
Scrub	Other vegetation
Scrub with scattered trees	Other vegetation
Seasonally inundated grassland	Wetland
Semi-deciduous forest	Forest
Semi-natural melaleuca	Forest
Swamp	Wetland
Unclassified	Unclassified
Unstocked forest	Forest
Upland agriculture	Agriculture
Upper mixed deciduous forest	Forest
Urban	Urban/industrial
Urban or built-over area	Urban/industrial
Urban/industrial	Urban/industrial
Water	Water
Water body	Water
Wetland	Wetland
Wood- and shrubland, dry	Other vegetation
Wood- and shrubland, evergreen	Other vegetation
Wood- and shrubland, inundated	Wetland

Government of
Lao PDR

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.

This volume is one in a series of eight publications resulting from the PAD Review (which also includes a CD-ROM):

- Cambodia National Report
- **Lao PDR National Report**
- Thailand National Report
- Vietnam National Report
- Regional Report
- Lessons learned in Cambodia, Lao PDR, Thailand and Vietnam
- Lessons from global experience
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