

Status of forest genetic resources conservation and management in Cambodia

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Introduction

Natural forests cover about half of the area of Cambodia and represent a wealth of forest types ranging from mangrove and tropical humid evergreen forests to dry forests and montane forests. The forests contain substantial biological resources, including valuable plants and wildlife species. The families of Dipterocarpaceae, Leguminosae, Lythraceae, Fagaceae and, in some places, Pinaceae or Podocarpaceae, dominate the forest vegetation. Bamboos are also common in some areas. The flora of lower altitudes is typical of the Indo-Chinese floristic composition, whereas that of higher altitudes is typical of the Indo-Malayan flora. The high mountain flora is poorly known (Dy Phon 1982).

In 1997, the forest area of Cambodia covered 10 638 208 ha (60.2% of the total land area), classified into evergreen, mixed, deciduous, secondary, coniferous, flooded, and mangrove forests (Table 1).

Table 1. Forest cover by forest type in hectares (DFW 2003)

Forest type	Dry land forest					Edaphic	
	Evergreen	Mixed	Deciduous	Secondary	Coniferous	Flooded	Mangrove
Area	3 986 719	1 505 326	4 281 397	374 197	82 425	335 307	72 835
Total	10 638 208						

The forests have a significant role in rehabilitation and development of Cambodia's agricultural, socioeconomic, environmental and especially tourism sectors. The forests also play a major role in subsistence livelihood of local communities, providing a major source of fuel, building materials, and non-timber forest products.

Prior to the 1970s, the estimated annual production of logs and fuelwood was 385 000 m³ and 357 000 m³ respectively and the average log exports amounted to 94 508 m³. During the 1990s, log production increased substantially from 600 000 m³ in 1991 to 4.3 million m³ in 1997, with export earnings of US\$ 114 million (DFW 2001).

Large tracts of natural forest are under heavy pressure due to logging, encroachment and shifting cultivation. Only few economically viable areas for logging remain, and a number of tree species have become vulnerable to extinction, in particular at population level and even at species level.

The ongoing forestry reforms give high priority to reforestation, the key to success being the supply and use of good quality seeds through the conservation of forest genetic resources (FGR).

Conservation of forest genetic resources

In Cambodia, the priority tree species for conservation and use are indigenous. The better wood quality and higher value of indigenous species could compensate for the slower growth rates as compared to exotics. An evaluation that includes also ecological and social considerations and future demand, could recommend planting indigenous species (Sloth 2002). However, this norm is often not followed due to other considerations.

The state of health of forests and threats to genetic diversity are not well documented in Cambodia. In general, however, valuable timber species are under threat because of forest encroachment, logging, land conversion as well as indirect human activities.

In situ and *ex situ* conservation of FGR

The preferred option for forest genetic conservation is *in situ* conservation, complemented by *ex situ* activities. *In situ* conservation is practised in two types of management regimes:

protected areas, and seed sources in natural forests. Prior to 1957, about one third of Cambodia's forested areas were inventoried and classified into 173 forest reserves (totalling 3.9 million ha) and six wildlife sanctuaries (13 million ha). The first national park in Southeast Asia, covering 10 800 ha of forested area around the temple of Angkor was designed and established in 1925. In 1993, a new system of protected areas was established by the Royal Decree on "Creation and Designation of Protected Area", signed by King Norodom Sihanouk on 1 November 1993. The Royal Decree includes 23 protected areas, covering in total 3 273 200 ha of Cambodia's land area.

The protected areas are divided into 4 categories: National Parks, Wildlife Sanctuaries, Protected Landscapes and Multi-Use Areas. The above are administered under the jurisdiction of the Ministry of Environment (MOE). In addition, the Ministry of Agriculture, Forestry and Fisheries (MAFF) manages nine protected areas which are significant for genetic resources, wildlife and watershed conservation. The total protected area under the MAFF is 1 346 225 ha.

Together with governmental *in situ* conservation activities, the Cambodia Tree Seed Project (CTSP) has established 23 seed sources in the natural forests outside protected areas (Table 2). Besides the objective of producing seed for collection, the seed sources are considered as protected sites for conserving genetic resources of priority species. *Ex situ* conservation activities include a seed production area, a seed orchard, and a provenance trial, as outlined in Section 3 below.

