

Chapter 6. Lao PDR

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Lao People's Democratic Republic

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SUMMARY

The Lao People's Democratic Republic (Lao PDR) is one of the most biodiversity-rich countries in Southeast Asia. Historically, a small population and low rate of natural resource exploitation (relative to neighbouring countries) has allowed significant natural and cultivated biological resources to survive. In the latter half of the 20th century, however, there was a rapid decline in forests, forest resources and wildlife. Although the LAO PDR Government took action in the 1980s and 1990s to address biodiversity conservation needs, by enacting laws and decrees and establishing a protected area system, loss of biodiversity continues. This can be attributed to limited administrative and management capacities in national and provincial governments, weak enforcement of existing laws and regulations, poor understanding and awareness, lack of integrated approaches to multi-sector development, and failure to address cross-border issues relating to resource exploitation, particularly trade in wildlife.

With little economic diversification, Lao PDR continues to rely on its natural capital to support national development and livelihoods for its people. A concerted effort is needed to develop an integrated approach to biodiversity conservation, because the opportunity to deal proactively with critical issues will soon be lost. Previous initiatives, such as the Tropical Forest Action Plan and National Environment Action Plan, were either sector-focused or not widely adopted for implementation.

Developing a National Biodiversity Strategy and Action Plan (NBSAP) is the beginning of a comprehensive approach. It needs to be recognised as part of an ongoing process that will require continuous monitoring, adjustment and, above all, political commitment. The NBSAP process in Lao PDR is supported by Danida and UNDP.

Key Issues

- Lao PDR still possesses a rich biological diversity that can provide the basis for sustainable national development and village livelihoods.
- Although the government has developed a number of decrees, laws and regulations, and established an ecologically comprehensive protected area system, management capacity, enforcement, and integrated approaches to development remain weak, and biodiversity continues to decline.
- A comprehensive and integrated approach to biodiversity conservation and development is urgently needed.

Biodiversity in Lao PDR

The Lao People's Democratic Republic, formerly Laos, is a land of forests, mountains and rivers. The biodiversity contained in its ecosystems has supported social, cultural and economic development for centuries, both within the country known today as Lao PDR, and in the larger area occupied by the Lao people known as the Lane Xang ("Million Elephants") Kingdom that included much of present-day northeast Thailand. Arable land for rice production has always been limited in Lao PDR, compared to the agriculturally rich areas of the Thai and Cambodian kingdoms; one author commented that "the cultivated land is nothing compared with the extent of the woods" (Tipps 1996). In historical times gold, silver and other minerals as well as a range of forest products were traded (Stuart-Fox 1998). Forest products included sticklac, cardamom, beeswax, ivory, rhinoceros horn, pangolin, porcupine quills, hides and skins and even trained elephants. Traditional trade mechanisms and formal presentation of tribute extended into the 19th century. "By the 1850s Bangkok was receiving annual taxes from the Lao territories amounting to some 10 tons of beeswax, 100 tons of cardamom, one ton of ivory and one ton of silk..." (Stuart-Fox 1998: 136). European explorers of the 19th century noted in their journals the abundance of tigers, elephants, rhinoceros, deer, wild cattle, primates, pea fowl, pythons, and other wildlife — all within forests with "a power and beauty beyond compare" (Tipps: 1996).

In the 1950s forest cover was estimated at 70 per cent; today, pressure on forests and other biological resources is increasing and the amount of forest cover is only around 40 per cent. Although forest cover has declined greatly in Lao PDR, the situation is much worse in neighbouring countries. Lao PDR still retains a substantial amount of forest cover compared with Thailand, China (Yunnan Province) and Vietnam. Northeast Thailand, which was substantially deforested during the middle of the 20th century, has seen the greatest loss. The relatively large amount of remaining forest cover in Lao PDR can be

attributed to a number of factors, including a small population, rugged mountainous terrain over much of the country and government policies to protect watersheds.

Natural forest cover is one basic indicator of biological diversity, and is affected by development. Lao PDR, which has a higher coverage of forest, is also the least developed country in the region. The challenge facing Lao PDR is to improve the socio-economic well-being of its people while sustaining its biological diversity. The reliance on natural resources (most of them forest-based) as trade commodities in local and international economies remains much as it was in the 14th–17th centuries at the height of the Lane Xang Kingdom. The centuries-old reliance of the diverse ethnic groups that comprise the modern state of Lao PDR on biological resources for subsistence is still important today.

The fact that casts a shadow over the future development of Lao PDR is that exploitation of biological resources is clearly unsustainable. The value of wild products has increased, but so has their scarcity and exploitation. Many of the wildlife species that formed the basis of trade and subsistence for hundreds of years are critically endangered; others, such as the rhinoceros, are most likely no longer found in Lao PDR. Similarly, as the value of tropical hardwoods and high value softwoods like hinoki, mai long leng (*Fokenia hodginsii*) and pine (*Pinus merkusi*) continues to increase, so does the pressure to harvest them. The impact of unsustainable logging on ecosystems will have further repercussions on a range of species not specifically targeted for wildlife trade, including the recently discovered saola (*Pseudoryx nghethingensis*).

The biodiversity contained in wetlands, including the Mekong and its numerous tributaries, lakes and ponds, seasonal water bodies and rice fields, also contributes major socio-economic benefits. The commercial and subsistence value of the fisheries alone is enormous. But, again, resources are being harvested unsustainably and are threatened by development.

The cultivated biodiversity of indigenous agricultural plant and animal varieties is also rich. European records in the 17th and 18th centuries noted that Lao rice was “so excellent that I don’t think that it may be possible to find it in other parts of the East”; another noted that “this country produces abundantly the best kind of rice” (Ngaosyvathn and Ngaosyvathn 1998).

The government has developed a number of policies over the past decade to protect the country’s remaining biological diversity. It has also ratified the Convention on Biological Diversity. For a number of reasons, however, effec-

tive implementation of these policies and instruments has not been achieved. The government, in partnership with UNDP and the Danish Government, is about to implement a National Biodiversity Strategy and Action Plan process. The framework provided by the NBSAP is overdue and much needed.

Ecosystems and species diversity

Lao PDR is situated in the Indochinese subdivision of the Indomalayan Realm. MacKinnon and MacKinnon (1986) consider Lao PDR to contain parts of four biogeographic units. Their 'Annam' unit encompasses the Annamite Range and extends across Vietnam to the South China Sea. The other three zones are sub-units of "central Indochina": "tropical lowlands", "tropical montane" and "sub-tropical transition zone". These are shared with Cambodia, Thailand, Myanmar, Vietnam and China. Indochinese fauna include species shared with the Himalayan Palaearctic (in the northern mountainous part of the region), the Chinese Palaearctic (species that have spread along the coast of southern China), the Sundaic subregion to the south, and with northern India through the Assam-Burma transition zone (MacKinnon and MacKinnon 1986). The Annamite Range and the Mekong River are the main natural barriers in the area, forming the limits of the range of a number of species and subspecies.

