

CONSERVATION AND MANAGEMENT OF FOREST GENETIC RESOURCES IN LAO PDR

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Introduction

Lao PDR is one of the poorest countries in Southeast Asia. In 1997, GNP per person was just US\$414, though GDP grew at a rate of 6.5% (FAO 2001). Over three-quarters of the country's population of 5.3 million people live in rural areas. Between 1995 and 2000, the population grew at an average rate of 2.6%.

Lao PDR depends heavily on its natural resources to earn foreign exchange and provide a livelihood for its people. Wood product exports account for 45% of total export revenues and about 55% of GDP comes from the agricultural sector. In 1940, the total area of forest was estimated at 17 million hectares, or 70% of the national territory (NOFIP 1992). By 2000, this area had declined to 12.5 million hectares, or 54% of the national territory (FAO 2001). Most of Lao PDR's forests are natural forests—plantations account for only 54,000ha. About 80 commercially valuable tree species are found in the country's forests, which are similar to forests in other parts of Southeast Asia with a monsoon climate and distinct wet and dry seasons. They can be classed into evergreen forests (30.2%), mixed deciduous forests (50.4%), deciduous forests (15%) and other types (4.3%).

Conservation and management of forest genetic resources

A protected area system was established in Lao PDR in 1993. There are currently 20 national biodiversity conservation areas covering about 3.3 million hectares (Figure 1). In addition, 276 areas have been designated as conservation or protection forests at the provincial and district levels (Table 1) (Department of Forestry 1999).

Table 1. Conservation areas in Lao PDR

Category	Units	Area (ha)
District conservation forests	144	503,733
Provincial conservation forests	57	931,969
District protection forest	52	55,713
Provincial protection forests	23	461,410
Total	276	1,952,825

The Lao Tree Seed Project, which is part of the Indochina Tree Seed Programme supported by the Danish government, is currently improving the supply of forest tree seed in collaboration with the National Agricultural and Forestry Research Institute (NAFRI). The Project plays a leading role in providing good-quality seed of priority species from well-managed seed sources for plantation establishment. The Project is also developing a national seed supply strategy, based on species-specific strategies, to integrate seed procurement, tree improvement, genetic conservation and seed marketing. In future, different ecological zones

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will be identified and a seed zoning system developed. Because seed sources must be matched to planting sites, the Project has also recommended that local seed sources are used for any tree planting programmes.