Specific policies for natural resource management do not exist, but activities are addressed through a number of sectoral policies. The Royal Government of Cambodia is in the early stages of preparing to develop a National Forest Programme (NFP), which will be fully consistent with international guidelines. The Department of Forestry and Wildlife (DFW), together with the CTSP, is currently developing a policy framework for the tree seed sector and forest genetic resource conservation. This framework will form an essential part of the ongoing forest reform process and contribute to the NFP. The impact of the current policy and legislation is further detailed below.

Table 2. Seed sources in the natural forests (CTSP 2002)

No. of site	Species	Area (ha)	Location		Number of mother trees
			Province	District	
1	<i>Dalbergia oliveri</i>	12.5	Preah Vihear	Tbeng Meanchey	78
2	<i>Sindora cochinchinensis</i>	117	Kampong Thom	Sandann	100
	<i>Tarrietia javanica</i>				39
	<i>Shorea hypochra</i>				22
	<i>Shorea vulgaris</i>				19
	<i>Dipterocarpus costatus</i>				396
	<i>Anisoptera glabra</i>				323
3	<i>Pterocarpus macrocarpus</i>	20	Siem Reap	Chikreng	83
4	<i>Azadirachta indica</i>	50	Banteay Meanchey	Mongkul Borey	90
				Santuk	72
5	<i>Pinus merkusii</i>	104	Kampong Thom		70
	<i>Fagraea fragrans</i>				70
6	<i>Dalbergia oliveri</i>	21	Rattanak Kiri	O Chum	21
	<i>Pterocarpus macrocarpus</i>				20
	<i>Xylia dolabriformis</i>				22
7	<i>Azelia xylocarpa</i>	18	Rattanak Kiri	Lumphat	27
	<i>Dalbergia oliveri</i>				41
	<i>Pterocarpus macrocarpus</i>				14
8	<i>Azelia xylocarpa</i>	20	Rattanak Kiri	Kaun Mum	26
	<i>Dalbergia oliveri</i>				17
	<i>Shorea cochinchinensis</i>				7
9	<i>Hopea ferrea</i>	30	Rattanak Kiri	Kaun Mum	88
10	<i>Dalbergia cochinchinensis</i>	50	Siem Reap	Varinn	67
11	<i>Dipterocarpus alatus</i>	7	Siem Reap	Angkor Wat	43

Past and present research and activities in the field of conservation, utilization and management of FGR

Although the forests are considered as a main source of income for the government and local communities in Cambodia, the budget allocation for research is almost nonexistent. There is only a little coordinated forest research that has been conducted by the CTSP and basic data are not easily available. The DFW has inadequate research facilities and only few staff trained in research techniques. Official records on the management of FGR are very few.

Production and use of forest tree seed

In early 2003, the CTSP conducted a survey to estimate seed demand. The findings are presented in Table 3, but as they are based on a sample only (nurseries), the national annual seed demand is presumably higher. Among the 21 species used in planting programmes, only three are exotic (acacia, eucalypt and teak), the rest being indigenous.

In the survey, five categories of tree seed users were identified – the DFW and Provincial Forest Offices (PFO), Armed Forces, communities, pagodas and the private sector. Each year, tree seed users need seeds of both exotic and indigenous species to produce seedlings that will satisfy a range of requirements for tree planting in reforestation and forest rehabilitation programmes, community forests, within and around villages and along roadsides. Currently, indigenous species form a small percentage of total seedling production, and are used mainly in small-scale plantations, Arbour Day, research sites, and pagodas. *Acacia* spp. and *Eucalyptus* spp. account for the largest share of seedling production and play a significant role in large-scale plantations for rehabilitation of degraded forests or for the pulp and paper industry.

Table 3. Result of the CTSP seed demand survey (CTSP 2003a)

