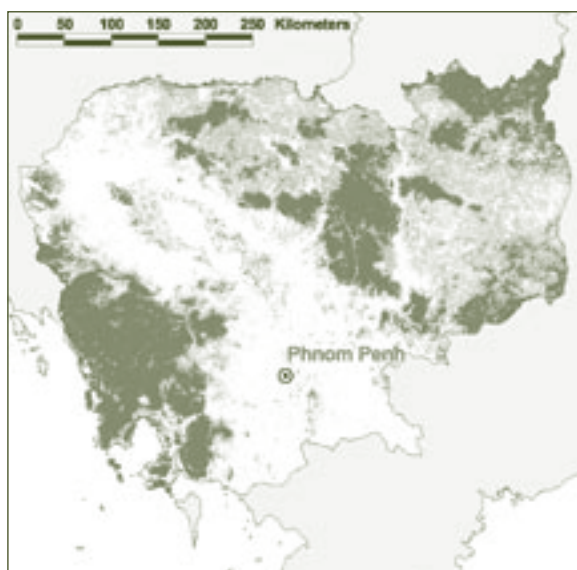


CAMBODIA



* For legend see page 58

Forest resources

Cambodia has a land area of 18.1 million hectares and a population of 12.6 million people. The country is dominated by a large alluvial central plain, through which courses the Mekong River and in the centre of which lies Tonle Sap Lake. Mountains and plateaux surround the central plain except in the southeast. Only a few points exceed 1,000 m in elevation; these are located primarily in the extreme northeast of the country, the highest peak being Phnom Kchual (1,843 m). The climate is typically tropical and subject to monsoons. Cambodia has a relatively large forest resource: FAO (2005a) estimated forest cover at 9.33 million hectares; the estimate of the Forestry Administration (FA) of the Ministry of Agriculture, Forestry and Fisheries (MAFF) is 11.1 million hectares^b.

Forest types. Cambodia's lowland tropical moist forest covers the northeastern part of the country

bordering Laos and Thailand. This forest type is dominated by Dipterocarpaceae, with five species – *Shorea hypochra*, *Anisoptera costata*, *A. glabra*, *Dipterocarpus costatus* and *Hopea odorata* – almost always present; *Parkia streptocarpa*, *Heritiera javanica* and *Syzygium cinereum* are other common species. Medium-altitude closed forest is found in the hilly country around the Gulf of Thailand and east of the Mekong River. The dominant trees, which can reach a height of 20 m, include oaks such as *Lithocarpus* spp, *Quercus cambodiensis* and *Castanopsis cambodiana*. Closed deciduous forests and open forests are mixed and found in the northwestern part of the country; common species include *Lagerstroemia* spp, *Xylia dolabriformis*, *Vitex* spp, *Anogeissus pierrei*, *Grewia paniculata*, *Terminalia* spp, *Ceiba pentandra*, *Pterocarpus pedatus* and *Irvingia oliveri*. Closed semi-deciduous forests occur where the dry season lasts three to five months and vary considerably in appearance and floristic composition. Secondary forest formations include bamboos and trees such as species of *Diospyros*, *Lagerstroemia* and *Cratoxylon*, as well as *Grewia paniculata*, *Combretum quadrangulare* and *Dipterocarpus intricatus*.

Dynamics of forest resource change. The rate of deforestation in Cambodia between 1990 and 2000 was an estimated 56,000 hectares per year (FAO 2005a). A significant but unestimated area of forest has been degraded by shifting cultivation, encroachment, development of agro-industries, illegal logging, over-harvesting and forest fire, as well as by the use of chemicals during periods of war. Deforestation is expanding rapidly in the country's closed forest area and will have a major impact on efforts towards SFM^c. Fires during the drier months of the year have reportedly become more common in the past ten years^c.

Table 1 PFE

| Estimated total forest area, range (million hectares) | Total closed natural forest ('000 hectares) Source: FAO 2001 | PFE ('000 hectares) ^d | | | |
|---|---|----------------------------------|---------|------------|-------|
| | | Production | | Protection | Total |
| | | Natural | Planted | | |
| 9.33–11.1 | 5,500 | 3,460 | 17 | 4,620 | 8,097 |

Permanent forest estate. Cambodia's 2003 forest law (see below) establishes a comprehensive formal system for the designation of the PFE, but this is yet to be fully implemented, nor have the forests been clearly demarcated. Table 1 presents an ITTO estimate of the extent of the PFE. This varies from that provided by the FA, which puts the total PFE at 11.1 million hectares^b (the same as the estimated total forest area). The estimate of natural production PFE comprises the current attributed concession area.

Planted forests. Estimates of the area of planted forests vary. FAO (2005a) estimated 90,000 hectares and the Department of Forestry and Wildlife (DFW 2003) 82,000 hectares^a, while the government of Cambodia (2004) reported that 13,000 hectares of plantations had been established between 1985 and 2004 on bare and degraded land. The higher estimates may include rubber plantations, some of which are harvested for timber; these cover an estimated 29,000 hectares^b. In this report the area of planted forest is estimated to be 17,000 hectares^c.