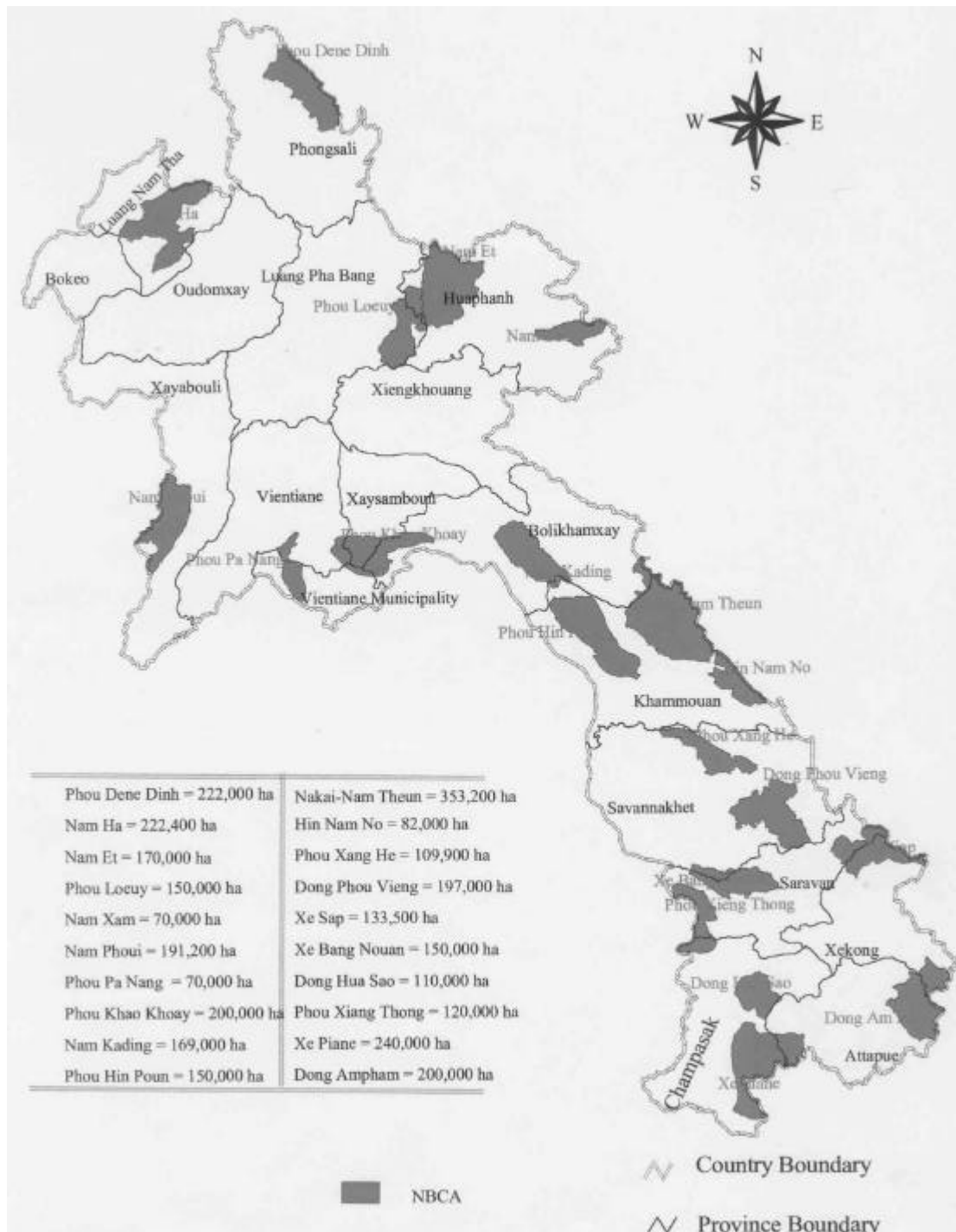


Figure 1. National Biodiversity Conservation Areas (NBCAs) in Lao PDR

The Project is based on strong collaboration between different stakeholders at provincial, district and village levels. The project has been implementing its activities in national biodiversity conservation areas and has formed partnerships with local communities, district and provincial agriculture and forestry offices, and private companies.

In 1999, the Lao Tree Seed Project held three workshops as part of a consultative process to identify the most important species for which to secure a seed supply. The major objectives of these workshops were to:

- Provide the Lao Tree Seed Centre with a tentative list of priority species for investigating seed procurement, tree improvement, conservation and marketing;
- Direct district and provincial forest authorities in their efforts to improve seed supplies; and
- Guide research and development activities.

The lists of important species drawn up at these workshops are given in Appendixes 1 and 2.

Proper documentation of seed origin during the collection of seed from priority species is critical, but often overlooked. There is a need to improve this practice and raise awareness among seed users and suppliers. There is also a need to obtain more accurate data on seed yield, particularly for indigenous priority species, to improve calculations of seed demand for tree planting programmes. In 2000, the annual tree planting target was 20,000ha, mainly in low-lying areas along the Mekong River (Jensen 2000).

Emphasis should also be put on documenting existing knowledge and experience of villagers and nurseries. The current decentralized approach in seed supply should be supported with a special emphasis on training and public awareness. Nurseries should act as focal points, and new models of collaboration developed between villagers living near seed sources and provincial and district agriculture and forest offices. The aim is to transfer more responsibility for management to local villagers and to develop agreements or contracts to enhance their role in seed collection. This approach, which would be cost-effective, is in line with the forestry law and the current decentralized approach in seed supply.

In 2000, government agencies collected most of the tree seed used in Lao PDR. In all, 38,703kg of seed was collected, most of which by districts and provinces (Table 2). Farmers and companies produce much larger amounts of seedlings than they do of seed. This difference can probably be attributed to the ready availability of seeds of *Eucalyptus camaldulensis*, which are being supplied by an ADB-financed plantation project which imports seed from Australia.

Table 2. Amount of seed collected and seedlings produced in Lao PDR

Collector	Seed collected (kg)	Seedlings produced
State (provinces and districts)	37,264	11,507,300
Farmers	187	2,028,890
Projects and communities	935	6,451,790
Companies	317	3,086,700
Total	38,703	23,074,680

Both *in situ* and *ex situ* conservation efforts are rare in Lao PDR and few data are available on the distribution of forest genetic resources. More information should be extracted from, for example, existing provenance trials and demonstration plots to develop conservation plans for different species. Additional information is needed to develop a national plan for the conservation of forest genetic resources. This plan should be shared with neighbouring countries, i.e. Cambodia, Vietnam and Thailand, to learn from their experiences and to enhance regional conservation efforts.

For endangered species, threats must also be analysed in a regional context to identify and recommend conservation action. In the case of *Aquilaria crassna*, for example, it has been suggested that the Lao Tree Seed Project establishes *ex situ* conservation stands, preferably as breeding seedling orchards (Thomsen 2000). Both *in situ* and *ex situ* conservation stands should also be considered for endangered and valuable populations of teak (*Tectona grandis*) and *Pinus merkusii*.

In addition to these limited conservation efforts, some work has been carried out on tree breeding. The Keng Ben Teak Improvement Station has gained experience in teak use and improvement in the northern part of the country. A number of potential seed sources for teak have also been identified in Sayaburi province. The major constraints to expanding tree breeding activities are a lack of experience, technical knowledge and trained staff.