No.	Species	Amount of seeds (kg)	Seed supplier
1	<i>Acacia</i> spp.	156	Vietnam, CSIRO, local people
2	<i>Azadirachta indica</i>	1072	CTSP's seed sources, local people
3	<i>Albizia lebbek</i>	2	Local people
4	<i>Anisoptera costata</i>	5	Local people (natural forests in Kampong Thom)
5	<i>Aquilaria crassna</i>	1	Local people
6	<i>Azadirachta indica</i>	137	Local people
7	<i>Cassia siamea</i>	10	Local people
8	<i>Dalbergia bariensis</i>	2	CTSP seed sources
9	<i>Dalbergia cochinchinensis</i>	5	CTSP seed sources, local people
10	<i>Dipterocarpus alatus</i>	604	CTSP seed source, pagoda, local people
11	<i>Eucalyptus</i> spp.	16	Vietnam, CSIRO, local people
12	<i>Eugenia jambolana</i>	1	Local people
13	<i>Hopea odorata</i>	64	Pagoda, local people
14	<i>Leuceana leucocephala</i>	2	Local people
15	<i>Melaleuca cajuputi</i>	1	Local people
16	<i>Peltophorum dasyrhachis</i>	1	Local people
17	<i>Pterocarpus macrocarpus</i>	14	CTSP seed source, local people
18	<i>Shorea farinose</i>	5	Local people
19	<i>Shorea vulgaris</i>	n.a.	CTSP seed source
20	<i>Tarrietia javanica</i>	72	CTSP seed source
21	<i>Tectona grandis</i>	n.a.	Thailand, Kampong Cham province

In Cambodia, there are no enterprises or private companies dealing with tree seed supply. This is because the demand for seed is still low and it is not possible to estimate future demand, as the users do not have long-term plans for tree planting activities. This creates a major constraint to planning for the ongoing supply of good quality seeds of appropriate species, which is, by nature, a long-term process. Instead, tree seeds are obtained in a number of ways, some formal, others informal.

Sometimes nursery managers collect the seeds by selecting good mother trees. They may test the seeds by cutting them to see if they are still alive. Nursery managers also purchase seeds from local people. In this case, the nursery managers advise local people on the selection of good mother trees. This is the most common method of obtaining seeds. However, without seeing the seed source, it is difficult to evaluate the quality. Indigenous tree seeds are usually purchased from local people and, therefore, quality can be assessed only through observing the germination rate. Seeds are also obtained from colleagues in other provinces and in these cases the seed quality is difficult to assess. It is also possible to obtain seeds through the DFW. Currently, the DFW purchases seeds of *Acacia* and *Eucalyptus* from Vietnam for distribution to the planting stations and nurseries.

Several nursery managers purchase seeds from Vietnam directly, rather than going through the DFW. Seeds purchased from Vietnam are of *Acacia* and *Eucalyptus* species and they are accompanied by certificates showing the date of seed collection, amount of seeds per kg, and a guarantee of germination higher than 70%.

Seed purchases from Thailand and Australia by the Reforestation Office are regulated by the supplier as well as by the receiver. The first step is to undertake tests of the proposed planting sites to ensure compatibility with the site of origin. CSIRO (Australia) and FORGENMAP (Thailand) issue phytosanitary certificates for the seeds, consignment notes and seed certificates. From the Cambodian side, approval for the import is needed from the MAFF, which submits a letter to the Customs Department to allow clearance for the seeds.

Tree improvement activities in Cambodia

Tree improvement in Cambodia is in its infancy; only a few activities have been carried out by the CTSP since 2002. Seed production areas for four species (*Dipterocarpus turbinatus*, *Hopea odorata*, *Aquilaria crassna* and *Azelia xylocarpa*) have been established in a 10-ha plot at Kbal Chhay, Sihanoukville. Seed orchards for two species (*Tarrietia javanica* and *Shorea vulgaris*) have been planted in a two-hectare plot at Kbal Chhay. A provenance trial is being conducted by the CTSP at Bak Sna where two species *Azelia xylocarpa* and *Pterocarpus macrocarpus* from six provenances will be planted in a five-hectare plot in 2004.

Reforestation activities

Reforestation activities have mainly taken place on poor sites. An area of some 300–400 ha was planted each year between 1915–1972, using species such as *Hopea odorata*, *Dipterocarpus* spp., *Tectona grandis*, *Pinus merkusii* and fast-growing fuelwood species such as *Peltophorum ferrugineum* and *Combretum quadrangulare* (Sam Ang 1998). Between 1985 and 2002, a total area of 11 125 ha was planted throughout the country, the main species used being acacias and eucalypts.