The wildlife status report (Duckworth, Salter and Khounbolin 1999) produced by IUCN, the Wildlife Conservation Society and the Department of Forestry, states that 319 out of 1140 species included in the review are of national or global conservation significance. This comprises 67 per cent of the large mammals, 53 per cent of the bats, 6 per cent of the insectivora, 14 per cent of the murid rodents, 22 per cent of the birds, 25 per cent of the reptiles and 2 per cent of the amphibians. In recent years a number of new genera and species of mammals (e.g. the Saola and Giant-Antlered Muntjac), birds, reptiles, amphibians and fish have been discovered in Lao PDR, while the known range of many other species has been extended and new species discovered (or, in the case of the Warty Pig, rediscovered). While the invertebrate fauna remains largely unsurveyed it is expected that new discoveries to science would also be made should assessments be undertaken. Similarly, botanical diversity is known to be high but comprehensive surveys need to be undertaken as soon as possible, since the last records were made by Vidal (1960) in the 1950s. This is particularly important given the high economic value of botanical products to commercial and subsistence economies in Lao PDR.

Threats to biodiversity conservation

Declining forest cover

An estimated 85 per cent of Lao PDR is covered by vegetation not under active management, much of which is secondary. The remaining 15 per cent comprises urban areas, permanent agriculture and active shifting cultivation. A 1996 analysis suggests that mature forest (an area with at least 20 per cent canopy cover and a 30-metre canopy) covers an estimated 40 per cent of land; the official figure is 47 per cent. The national forest estate appears to be shrinking at the rate of about 0.5–0.7 per cent per year. There is very little mature forest north of 19° 30'N. The largest and least disturbed blocks of forest are all in or south of the Nam Theun catchment (Stibig 1997). Various factors are causing the decline of forest cover:

- clearing of lowland forest for permanent agriculture;
- logging;
- construction of roads and reservoirs;
- shifting cultivation;
- fires; and
- the use of chemical defoliants during the Indochina War.

Commercial logging has increased significantly since late 1998, especially in the south of the country. Logging was particularly extensive at the end of the 2000 season. Logging has even occurred in a number of designated protected areas; although laws prohibit such activities, government policy and regulations are difficult to enforce. The decentralisation of power to provincial governments and the semi-autonomous operations of regional military development companies make it difficult for the central authorities to communicate policy and enforce regulations. The scale of recent logging threatens the credibility of government policies related to sustainable development and conservation.

As one of the last countries in Asia with substantial reserves of valuable timber, Lao PDR is attracting considerable interest from other countries in the region, particularly Thailand, Vietnam, Malaysia, Korea and Taiwan. Vietnamese contractors have carried out most of the logging; logs are transported to Thailand and Vietnam.

Hunting and wild products

It is one of the natural resource management paradoxes in Lao PDR that biological resources are under threat despite the retention of extensive forest

habitat and a relatively low human population density. Although new species of large mammals have been discovered, wildlife is subject to intense pressure. There is a long tradition of hunting in Lao PDR; rural communities are dependent on hunting and harvesting of wild products to supplement seasonal rice harvests. This is especially important given the vagaries of climate. Most, if not all, taxa of wild vertebrates are used by at least some ethnic groups, either for food, medicine or trade. While most of the ethnic Lao of the lowlands are Buddhists, this seems to have little influence on the exploitation of wildlife, in contrast to some other Buddhist countries (e.g. Sri Lanka, Tibet and Bhutan). Vientiane residents have been observed hunting small birds in the grounds of the city's Buddhist temples. Several non-Buddhist tribes, however, have spiritual taboos against the exploitation of certain species. Some Hmong tribes do not eat or touch snakes, for example, and the Kri have restrictions on killing snakes, canids, bears, cats, elephants, rhinos and wild cattle (Duckworth, Salter and Khounbolin 1999).

Hunting has increased in recent decades, and modern automatic weapons and explosives have had a considerable impact on wildlife populations. Commercialisation and trade in wildlife products has also increased with higher prices and improved access to previously remote areas.

A survey in February 1999 by the IUCN NTFP Project in Ban Nong Hin in Champassak assessed villager perceptions of the impacts of wild product harvesting over the previous ten years. The villagers recorded declines of up to 90 per cent for fish and rattan, 80 per cent for kisi resin, 75 per cent for wild cardamom, 65 per cent for malva nuts and 50 per cent for wild vegetables. These figures indicate an obvious decline in availability and also point to unsustainable levels of harvesting or loss of critical habitats.

The villagers provided no percentage value with respect to wildlife, but a verbal assessment paints a depressing picture:

Ten years ago there was plenty of wildlife: turtles, monitor lizards, deer, snakes, jungle fowl, other birds. You could easily hunt them in your back yard. There was no outside market, no selling. Only our village (nine families) used to hunt. Today, many species have disappeared (turtles, deer, jungle fowl, and birds). You can walk for 48 hours and still not get anything. Market demand is big; prices are getting higher — one mouse deer costs 12,000 kip [about US\$3 at that time]. Many outsiders come to hunt in our forests." (J. Foppes, pers. comm.)

In addition to subsistence use, various wildlife species are sold as food, medicine, pets and for a variety of purposes to buyers within Lao PDR. Until

recently, wildlife meat was openly available — often live — at fresh food markets in provincial capitals and in most district towns, and in restaurants in larger urban centres. Srikosamatara, Siripholdej and Suteethorn (1992) estimated that yearly sales at the major market in Vientiane included 8000-10,000 mammals (more than 23 species), 6000-7000 birds (more than 33 species) and 3000-4000 reptiles (more than 8 species). This adds up to 33,000 kg and US\$160,000 per year.

During the 1990s, increasing control over the wildlife meat trade meant that much activity became clandestine. It is now much more difficult to monitor the volume and species range of trade (Duckworth, Salter and Khounboline 1999). Hunting for the meat trade is higher in years of low rice harvest or other economic stress. This has important implications for design of trade controls and for the role of alternative livelihood development in conservation projects. A study in Saravane Province found that virtually all foods except rice were collected from the forest (Foppes and Ketpanh 2000).

Although much wild meat is consumed within the country, there is also a massive illegal trade of live animals and animal parts into neighbouring countries. Although Lao wildlife has been traded for centuries, trading levels have increased dramatically in recent decades. As wildlife populations decline the value of wild products increases. The last 15 years in particular have seen a large rise, fuelled by increasing affluence in China and, to a lesser extent, Southeast Asia. Villagers in Nakai-Nam Theun NBCA cite 1985 as the year traders and poachers first came over the international border in large numbers (Duckworth, Salter and Khounboline 1999). Donovan (1999) postulates that the economic crisis in Asia has further fuelled the illegal trade in wildlife, as the affluent, in developed Asian countries, increase the demand and encourage middlemen and impoverished villagers to hunt and trade wild species.