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Appendix 1. Values and uses of target, important species in Lao PDR

Species	Value code ^{a)}	Present, future or potential use ^{b)}											Location ^{c)}	
		ti	po	pu	wo	nw	fo	fd	sh	ag	co	am		xx
<i>Adina cordifolia</i>	1	✓	✓										✓	VT,SK,CS
<i>Afzelia xylocarpa</i>	1	✓	✓										✓	VT,SK,SV,CS,SR
<i>Aglia gigantea</i>	1												✓	KM,CS
<i>Ailanthus triphysa</i>	1												✓	LB,VT,CS
<i>Albizia procera</i>	1	✓	✓										✓	VT,KM,SK,CS
<i>Albizia lebbek</i>	1												✓	LB,SR
<i>Alstonia scholaris</i>	1												✓	VT,TK,SK,CS
<i>Amoora polystachya</i>	1												✓	CS,SV,AP
<i>Anisoptera costata</i>	1												✓	LB,SR,VT,CS,SV
<i>Artocarpus heterophyllus</i>	1												✓	Whole country
<i>Azadirachta indica</i>	1												✓	VT,CS,AP
<i>Bischofia javanica</i>	1				✓									LB,SR
<i>Cassia siamea</i>	1				✓		✓							VT,SK,KM,SV,CS
<i>Chukrasia tabularis</i>	1	✓	✓											Northern parts of country
<i>Dalbergia cultrata</i>	1	✓	✓											SR,VT,SK,CS
<i>Dalbergia cochinchinensis</i>	1	✓											✓	SK,CS
<i>Dalbergia oliveri</i>	1	✓											✓	SR,VT,KM,SK,CS
<i>Dipterocarpus intricatus</i>	1	✓	✓										✓	LB,VT,KM,SK,CS
<i>Dipterocarpus alatus</i>	1	✓	✓											VT,SK,CS
<i>Fagraea fragrans</i>	1	✓											✓	VT,SK,CS
<i>Gmelina arborea</i>	1	✓											✓	VT
<i>Garonia spp.</i>	3		✓										✓	XK,HP,LB
<i>Heritiera javanica</i>	1	✓											✓	SK,CS
<i>Hopea odorata</i>	1	✓	✓										✓	VT,BS,SK,CS
<i>Lagerstroemia speciosa</i>	1	✓										✓	✓	VT,BS,KM,SK,CS
<i>Madhuca pasquieri</i>	1	✓												HP,XK
<i>Mangifera indica</i>	1	✓					✓						✓	LB,OS,SR,SK,CS
<i>Melanorrhoea laccifera</i>	1	✓											✓	SK,SV,CS,AP
<i>Mesua ferrea</i>	3												✓	CS
<i>Parashorea stellata</i>	1	✓	✓										✓	SK,CS
<i>Pentace burmanica</i>	1	✓	✓										✓	VT,CS
<i>Pinus merkusii</i>	1	✓				✓							✓	XK,KM
<i>Pometia pinnata</i>	1	✓											✓	OX,SR
<i>Pterocarpus macrocarpus</i>	1	✓	✓										✓	SR,VT,BS,SK,CS
<i>Pterocarpus pedatus</i>	1	✓	✓										✓	VT,SK,CS
<i>Sandoricum koetjape</i>	1	✓					✓						✓	VT,SK,CS
<i>Shorea talura</i>	1	✓	✓										✓	VT,BS,CS
<i>Shorea obtusa</i>	1	✓	✓										✓	VT,SR,BS,CS
<i>Shorea siamensis</i>	1	✓	✓										✓	VT,SK,CS
<i>Sindora cochinchinensis</i>	1	✓	✓										✓	VT,SK,CS
<i>Tectona grandis</i>	1	✓	✓										✓	BK,SR
<i>Terminalia tomentosa</i>	1	✓	✓										✓	VT,SK,CS
<i>Terminalia coriacea</i>	1	✓	✓										✓	Whole country
<i>Terminalia bellerica</i>	3												✓	VT,SK,CS
<i>Terminalia chebula</i>	3						✓						✓	VT,SK,CS
<i>Toona febrifuga</i>	1	✓											✓	VT,SK,CS
<i>Vatica odorata</i>	1	✓	✓										✓	VT,SK,CS
<i>Vitex spp.</i>	3		✓											VT,BS,KM,SK
<i>Xylia kerrii</i>	1	✓	✓										✓	VT,KM,SK,CS

^{a)} 1 = Species of current socio-economic importance; 2 = Species with clear potential or future value; 3 = Species of unknown value given present knowledge and technology.

^{b)} ti = timber; po = post, poles, roundwood; pu = pulp and paper; wo = fuelwood, charcoal; nw = non-wood products; fo = food; fd = fodder; sh = shade, shelter; ag = agroforestry; co = soil and water conservation; am = amenity; xx = other.

^{c)} OS = Oudomsay; LB = Luangprabang; XK = Xiengkuan; HP = Hoaphan; SR = Sayaburi; VT = Vientiane; BS = Bolikhamxay; KM = Khammuan; SK = Savannaket; CS = Champasack; SV = Saravan; AP = Attapue.