The forestry sector reform process gives high priority to reforestation implemented by the DFW and the Armed Forces in the years to come. In addition, the significant contribution of local communities to national tree planting targets is recognised. In 2003, the DFW is planning to establish 1625 hectares of plantations through its planting stations, with focus on *Eucalyptus camaldulensis*, *Tectona grandis*, and *Dipterocarpus* spp. In addition, 1.3 million seedlings will be produced for distribution to the local population, consisting of a mix of exotics, natives and fruit tree species (DFW 2002). Activities by the Armed Forces will cover 2200 hectares each year.

Socioeconomic conditions and issues related to conservation, utilization and management of FGR

The role of indigenous species in meeting the needs of the society is very important. Over the centuries, people of Cambodia have used different tree species for many uses such as house poles, doors, frames, construction, furniture, fuelwood, etc. In addition, many non-timber forest products (NTFP), such as oils, fruits and medicines have proved essential for rural livelihoods, supplementing their subsistence agricultural activities.

Population growth is a driving force of biotic impoverishment. It is widely accepted that population pressure can lead to ecosystem degradation. However, the relationship between population pressure and the environment is complex. Cambodia's population in March 1998 was 11.43 million, with 2.188 million households (5.2 people per household). The annual growth rate is 2.5% and approximately 84% of the population lives in rural areas (Hang 2002). Households using firewood or charcoal as major forms of energy for cooking were about 90% and 5.3%, respectively. An estimated six million m³ of wood is consumed every year as fuelwood (Soktha 2001). Thus, with no immediate alternative for fuelwood, forest species would continue to be very important to the Cambodians.

Large tracts of forest have been cut under various regimes of selective cuttings. In several places it is clear that the volume cut exceeds the limit of sustainability. Unfortunately, encroachment and shifting cultivation at former concession sites have turned out to be an even greater threat to the remaining natural forest. Areas with significant FGR that are threatened include the Cardamom and Elephant mountains in the southwest, the eastern section of the Dangrek Range, and the north-eastern border area between Lao PDR and Vietnam.

Forestry sector and FGR conservation in Cambodia

The forestry sector has the responsibility for FGR conservation in areas falling under its jurisdiction. The chosen approach is to increase the utilization of priority species through promoting them in tree planting activities within forest restoration and rehabilitation and on-farm production. Responsibility for managing tree seed sources and FGR is shifting from the traditional forestry sector approach towards community participation, which is essential for successful *in situ* conservation. The approach has been initiated in three locations: within forest concessions, within community forests and on state managed forestlands. Management agreements for each site are secured by a Ministerial Declaration.

Identification of national priorities

The first step towards FGR conservation is the identification and prioritization of species, applying three main criteria: socioeconomic importance, level of within-species variation, and the level of threat or risk (FORGENMAP 2002).

In Cambodia, detailed information on tree species is lacking. However, priority species for conservation have been identified through a process involving stakeholders from a range of sectors and institutions. Species were ranked according to their potential uses (timber, posts and poles, fuelwood and charcoal, NTFPs, pulp and paper, food, shade, agroforestry systems, soil and water conservation, amenity, aesthetic and ethical values and other) resulting in a list of 34 priority species. Each of the identified groups of species was further classified according to the IUCN Red List Categories, from critically endangered (level 5) to endangered (level 4) and threatened (levels 1–3). Where IUCN data was not available, the classification was based on local knowledge. To economise resources, priority status was initially allocated to the two most threatened categories, resulting in 21 species, as listed in Table 4. For information on priority species for APFORGEN, see Appendix 1. Species numbered as 22–34 will also receive attention, but more gradually, given their lower priority, and the limited resources for implementation.

Table 4. Priority tree species for Cambodia (CTSP 2003b)