A well-organised network in Vietnam takes wildlife, mostly live, to China; much of this comes from Lao PDR. Certain Lao towns serve as important centres for this trade. Live wild animals are also easily moved across the Lao-Thai border. Bears specially ordered for the restaurant market are traded internationally from Lao PDR (Mills and Servheen 1990). The predominant international use of Lao wildlife is traditional medicine. The most valuable products are certain turtles and tiger bones, which are traded to buyers in China. A wide variety of other species are also used, including many which are or were common, such as geckoes, snakes, civets, otters, gibbons and Douc Langurs. The greatest volumes traded are probably in pangolins and turtles. Rhino horn was formerly moved in bulk to Bangkok for resale, but trade in this product is probably now minimal, as regional rhino populations have col-

lapsed. Unless a combination of education and effective enforcement of wildlife regulations is implemented, international trade will contribute to the ongoing decline in wildlife in Lao PDR (Nooren and Claridge, in press).

Agricultural impacts

Agricultural land use affects biodiversity for a number of often inter-related reasons: changing patterns of traditional land and resource use; subsistence and income supplementation by farmers through non-timber forest product (NTFP) use; and commercialisation of agriculture.

Changes in traditional agricultural practices

In many parts of Lao PDR increasing population pressure on available land for shifting cultivation has resulted in declining soil fertility and increased weed infestation through decreased fallow periods. In some areas, however, where traditional fallow practices are maintained, shifting cultivation may be sustainable provided that the population growth rate is stabilised. The government has committed itself to ending shifting cultivation. It intends to achieve this by means of a number of elements:

- using technology to improve the productivity of crops and livestock;
- improving land-use planning at the local level;
- formalising land tenure through a process of land allocation;
- developing alternatives to agricultural income for shifting cultivators; and,
- in some cases, resettling communities.

Fisher (1996) identified a number of issues related to shifting cultivation, some of which have direct implications for biodiversity conservation. Allocating specific areas of land to shifting cultivators for sedentary cultivation is potentially of concern, since it involves an intensification of resource use that may be unsustainable without major additional inputs such as fertilisers. Unless reallocation is accompanied by major effective changes in agricultural technology and provision of alternative sources of income, serious problems will arise.

Sedentary cultivation without adequate fallow areas will not only cause declining soil productivity, it will also not produce the NTFPs that are an important part of household economies and nutrition, especially in years of low rice production. NTFPs have been found to contribute an average 55 per cent of family cash income of villages near forests (Foppes and Ketpanh 1997). In shifting cultivation, the vegetation regrowth in fallow areas acts as

a natural resource buffer. In a sedentary situation, where this buffer is absent, it is not enough just to produce the same volume of rice. There must be considerably more rice to provide cash to replace the lost NTFPs. This results in a greater impact on biodiversity adjacent to the settlement areas as families intensify and broaden their harvest of forest and wetland products to raise income to supplement their rice production. Conservation values are severely compromised where this occurs near or within protected areas. Increasing population levels aggravate this problem.

Encouraging the use of improved technology can cause problems by encouraging farmers to use high-yield crop varieties which require fertiliser and pesticides, and potentially threaten the diversity of local crop varieties, especially in upland areas. Most expensive technology can lead to increased farmer debt.

Commercialisation of agriculture

Commercial crop production is having a detrimental impact on biodiversity values in some areas. It is a trend that is likely to continue as the free market develops further and foreign investment in the agricultural sector increases.

In Champassak Province, for example, commercial coffee production has become an important part of the provincial economy. Buyers from other countries in the region purchase coffee beans from village growers who cultivate their crops in small plots. Coffee is a high-value crop which could contribute significantly to the livelihood of villagers in protected area buffer zones, but it is having a negative impact on the values of Dong Hua Sao National Biodiversity Conservation Area and other remaining forest areas. Because the soil of newly cleared forest is considered the best for coffee production, resident communities within and adjacent to the protected area have expanded coffee cultivation into primary forest. Unless the provincial authorities take management action in consultation with villagers, forests in the protected area will continue to be fragmented.

Large-scale agroforestry is under way, or is planned, in some parts of the country. As well as the direct impact of clearance of natural vegetation, this can result in the alienation of local communities from their traditional resources with increased pressure on nearby conservation forests.

Agricultural pesticide use will have an increasing impact on natural systems unless controls are enforced. For example, DDT and the organophosphate methyl parathion are sold illegally to farmers and villagers (Claridge, 1996) as pesticides and to poison aquatic resources. These extremely toxic chemicals are used without training or protection. In many villages cropland is adjacent

to or linked through food chains to water resources, forests and other natural ecosystems (especially wetlands), so the continuing haphazard use of these chemicals poses a serious threat to biodiversity values as well as human health.

Wetlands and aquatic resources

Wetlands in Lao PDR play an extremely important role in the subsistence and commercial economy of the country. Although wetland resources are important in all parts of the country, they are particularly valuable in the lowlands since much of the lowland forests have been cleared for agricultural use. Wetland resources are important in food security in times of rice deficit as well as an ongoing source of plant products and protein (fish, crustaceans, turtles, frogs, and insects). Wetlands also have an essential role in transportation, flood amelioration, hydropower generation and provision of potable water. Their management is usually complex, involving a number of government agencies as well as local communities.

There are a number of critical issues affecting wetlands, including unsustainable fishing practices, introduction of exotic fish species (i.e. carp and *Tilapia*), hunting and trading of aquatic wildlife and migratory waterbirds, dams, weed infestation (e.g., *Mimosa pigra*), pesticides, pollution and irrigation projects (Claridge 1996).

Policy and laws relating to biodiversity conservation

Article 17 of the National Constitution, adopted in 1991, states: "all citizens must protect the environment and natural resources: land, subterranean areas, forests, fauna, water sources and the atmosphere". Within the last decade the Lao government has developed a number of policies relating to natural resource management and biodiversity conservation. Many of these have been in the context of a national development strategy, as the government acknowledges the links between sound natural resource management and sustainable development. The Economic Policy Framework for 1994-2000 stated broad objectives for natural resources and the environment:

- halt the degradation of the natural resource base;
- maximise the benefits of hydropower;
- improve returns from sustainable management and conservation of forest resources;
- minimise the impacts of tourism on the environment and on cultural heritage;

- promote ecotourism, incorporating the environment and traditional Lao culture into tourism activities;
- ensure sustainable use of forest, land and water resources; and
- conserve biodiversity.

Box 1. Key initiatives in policy and law

Government adopted the Tropical Forestry Action Plan in 1990 (implemented through the National Forestry Action Plan), which was the basis for much of the subsequent forestry sector program. In 1993 it established a national protected area system through Decree 164. The system comprised 18 (later 20) National Biodiversity Conservation Areas (NBCAs), covering about 13 per cent (approximately 30,000 sq. km) of total land area and providing a representative coverage of most of the critical ecosystems in Lao PDR.

A National Environmental Action Plan (NEAP) was adopted in 1994. It recommended development of an environmental policy, a legal and regulatory framework, integration of environmental concerns with the national planning system, and establishment of a national environmental assessment system. With regard to biodiversity, the NEAP stated that government would do the following:

- provide secure access to land for indigenous populations, and provide communities with incentives to manage resources on a more sustainable basis and participate in protection activities;
- develop a legislative framework for wildlife protection and protected area systems;
- implement management plans for NBCAs and survey and review an additional nine areas and four wetland areas to expand the national protected areas system;
- establish a Conservation Trust Fund financed by the international community;
- introduce environmental education and staff training.

In 1995 government signed the Regional Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin.

In the global context, Lao PDR has also signed and/or ratified relevant international conventions and protocols, including the World Heritage Convention (WHC) in 1987 and the Convention on Biological Diversity (CBD) in 1996. Lao PDR has not, however, become party to the Convention on International Trade

in Endangered Species (CITES), which is unfortunate given the severity of the wildlife trade issues facing the country. The government has recently been considering joining the Ramsar Convention on Wetlands.

In order to achieve its policy objectives the government has enacted a number of decrees, laws and regulations, including the Environmental Protection Law (Decree 068/PM) adopted in 1999. Table 1 summarises the key legal instruments relating to biodiversity.

Table 1. Principal legal instruments addressing biodiversity protection

Legal instrument	Key provisions
Decree of the Council of Ministers No. 185/CCM, in Relation to the Prohibition of Wildlife Trade, 21 October 1986	<ul style="list-style-type: none"> prohibits export of all wildlife
Decree of the Council of Ministers No. 47/CCM, on the State Tax System, 26 June 1989	<ul style="list-style-type: none"> lists types of natural resources, including various species of wildlife, aquatic animals and parts thereof and associated resource tax rates and special fees; 67 species or species groups of wild animals are listed
	<ul style="list-style-type: none"> subsistence level users of natural resources are exempted from resource taxes 1996 New Tax law does not list natural resource tax
Decree of the Council of Ministers No. 118/CCM, on the Management and Protection of Aquatic Animals, Wildlife and on Hunting and Fishing,	<ul style="list-style-type: none"> defines wildlife as state property with MAF mandate to manage it (including through awareness programs) 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 (unspecified), 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	<ul style="list-style-type: none"> establishes NBCAs and states that to chase, hunt or fish any species within them is illegal explosives, chemicals, poisons and other substances harmful to wildlife are banned in NBCAs MAF may warn or fine anyone who disobeys the decree, and may confiscate illegal items

<p>Order 54/MAF on the Customary Rights and Use of Forest Resources, 7 March 1996; followed by recommendations 377/MAF on Customary Use of Forest Resources</p>	<ul style="list-style-type: none"> • 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
<p>Decree 1074, Ministry of Agriculture and Forestry, 11 September 1996</p>	<ul style="list-style-type: none"> • prohibits hunting of protected species “such as Asian Elephant, Banteng, Saola, Douc Langur, etc.” • prohibits hunting during a closed (breeding) season, and/or by dangerous methods, and/or by the use of weapons in NBCAs, protected areas and towns • bans wildlife trade, except for research and/or conservation • bans exporting wildlife used for food • PAFO responsible for coordinating with other agencies to collect and register weapons used for hunting
<p>Declaration of the President No. 125/PO on the Forestry Law approved by the National Assembly No. 04/NA on 11 October 1996.</p>	<ul style="list-style-type: none"> • classifies forests into five use types: protection forest (protecting watersheds and preventing soil erosion), conservation forest (protecting and conserving biodiversity), production forest, regeneration forest, and degraded forest land (for tree planting, permanent agriculture, livestock production, etc.). • grants state ownership of and authority to manage wildlife • prohibits possession of wildlife without permission • mandates state to define two categories of protected wildlife • prohibits hunting during a closed season (unspecified) and/or by means of mass destruction • prohibits hunting of and trade in prohibited species, with certain exceptions • states that all guns and hunting equipment must be registered with certificates • Article 46, Part 5 establishes 13 July as Wildlife Day
<p>Decree of the Prime Minister No. 68 on the Establishment and Activities of the Science, Technology and Environment Agency, 21 May 1999</p>	<ul style="list-style-type: none"> • establishes fundamental principles, and makes provision for regulations and other measures for the protection, conservation, mitigation and restoration of the environment • specifically (Art. 2.4) deals with research on the trends of conservation of nature and the environment • Article 3.9 endorses STEA's role in cooperating on, negotiating and signing international instruments

Institutional arrangements

Two principal agencies involved in biodiversity conservation and management in the central government will jointly execute the NBSAP:

- the Science, Technology and Environment Agency (STEA) is responsible for policy, research and international agreements and conventions and is the lead agency for the CBD and GEF; and
- the Ministry of Agriculture and Forestry (MAF), including the Department of Forestry (DoF).

A number of sectoral line agencies also have direct impacts on biodiversity conservation, including the Ministry of Industry and Handicrafts (hydropower development), Electricité du Laos (EdL; transmission lines), and Ministry of Communications, Transport, Post and Construction (MCTPC; transport infrastructure). These ministries have established environment units, albeit with limited capacity and capability. All national ministries operate at provincial and district levels (although STEA has yet to establish its presence in all provinces). Provincial Agriculture and Forestry Offices (PAFOs) and District Agriculture and Forestry Offices (DAFOs), for example, manage national protected areas, within the constraints of their limited capacities. In addition, each province has identified and manages provincial protected forest areas. Rural Development Committees (RDCs) in the provinces coordinate and implement development, supported by provincial planning offices, and often deal directly with protected area, buffer zone and biological resource issues (such as NTFPs).

Table 2 summarises the principal government agencies and some key issues and initiatives (adapted from Azimi et al. 2000).

Table 2. Key government agencies dealing with biodiversity

Responsibilities	Issues	Initiatives
<i>Science, Technology and Environment Agency, Office of the Prime Minister</i>		
Overall coordination; oversight of environmental affairs; environmental management (setting policy and regulatory framework, monitoring state of the environment and compliance with policies and regulations); national CBD focal point	<ol style="list-style-type: none"> 1.Coordination and cooperation with line agencies for effective implementation of policies. 2.Capacity and capability for implementing responsibilities under Decree 068/PM. 	<ol style="list-style-type: none"> 1.Ratification of CBD. 2.Establishment of provincial offices. 3.Decision to prepare BSAP.