N°	Scientific Name	Level of threat	IUCN Red List
1	<i>Dalbergia oliveri</i>	5	EN A1cd
2	<i>Aquilaria crassna</i>	5	CR A1cd
3	<i>Dalbergia cochinchinensis</i>	5	VU A1cd
4	<i>Gardenia ankorensis</i>	5	
5	<i>Azelia xylocarpa</i>	5	EN A1cd
6	<i>Pterocarpus marcrocarpus</i>	5	VU A1d
7	<i>Dysoxylum loureiri</i>	5	
8	<i>Diospyros cruenta</i>	5	
9	<i>Lasianthus kamputensis</i>	5	
10	<i>Diospyros bejaudii</i>	4	
11	<i>Fagraea fragrans</i>	4	
12	<i>Dasymaschalon lamentaceum</i>	4	
13	<i>Shorea cochinchinensis</i>	4	
14	<i>Hopea helferi</i>	4	CR A1cd + 2cd , B1 + 2c
15	<i>Pinus merkusii</i>	4	
16	<i>Garcinia hanburyi</i>	4	
17	<i>Cinnamomum cambodianum</i>	4	
18	<i>Sterculia lychnophora</i>	4	
19	<i>Cananga latifolia</i>	4	
20	<i>Albizia lebbbeck</i>	4	
21	<i>Hopea odorata</i>	4	VU A1cd + 2cd
22	<i>Tarrietia javanica</i>	3	
23	<i>Diospyros pilosanthera</i>	3	NE
24	<i>Hopea ferrea</i>	3	EN A1cd + 2cd , B1 + 2c
25	<i>Xylia dolabriformis</i>	3	
26	<i>Fibraurea tinctoria</i>	3	
27	<i>Shorea hypochra</i>	3	CR A1cd
28	<i>Shorea vulgaris</i>	3	
29	<i>Diospyros nitida</i>	3	
30	<i>Cassia garretiana</i>	2	
31	<i>Dipterocarpus alatus</i>	2	EN A1cd + 2cd , B1 + 2c
32	<i>Anisoptera costata</i>	2	EN A1cd + 2cd
33	<i>Melanorrhoea laccifera</i>	2	
34	<i>Artocarpus chaplasha</i>	1	

Level of threat: 5 = critically endangered; 4 = endangered; 1-3 = threatened

IUCN Red List categories appearing in this table: CR = critically endangered; EN = endangered; VU = vulnerable; NE = not evaluated; for further information, please refer to IUCN (2001)

Institutional framework and capacity-building activities

Responsibility for forest management in Cambodia lies with the MAFF, and MOE. Management of protected areas is under the jurisdiction of the MOE and other forest areas under the MAFF/DFW. The Department of Fisheries of the MAFF manages flooded forests and mangroves.

The forestry administration is undergoing a reform to establish a direct organizational line of command from central to local levels by returning the responsibility for forest management to the relevant authorities. Such reforms require a comprehensive review of the roles and responsibilities of all levels of the DFW, lines of communication, and interactions with other government departments to ensure effective implementation on ground level.

The Royal Government of Cambodia (RGC) acknowledges international issues, processes and commitments during and following the United Nations Conference on Environment and Development (UNCED) in 1992. Therefore, consistent with the IPF/IFF guidelines,

a national forest programme will be developed as a process for forest policy implementation and strategy development. Currently in its initial stages, activities to date have consisted of capacity building meetings to familiarise the DFW staff and advisors with the elements and structures of the national forest programme.

National forest policy and sectoral plans

A statement on national forest policy was issued by the RGC in 2002. It directs the management of forest resources towards the national goals of environmental protection, biodiversity conservation, poverty reduction, economic development and good governance. Forest policy will be further developed through a consultative process within the national forest programme. Recommendations for the tree seed sector will be integrated.

In line with national development plans defined by the RGC, the forest sectoral plan aims to manage forest resources to maximize economic benefits whilst ensuring ecological sustainability, community benefits and habitat protection for native fauna and flora. The plan notes that the government has promoted nursery establishment, selection of appropriate tree species, expansion of reforestation schemes and community forestry. To continue such endeavours, the DFW will establish tree seed banks through the foundation of seed quality selection and maintenance centres, and seed source forest stands in major forested areas throughout the country in order to ensure the most effective reforestation in terms of economic benefit, genetic conservation, environmental protection and services (DFW 2001, cited in CTSP 2003b).

Forestry law and FGR

According to the forestry law approved in 2002, provision is made for FGR conservation within protection forests and within special management areas in forest concessions. Applications to designate appropriate areas of the permanent forest reserve as protected forests can be prepared by the MAFF and approved by the RGC. Management plans will be prepared, implemented and enforced for these areas by the forest administration. The Minister of MAFF has the authority to issue permits for the establishment of botanical gardens or experimental stations within the permanent forest reserve as well as for the establishment of forest nurseries to provide seedlings. The forestry law emphasises the increasing role of the DFW, the military and local people in tree planting activities. Annual planting areas and budgets have expanded accordingly.