<i>Ministry of Agriculture and Forestry</i>		
Forest resource use and management; biodiversity conservation and management, especially for national protected area system; soil resource management; water resource management; fisheries management; livestock and crop production.	<ol style="list-style-type: none"> 1. Capacity to control over-exploitation of forest resources. 2. Capacity, capability and commitment for effective conservation management of protected areas. 3. Integration of biodiversity planning and management with broader physical and socio-economic planning and development, especially in relation to watersheds. 	<ol style="list-style-type: none"> 1. Support for establishment of protected area system in 1993. 2. Establishment of National Agriculture and Forestry Research Institute (NAFRI) and Living Aquatic Resources Research Centre (LARReC). 3. Support for integrated approaches to biodiversity conservation and community development. 4. Support for and participation in BSAP.
<i>Ministry of Industry and Handicrafts</i>		
Hydropower development; industrial environment development; mineral resources.	<ol style="list-style-type: none"> 1. Applying consistent environmental standards to the assessment and development of hydro dams and protection of watersheds. 2. Integrating energy, mining (eg., limestone karst), industrial development with biodiversity conservation and management. 3. Capacity and capability of staff to deal with environmental issues. 	<ol style="list-style-type: none"> 1. Establishment of an environment unit. 2. Application of internationally acceptable standards to the assessment of the proposed Nam Theun 2 hydro dam, including agreement to use dam revenue for biodiversity conservation and management.
<i>Ministry of Communications, Transport, Post and Construction</i>		
Development and management of communications infrastructure.	<ol style="list-style-type: none"> 1. Impact of road construction on forests, wetlands, protected areas. 2. Integration of infrastructure development with biodiversity conservation and management. 3. Low capacity/capability of environment unit staff. 4. Supervision of construction activities at provincial level. 	<ol style="list-style-type: none"> 1. Establishment of an environment unit. 2. Preparation of road EIA guidelines. 3. Preparation of environmental inventories for four provinces to provide baseline information and issue analysis for road sector development.

<i>Ministry of Public Health</i>		
Public health and sanitation; medicinal plants.	<ol style="list-style-type: none"> 1. Conservation and sustainable use of medicinal plants. 2. Effective links to other line agencies responsible for biodiversity issues. 	Establishment of Medicinal Plants Institute.
<i>State Planning Committee</i>		
National development planning; development project and approvals.	<ol style="list-style-type: none"> 1. Effective integration of biodiversity concerns into national development planning. 2. Potential duplication of STEA responsibilities. 	Establishment of a Department of Human Resources and Environment.

Relationship to national development

Overview

In Lao PDR there are fundamental connections between people, economic development needs and prospects, and natural resources. In 1999, the UNDP Human Development Report listed Lao PDR at 140 on the global Human Development Index, down from 138 in 1996. While this is partly due to the Asian economic downturn, it is also an indication that the country's development strategy is seriously hindered (by a small production/export base and an export earning dependency on hydro-electricity, agriculture, timber and wood products). In addition, the country faces increasingly acute capacity problems, resulting from underdeveloped macroeconomic institutions and a serious shortage of skilled workers. Absolute poverty is still widespread in rural areas. These factors have direct implications for biodiversity conservation.

Export earnings

Export earnings are highly dependent on the country's natural resource base. Pressure to exploit those resources — especially water and forests — is likely to increase in the face of increased economic hardship. Logging has increased markedly since early 1999, in some cases within declared National Biodiversity Conservation Areas. This prompted expressions of concern from the World Bank and bilateral donors and resulted in a logging ban in May 2000.

At the same time, the optimistic projections for sale of hydro-electricity to neighbouring countries have not been realized. Thailand, the major potential customer, renegotiated its commitment to purchase 3,000 Mw of power from

Lao PDR by 2010. Its only commitment is to purchase power from the proposed Nam Theun 2 hydro dam. This further reduces Lao PDR's economic options, forcing it to focus more and more on forest reserves as a source of foreign revenue. Since much of the country's natural biodiversity is forest-related, increased harvesting would have a major negative impact.

The 1994 NEAP's biodiversity surveys endorse the establishment of new protected areas, such as Dong Kanthung on the border with Thailand and Cambodia. The lack of progress in implementing this recommendation (except for the addition of Xe Sap NBCA), can be attributed to changing government attitudes to conservation areas and "locking up" forest resources.

Lack of capacity

Low absorptive capacities and skilled manpower affects the government's ability to implement policies and plans relating to biodiversity conservation and resource management, especially with the move in recent years towards increasing autonomy in decision-making at the provincial level. An example of this is the Centre for Protected Areas and Watershed Management (CPAWM), which was "upgraded" in the 1999 reorganisation of the Department of Forestry and Ministry of Agriculture and Forestry to a Division of Forest Resource Conservation. Shortly afterward, the number of staff in the new division — already low — was drastically cut, further compromising its ability to do its job.

Rural underdevelopment

The continuing lack of development in rural areas, where most of the population lives, means that if initiatives to conserve natural resources are to succeed they must be linked to the needs of the nation and those of local communities. This is difficult, especially when centralized natural resource actions do not provide adequate benefits for local communities.

A case in point is Prime Minister's Decree 11, announced in August 1999, which contradicted previous policies that provided benefits from village forestry to local people. It also contradicts the NEAP recommendation to provide communities with incentives to manage resources. The new decree makes it clear that forest resources belong to the state and that profits from harvesting accrue to the state, and not to villagers. The immediate effect of the decree was to undermine the US\$15 million World Bank/Finnida-supported Forest Management and Conservation Project, a five-year initiative to promote sustainable village forestry. Actions like these by the government will not encourage rural communities to sustainably harvest natural resources, espe-

cially in areas where traditional resource use attitudes and methods are breaking down and resources are becoming scarce.

Lack of development planning

There is a lack of, and an urgent need for, strategic regional development planning to integrate resource conservation and sustainable use into broader economic and land-use planning. Despite the recognition that integrated, broad-based planning is fundamental to sustainable development, and notwithstanding the number of stakeholders in biodiversity-related issues (Table 1), coordinated, cross-sectoral development planning is still not occurring. This in turn means that every new development activity is dealt with on an ad hoc basis, and biodiversity consideration are not always taken into account.

Environmental impact assessments (EIAs) are often seen as sufficient to deal with key development issues. They are usually carried out as reactive responses to predetermined development decisions, however, and the quality of the assessments and subsequent monitoring is extremely variable. This is particularly so in EIA procedures for development that affects biodiversity.

There are some important examples of line ministries taking steps to achieve an integrated approach:

- the Ministry of Industry and Handicrafts' comprehensive planning and assessment of the Nam Theun 2 hydropower dam in relation to the Nakai-Nam Theun National Biodiversity Conservation Area (in cooperation with other ministries and the World Bank); and
- the Ministry of Communication, Transport, Post and Construction's environmental inventories of four provinces to provide a baseline for road infrastructure development.

In terms of NBCAs, implementing an effective integrated planning process at all levels of decision-making is essential to the system's long-term viability. Given the importance of protected area resources to national, regional and local development (water, energy, genetic resources, NTFPs, timber, tourism, etc.), conservation areas could be the catalyst for an integrated planning process. In Khammouane Province, for example, almost 40 per cent of the land area has been declared a national conservation area (in addition to provincial conservation areas). Conservation and natural resource management should be a critical factor in provincial planning.

The continuing reliance on external donor support also has implications for biodiversity conservation. There is a need for a consistent approach and

coordination with bilateral and multilateral donors on issues relating to environment, conservation and sustainable development.

Integrating biodiversity concerns into development planning

Given Lao PDR's reliance on natural products and systems to support economies, biodiversity values, benefits and issues should form the foundation of national development planning. Direct benefits include timber and NTFPs from forests, medicines, fish and other aquatic resources from rivers, lakes and paddy fields, indigenous crop and livestock varieties that are resistant to disease and adapted to local conditions, and revenue from tourism. Indirect benefits, such as protection of water quality and options for energy development by maintaining forest cover in water catchments, are extremely important as well. Biodiversity values are so fundamental to the well-being of the country that if they are ignored, and not incorporated into the national planning framework, development will not be sustainable over the long term.

Experience has shown that it can be difficult to foster effective inter-agency cooperation within the Lao Government system on cross-sectoral issues, but such cooperation is essential to an integrated approach to national development planning. It is particularly important in addressing biological diversity issues. In view of the relatively small size of the government at national and provincial levels, and the importance of natural resources to the national economy, it should be possible to integrate biodiversity into national sustainable development planning. NBSAP preparation and implementation will be important steps in this process.

Environmental planning and biodiversity assessment

Proposed National Conservation Strategy

There has been little comprehensive strategic environmental planning in Lao PDR. Although a Tropical Forestry Action Plan was prepared and adopted by the government in 1990, it was sectoral in nature. In 1991, one of the objectives of the Sida-funded Forest Resources Conservation Program (FRCP), part of the Lao-Swedish Forestry Program (LSFP), was to initiate the development of a National Conservation Strategy (NCS). A consultant was subsequently engaged by IUCN to undertake a preliminary study (referred to as the NCS Phase 1). This resulted in recommendations on an administrative and consultative structure for Phase 2 of the NCS process, and preparation of a work plan and budget.

The consultant worked closely with the Ministry of Agriculture and Forestry (MAF) and the Ministry of Science and Technology (MST), the predecessor of the Science, Technology and Environment Organisation (STENO). Based on the Phase 1 report, MAF requested further Sida assistance to develop the NCS, with the proviso that further management of the NCS would be the responsibility of MST. In 1992 IUCN submitted a draft proposal for Phase 2 of the NCS to government; this was revised in 1993 as a proposal for a National Environment Management Project to develop a National Conservation Strategy. IUCN produced a User's Guide to Planning and Implementing a National Conservation Strategy that same year (Salter 1993). The proposal was approved by the Prime Minister's office, through STENO, in January 1994.

National Environment Action Plan

By the time the NCS Phase 2 proposal was approved, donor interest had shifted to other priorities. Sida had funded UNDP technical assistance to STENO and was unwilling to proceed further with the NCS. The World Bank required the preparation of a National Environmental Action Plan (NEAP), which was adopted by the government in 1994. The main points of the NEAP in relation to biodiversity were summarised earlier. The NCS had, in effect, been overtaken by events and there was no interest in supporting it, especially when the NEAPs required by the World Bank appeared to be addressing the same issues.

The NEAP was the only strategic environmental planning that predated the NBSAP. It is widely recognised that the NEAP has not been used effectively despite its adoption by government. This is probably because, although its recommendations and analyses were basically sound, the NEAP is seen as an "external" requirement. A recent Asian Development Bank technical assistance to the Lao government has revised the NEAP as one of its activities.

Strategic assessment and planning

Other examples of broad-scale strategic environmental assessment and planning are the GTZ forest assessment and monitoring work (Stibig 1997) and a series of Sida-funded provincial environmental inventories carried out by IUCN of the provinces of Khammouane (IUCN 1997), Bolikhamxai, Louang Prabang and Oudomxai (MCTPC 2000 a,b,c). The inventories have generated considerable interest at provincial level, and provide the first comprehensive overviews of key environmental and socio-economic factors and issues.

The LSFP Forest Resource Conservation Sub-program (1988–95), which resulted in the establishment of the national protected areas system, was an

important strategic assessment and planning process for biodiversity conservation. Very few countries have been able to undertake such a protected area system planning process based on effective ecological representativeness.

The Sustainable Use of NTFPs Project was another important strategic process. Although the project ostensibly focuses on a narrow sector — non-timber forest products — the project is an important part of the country's biodiversity planning and assessment because of the value of NTFPs to local and national economies and the importance of their sustainable use. The 1999 wildlife status report (Duckworth, Salter and Khounbolin 1999) is also a valuable reference for future biodiversity planning. This report built on area-specific biodiversity assessments carried out by the Wildlife Conservation Society, IUCN and WWF over the previous ten years.

Lessons learned

Several major lessons have been learned from this limited, but important, range of strategic environmental planning.

Ownership of planning processes and outputs is fundamental to all strategic planning concerning biodiversity. Because the NEAP was the result of a process that was not fully integrated, its major recommendations have still not been implemented almost six years after its adoption. In comparison, the FRCP planning was carried out (by means of IUCN technical assistance) in day-to-day partnership with the Centre for Protected Areas and Watershed Management, and resulted in the declaration of the national protected area system. In addition to an integrated approach to project and program implementation, intra-government cooperation and coordination is required. Not only must externally supported activities involve all stakeholders, government itself needs to ensure full participation and cooperation between its own agencies.

Biodiversity planning should be followed through by sustained implementation. The assessment and planning process that led to the establishment of the NBCAs was followed by a number of international technical assistance projects to introduce management systems in individual areas. In a country such as Lao PDR, with very little human resource capacity, support needs to be planned on a long-term basis. Most technical assistance projects last a maximum of five years, which isn't enough time to effectively train staff or develop sustainable management systems. A common outcome is that management staff are not thoroughly trained; this compromises the long-term management of the area. While there is a lack of capacity in all fields, the problem is particularly acute at the senior management level. There are almost

no competent senior managers able to deal with biodiversity conservation policies and management issues at either the central or provincial levels.

During the World Bank-funded IUCN technical assistance support for Nakai-Nam Theun NBCA in 1998, the number of active field staff increased to seven (for an area of almost 4,000 sq. km), but when the funding terminated only four people were retained. If the international community and the Lao Government want long-term, effective nature conservation — as the critical element in a national biodiversity strategy — then long-term commitments have to be made at both national and international levels.

There is considerable interest at village, district and provincial levels in dealing with biodiversity issues, especially as they relate to long-term subsistence and income generation. Such interest creates support for projects dealing with agreements on forest use by local people; this was particularly so in the case of the NTFP Project. There have been problems, however, with policy support from the central level, especially in the forestry and agriculture sector. Biodiversity planning and management issues must be addressed at all levels; government must follow through with consistent approaches to biodiversity if the concepts of conservation and sustainable use are to be accepted by provinces, districts and villages. All sectors must be made aware of biodiversity-related policies, especially those dealing with infrastructure development.