The forest concession sub-decree, which was approved in 2000, highlights that within forest concession management, areas of natural biodiversity, important ecosystem functions and forest services must be conserved and protected through the establishment of special management areas. Strategic management plans, submitted by forest concessionaires will be evaluated against a set of criteria that includes seed source conservation.

Forest genetic resource strategy

A FGR strategy is in the process of development by the DFW and the CTSP. The process includes a number of diverse stakeholders and covers the selection of priority species, species distribution and gene-ecological zoning, conservation status of key populations, methods of conservation as well as organisation and implementation of the strategy.

Links with international initiatives

The RGC ratified the Convention on Biological Diversity (CBD) in 1995 and the forestry sector has been represented through the preparation of the mandatory National Report on Biological Diversity, and the National Biodiversity Strategy and Action Plan. The RGC views the CBD as a framework to achieve sustainable development through the sustainable use and protection of biodiversity and is now taking serious steps towards implementing conservation programmes and awareness-raising for the sound use and conservation of biodiversity resources. Links will be established with other relevant initiatives as they develop.

Biosecurity regulations

Biosecurity regulations are not yet in place in Cambodia, although an inter-ministerial team is beginning to develop the National Biosafety Framework.

Cambodia Tree Seed Project

CTSP was initiated in 1999 with financial support from the Royal Government of Denmark/Danida. The project staff included nine counterpart staff and one technical advisor. The objective of the project is to promote the use of good quality tree seed from good seed sources. Since 1999, the CTSP has conducted many training courses for seed users and producers. The project has also published numerous posters, species leaflets and technical books for distribution during Arbour Day and to provincial foresters, nursery managers, farmers, NGOs and other seed users. A series of TV spots on the subject of using good quality seed and of conservation of priority species is being developed by the CTSP in collaboration with the DFW.

In 2002, with financial assistance from the Japan International Cooperation Agency (JICA), DFW established a forestry and wildlife training centre. A number of courses have already been conducted on different subjects related to the field of forestry, however, a course on FGR conservation is yet to be developed.

As part of a regional programme, the CTSP provides links for the DFW into the Indochina Tree Seed Project, which promotes cooperation and information exchange between the tree seed sectors in Cambodia, Vietnam and Lao PDR, and other tree seed programmes in the Southeast Asia as well as with the Danida Forest Seed Centre (DFSC).

Proposal for regional and international collaboration

Little information exists on bamboo and rattan resources utilization and management in Cambodia, even though there is a long tradition of their use. There is a need to establish a network of bamboo and rattan research and management with cooperation from the Bamboo Information Centre (China, India) or with other international institutes dealing with bamboo and rattan, such as the International Network on Bamboo and Rattan.

Research needs

The following research activities are suggested, aiming at promoting the cultivation and utilization of FGR in Cambodia:

1. An investigation is needed to determine both silvicultural and ecological requirements of the priority species and their management strategies. As information on the growing stock and distribution of these species is still meagre, a full-scale inventory coupled with phenological and threat studies should be conducted.
2. Pilot plantations should be established to capture the variability in growth and yield performance of the priority species in different parts of the country (covering various soil conditions). Research should be initiated for monoculture plantations as well as for agroforestry systems.
3. Initiate a genetic improvement programme of priority species through provenance trials in different ecological zones.

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Appendix 1

Information on priority species for the APFORGEN Inception Workshop

Priority species	Areas managed for conservation (ha)		Areas managed in natural forest for production of ... (ha)		Areas managed in plantations for production of ... (ha)		References and reports
	In situ	Ex situ	Timber	Non-timber	Timber	Non-timber	
1. <i>Azelia xylocarpa</i>	38				25		CTSP and reforestation reports
2. <i>Agathis borneensis</i>							
3. <i>Albizia lebbbeck</i>							
4. <i>A. procera</i>							
5. <i>Alstonia scholaris</i>							
6. <i>Anisoptera costata</i>	117					4	CTSP's report CTSP's report
7. <i>Aquilaria crassna</i>							
8. <i>Artocarpus heterophyllus</i>							
9. <i>Avicennia alba</i>							
10. <i>Azadirachta excelsa</i>							
11. <i>A. indica</i>				50			CTSP's report
12. <i>Calamus manan</i> – rattan					110		Reforestation office's report
13. <i>Cassia siamea</i>							
14. <i>Casuarina equisetifolia</i>							
15. <i>Chukrasia tabularis</i>							
16. <i>Dalbergia bariensis</i>	72						CTSP's report
17. <i>D. cochinchinensis</i>	50					3	CTSP's report
18. <i>Dipterocarpus alatus</i>	20					472	Reforestation office's report
19. <i>D. grandiflorus</i>							
20. <i>D. tuberculatus</i>							
21. <i>Dryobalanops aromatica</i>							
22. <i>Durio</i> sp.							
23. <i>Dyera costulata</i>							
24. <i>Eusideroxylon zwageri</i>							
25. <i>Fagraea fragrans</i>	104						CTSP's report
26. <i>Gonystylus bancanus</i>							
27. <i>Hopea odorata</i>						190	Reforestation office's report
28. <i>Intsia bijuga</i>							