Bilateral and multilateral development assistance providers need to be consistent and coordinated in their inputs. The extent of duplication and overlap by various providers in biodiversity-related sectors is often remarkable. At the same time, the short time frame of many projects (one–three years) makes it difficult for them to meet their objectives. Other donor/lender projects, especially those related to infrastructure, have been implemented in contradiction to the provider's own environmental policies. This can result in the unnecessary loss of biodiversity due to road construction, power utility and agriculture projects.

Biodiversity resources have high economic value. The various biodiversity assessments that have been carried out have highlighted the high conservation and economic value of wild biodiversity (e.g., for tourism and subsistence), as well as its general decline and, in many cases, the threat to its existence.

Biodiversity strategy and action plan

Background

In 1998, UNDP formulated a NBSAP project proposal (to be funded by Danida) in consultation with STENO and other government agencies. After several months of inactivity and government's failure to endorse the final project document, Danida fielded a review mission in mid-1999. This resulted in a revised UNDP project document, which was subsequently endorsed by government (UNDP 1999). Although the project had not commenced at the time of writing, the information presented here summarises the planned arrangements for the NBSAP process.

Project structure and implementation

The NBSAP process will be directed by a National Biodiversity Steering Committee (NBSC), established and chaired by STEA. Representation on the NBSC will include STEA, Ministry of Agriculture and Forestry, State Planning Committee, Office of International Cooperation, Ministry of Foreign Affairs, Ministry of Public Health, Ministry of Education, Lao Women's Union and the Lao Youth Organisation. The NBSC will carry out the following tasks:

- supervise project implementation;
- approve work plans and budgets;
- endorse relevant outputs related to project objectives;
- ensure that national policies and strategies are adhered to; and
- present the NSBAP to the Committee for International Cooperation and Prime Minister for approval.

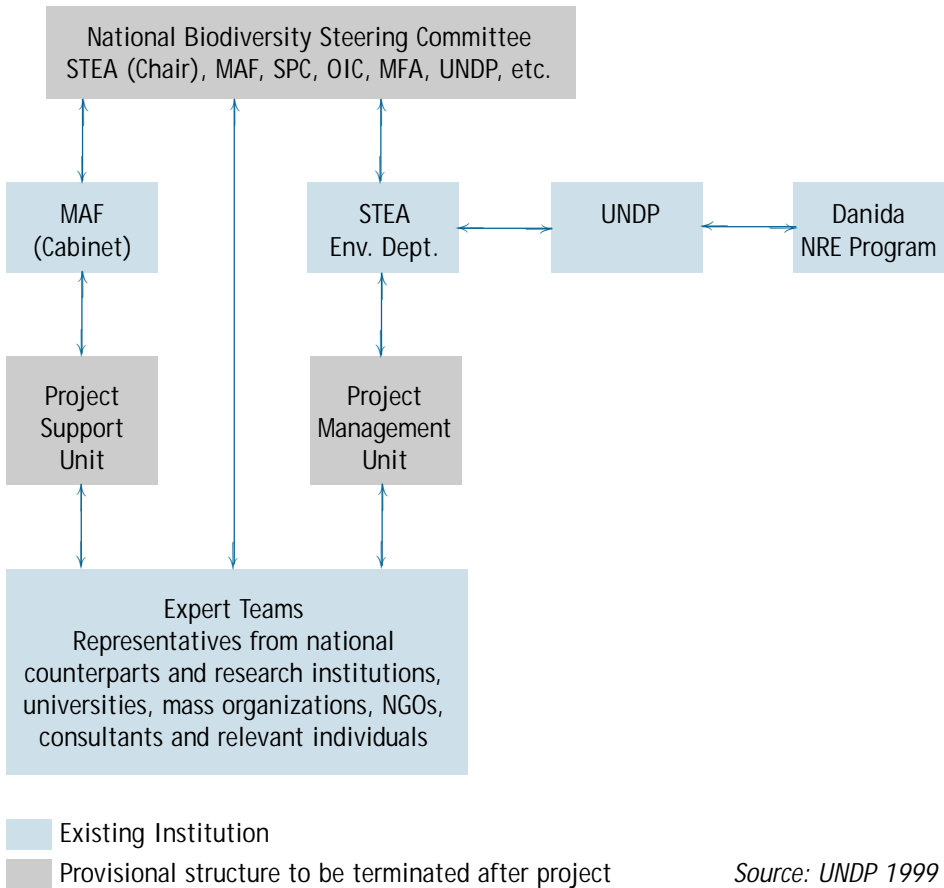
The NBSC will hold four meetings during the 19 months of project implementation. It will also hold additional meetings to endorse the Biodiversity Country Report, the National Biodiversity Strategy and the final draft of the BAP. Review meetings will be convened by UNDP and Danida.

Project implementation will be undertaken by a national Project Director and a Project Manager and assistants; a Project Management Unit will be established in STEA. UNDP and government will recruit an international planning advisor to assist national staff. An international biodiversity country report consultant and environmental economist will also be hired. MAF will be responsible for producing the National Biodiversity Country report and will appoint a full-time project staff member.

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The project document also describes “ad hoc teams” that will support STEA and MAF, comprising representatives from national counterpart and research institutions, the university, Lao Women’s Union, Lao Youth Organisation, international NGOs...and relevant individuals. The role of these teams is not well defined, but it is noted that, “some members...will visit participating provinces...to prepare draft province profiles and...provide training to staff in provinces and to leaders of mass organisations” (UNDP 1999).

Figure 1. Proposed organisational arrangements for NBSAP process



Analysis of BSAP Project strategy and objectives

The UNDP/Danida project proposes the standard three-step process:

- a Biodiversity Country Report;
- a National Biodiversity Strategy; and
- a Biodiversity Action Plan.

These will be undertaken over 19 months. The basic premise of the project is that “a nature conservation strategy must focus on the livelihood of the local population in order to enhance communities’ incentives to participate in the conservation of resources” (UNDP 1999). The proposal further states that this focus will determine the framework of issues for the Biodiversity Strategy and the Biodiversity Action Plan.

It is intended that the NBSAP process, and information derived through the Biodiversity Country Report and public awareness activities, will benefit the poorest households and rural communities. The NBSAP is an initiating process, however: its benefits to rural communities will evolve over the medium to long term as a result of appropriate biodiversity policy and implementation. These must be achieved through consensus on the part of national, provincial and district governments. Effective integration of conservation objectives and rural development and poverty alleviation is extremely difficult to achieve. This realization has emerged from recent reviews of ICDP field projects in Laos (World Bank projects) and other Southeast Asian countries (Wells et al. 1999). It is clear that basic assumptions about the flow of benefits from biodiversity conservation activities to livelihoods need to be questioned. In the case of an NBSAP, the framework needs to be defined on the basis of CBD principles, which must also form the foundation of cross-sectoral development planning. Line agencies (agriculture, forests, rural development) must then implement effective programs to support livelihood objectives, and they must be based on biodiversity conservation principles.

The BSAP project is also based on the assumption that Mass Organisations (Lao Women’s Union and Lao Youth Organisation) will have the capability to be the “prime promoters of sustainable resource use practices, including sustainable use, protection and management of the country’s biodiversity”. Educating and training the members of these organisations is itself a long-term commitment, however. While Mass Organisations have a role in promoting project goals, farmers are more likely to have inherent awareness of biodiversity issues through indigenous environmental knowledge. As the project document rightly points out, the “traditional knowledge of Lao farmers...is a unique resource which can be mobilised”. In fact, Article 8 (j) of the CBD specifically obliges signatories to *“respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities...relevant for the conservation and sustainable use of biological diversity and promote their wider application”*.

While conservation of biodiversity should certainly be integrated with all facets of development planning, the project objective suggests that the scope

of the Biodiversity Strategy and Action Plan will be predetermined by existing national development plans rather than addressing the wide scope of issues defined by the CBD. In view of the high socio-economic and conservation value of biodiversity in Lao PDR, and the country's reliance on biological resources for its development options, a proactive objective would seem more appropriate. This would be more in line with Article 10 (a) of the CBD: *“to integrate consideration of the conservation and sustainable use of biological resources into national decision-making”*. This, in turn, is reinforced by Article 6 (b), which states that conservation and sustainable use of biodiversity should be integrated into relevant sectoral or cross-sectoral plans, programs and policies. This implies that a party to the CBD should develop anticipatory policies towards biodiversity conservation and its sustainable use in order to comply with these obligations (Glowka, Burhenne-Guilmin and Synge 1994).

These are the proposed immediate objectives of the NBSAP:

- provide relevant authorities at national and provincial levels with a framework for actions needed to ensure sustainable use of Lao PDR biodiversity;
- adopt a cross-sector approach for the sustainable management and protection of Lao biodiversity; and
- create awareness among stakeholders of the importance and value of biodiversity and of their role in its management.

The objectives, while valid and essential, are limited in scope considering that the project will contain a country report, strategy and action plan. And although the detailed activities and proposed outcomes of the BSAP cover a range of important issues, processes and products, the conceptual context and broad objectives fall short of covering the comprehensive objectives of the CBD that are highly relevant to Lao PDR.

Recommendations

The BSAP is an important process and the biodiversity issues facing Lao PDR are becoming more urgent with each passing year. The window of opportunity for dealing proactively with these issues is closing rapidly. In order to derive maximum benefit from the process the Government of Lao PDR should ensure that these points are addressed:

Integrated national development

1. Development and implementation of a framework and anticipatory policies to ensure that biodiversity is included in national, provincial and local economic planning.

2. Design and implementation of integrated regional and provincial physical and social development plans in key areas that incorporate biodiversity conservation principles and mechanisms (such as the national protected areas system, Biosphere Reserves and World Heritage Areas).
3. Ensuring that biodiversity considerations are incorporated into primary resource development, especially forestry, agriculture and fisheries.

Governance

4. Ensuring that Government laws and policies are consistent and support sustainable use of biodiversity resources at local levels, and that national, provincial and district staff are trained in the application of laws, regulations and policies.
5. Fostering inter-agency cooperation within government and developing mechanisms to ensure intra-governmental compliance with national biodiversity policies.
6. Ensuring that all levels of government and society are involved in biodiversity-related decision-making and benefit sharing, especially with regard to livelihood issues affecting local communities.
7. Fostering national ownership of biodiversity initiatives, projects and activities as a basis for committed and sustainable implementation of outcomes.

Donors

8. Ensuring that donors provide assistance on biodiversity issues in a coordinated and consistent manner, and avoid duplication of activities that results in wasted funding and divert limited human resources.
9. Encouraging donors to maintain long-term support and sustained implementation for biodiversity-related projects and activities.

Biodiversity assessment, conservation and rehabilitation

10. Development and implementation of effective mechanisms to deal with the escalating trade in wildlife that is resulting in loss of species and reduction in biodiversity on a national scale.
11. Recording and analysing indigenous environmental knowledge of biodiversity in the development of strategies for conservation management and sustainable use.

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12. Implementation of a national botanic survey and development of a national herbarium, including recording and analysis of medicinal plants.

13. Identification of suitable degraded areas, and development of a program, for ecological restoration (such as reforestation).

International cooperation

14. Implementation of mechanisms with neighbouring countries to allow cooperation on biodiversity issues, including trade, sustainable use, and conservation management of biodiversity areas.

15. Engaging the Government of Vietnam on constructive approaches to dealing with the large-scale trade and illegal exploitation and removal of natural resources from Laos across common border areas.

Training and capacity-building

16. Development and implementation of a strategy (which includes effective and relevant approaches to training) for resolving the problem of limited technical and managerial capacity to deal with biodiversity issues at national and provincial levels.

17. Training provincial and district staff in the enforcement of wildlife trade regulations.

Education and awareness

18. Development of environmental curricula that includes biodiversity principles for inclusion in primary and secondary school education programs.

19. Development of tertiary natural resource assessment and management courses at the University of Laos.

20. Development and implementation of an environmental awareness campaign that includes biodiversity principles and targets the wider community in Lao PDR.

Chronology

1987	World Heritage Convention ratified
1988	Lao-Swedish Forestry Cooperation Program (LSFP) adds Forest Resources Conservation Sub-Program (FRCP) to evaluate the status and distribution of forest and wildlife resources and determine priority conservation needs.
1989	LSFP FRCP presents its approach to determining forest conservation priorities, based on effective biogeographic representation.
1990	Tropical Forestry Action Plan adopted
1991	National Constitution adopted, including Article 17 requiring all citizens to protect the environment and natural resources
1992	Participation of Lao PDR in the UN Conference on Environment and Development, and endorsement of agreements
1993	Prime Minister's Decree 164, legally establishing 18 National Biodiversity Conservation Areas (NBCAs) – based on recommendations of LSFP FCP
1994	National Environmental Action Plan (NEAP) adopted by Government
1995	Government signed Regional Agreement on the Cooperation for the Sustainable Development of the Mekong Basin
1995– 2000	Implementation of Sustainable Use of NTFPs Project – field based issues analysis and sustainable use model development at village level Various NBCA management, INRM and community forestry projects implemented through international donor support
1996	An Inventory of Wetlands of the Lao PDR prepared by IUCN MAF Decree 1074 protecting wildlife Declaration of President No. 125/PO on Forestry Law Government signed Convention on Biological Diversity
1997	Xe Sap (LSFP FCP recommended) and Dong Phouvieng NBCAs added to protected area system
1998	Biodiversity Strategy and Action Plan Proposal prepared by UNDP
1999	Revised BSAP Proposal prepared by Government of Denmark Prime Minister's Decree 68 on Establishment and Activities of STEA (Environment Law)
2000	Planned Commencement of Biodiversity Strategy and Action Plan Project funded by Danida and supported by UNDP

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