Priority species	Areas managed for conservation (ha)		Areas managed in natural forest for production of ... (ha)		Areas managed in plantations for production of ... (ha)		References and reports
	In situ	Ex situ	Timber	Non-timber	Timber	Non-timber	
29. <i>I. palembanica</i>							
30. <i>Koompassia malaccensis</i>							
31. <i>Lagerstroemia ovalifolia</i>							
32. <i>Litchi sinensis</i>							
33. <i>Melaleuca cajuputi</i>							
34. <i>Metroxylon sagu</i>							
35. <i>Palaquium rostratum</i>							
36. <i>Parashorea stellata</i>							
37. <i>Parkia speciosa</i>							
38. <i>Peltophorum ferrugineum</i>							
39. <i>Pinus kesiya</i>							
40. <i>P. merkusii</i>					104	19	
41. <i>Pterocarpus indicus</i>							
42. <i>P. macrocarpus</i>	59						CTSP's report
43. <i>Rhizophora</i> sp.							
44. <i>Samanea saman</i>							
45. <i>Schima wallichii</i>							
46. <i>Shorea cochinchinensis</i>	20						
47. <i>S. hypochra</i>	117						
48. <i>S. laevis</i>							
49. <i>S. leprosula</i>							
50. <i>S. macrophylla</i>							
51. <i>S. ovalis</i>							
52. <i>S. parvifolia</i>							
53. <i>S. roxburghii</i>							
54. <i>S. stenoptera</i>							
55. <i>Sindora cochinchinensis</i>	117						
56. <i>Sterculia lychnophora</i>							
57. <i>Tairietia javanica</i>	117						
58. <i>Tectona grandis</i>							
59. <i>Terminalia chebula</i>							
60. <i>Toona sinensis</i>							
61. <i>T. sureni</i>						336	Reforestation Office report

Priority species	Areas managed for conservation (ha)		Areas managed in natural forest for production of ... (ha)		Areas managed in plantations for production of ... (ha)		References and reports
	In situ	Ex situ	Timber	Non-timber	Timber	Non-timber	
62. <i>Vatica odorata</i>							
63. <i>Vitex parviflora</i>							
64. <i>Xylocarpus dolabriformis</i>	21						
65. <i>Xylocarpus</i>							
List of priority bamboo & rattan species (Rao et al. 1998)							
Bamboo							
1. <i>Bambusa bambos</i>							
2. <i>B. blumeana</i>							
3. <i>B. tulda</i>							
4. <i>B. vulgaris</i>							
5. <i>Cephalostachyum pergracile</i>							
6. <i>Dendrocalamus asper</i>							
7. <i>D. giganteus</i>							
8. <i>D. latiflorus</i>							
9. <i>D. strictus</i>							
10. <i>Gigantochloa levis</i>							
11. <i>Melocanna baccifera</i>							
12. <i>Phyllostachys pubescens</i>							
13. <i>Thyrsostachys siamensis</i>							
14. <i>T. siamensis</i>							
Rattan							
1. <i>Calamus manan</i>							
2. <i>C. caesius</i>							
3. <i>C. trachycoleus</i>							
4. <i>C. merrillii</i>							
5. <i>C. nagbettaii</i>							
6. <i>C. ovoideus</i>							
7. <i>C. zollingeri</i>							
8. <i>Calamus palustris</i> and relatives							
Additional priority species							
1. <i>Acacia</i> spp.							
2. <i>A. mangium</i>							
3. <i>A. nilotica</i>							
4. <i>Azelia rhomboidea</i>							