Institutional arrangements

Forest tenure. According to Article 10 of the 2003 Law on Forestry, the PFE consists of permanent forest reserves (owned by the state) and private forests. Permanent forest reserves comprise three categories: production forests, protection forests and conversion forest lands; the latter are classified as permanent forest reserves until the government decides to use the land for other purposes. Private forests are to be maintained by their owners, who have the right to harvest and sell the products derived from such forests. Any individuals who plant trees on private land or on state forest land where they have been granted user rights have the right to maintain, develop, harvest and sell forest products (Article 46). For local communities, the state recognizes and ensures their user rights for the purpose of traditional customs, beliefs, religion and living (Article 40). In recent years, Cambodia has followed the global trend of favouring various forms of decentralized forest management. Numerous pilot projects are under way to strengthen the ability of local communities to manage forests. Many of

these build on a long tradition of local forest management by rural people. Other programs target communities who were displaced or whose traditional practices were disrupted during periods of armed conflict.

SFM policy framework. Cambodia's 2003 Law on Forestry incorporates a framework for SFM in its articles 8 and 9, which state that SFM will be conducted in a manner consistent with the National Forest Sector Policy and this 2003 law.

Forest policy and legislation. In October 1998, the National Assembly adopted the government's 'policy platform', which provided for specific actions to establish SFM, including the re-drafting of forest laws and guidelines. In January 1999, the National Assembly decided to crack down on illegal logging, banned the conversion of forest land for other purposes, and decided to retain 10–20% of the AAC from concession forests to meet the domestic demand for timber. In July 2002, the government adopted a national forest policy with the following objectives: (i) to conserve and sustainably manage the country's forest resources; (ii) to establish the remaining forest reserves as PFE; (iii) to promote the maximum involvement of the private sector and the participation of local people; (iv) to establish a coordinated multi-stakeholder process for forestry development; and (v) to promote programs of forestation on arable lands and farms.

The 2003 Law on Forestry replaced Decree No 35 of 1988; it defines the framework for management, harvesting, use, development, conservation and protection of the forest. The major objective is to ensure SFM and customary user rights of forest products for local communities. A number of guidelines and codes serve to regulate forest management, such as: the Cambodian code of practice for forest harvesting (1999), the construction code for forest engineering works, guidelines for SFM, and a planning manual for the management of forest concessions. Uncertainty over the best approaches to solving forest problems led to the undertaking of a major independent forest-sector review, which was completed in 2004. It made numerous recommendations, which the government is now considering. An ITTO diagnostic mission in 2004, which examined obstacles to the attainment of SFM in the country^b, also made a wide range of recommendations.

Meanwhile, the forest sector lingers in a state of uncertainty as the government continues to contemplate the future of industrial concessions and other issues relevant to the forest sector. A model forest concession agreement, prepared with the technical assistance of the World Bank and the Asian Development Bank (ADB), is being used in the renegotiation of contracts between the government and forest concessionaires. The forest-sector reforms, however, are very new and have not yet become effective; the enforcement of existing policies, laws and regulations is weak^b.

Institutions involved in forests. The FA was established in 2003 within MAFF, replacing the DFW. The FA is the sole agency responsible for managing the forest estate; however, national parks and equivalent reserves, including those containing forest, are under the jurisdiction of the Ministry of the Environment and there appears to be some overlap in responsibility. The system of provincial and district forest offices under the direct authority of provincial and district officials was abandoned in 2000. With the new structure operational in 2005, the government decentralized ministerial functions to lower authorities through four regional forest inspectorates^c. In addition, the Forest Research Institute has been re-established under the responsibility of the FA. Global Witness, an international NGO, was contracted to act as an independent monitor of the Forest Crime Monitoring Project; in 2003 this function was transferred to the Swiss-based company SGS and Global Witness officials were allegedly denied further entry to Cambodia (Global Witness 2005). A GIS unit within the FA has completed the Year 2000 Forest Resource Interpretation project. There are awareness programs for biodiversity conservation, reduced impact logging (RIL) and certification. A forestry training centre was inaugurated in 2003 and serves as the FA's vocational training centre.

The present reforms stipulate greater participation of grassroots organizations and of civil society generally in the forest sector. Wildlife and biodiversity conservation is being promoted by international conservation NGOs and community forestry programs by NGOs such as Concern and Oxfam. In 2003, the Cambodian Timber Industry Association was created to respond to these reforms and to assist member companies to attain the capacity to meet the stringent technical and regulatory requirements.

Status of forest management

Forest for production

Before 1970, the forests of Cambodia were managed in a very conservative manner. Forests were classified into forest reserves managed for specific objectives such as production, wildlife conservation, research and preservation. Subsequent political developments caused this system to disappear; in the early 1990s, a system of forest concessions was introduced. In Cambodia, harvesting intensity is expressed in terms of the volume of merchantable timber or the percentage of the standing merchantable volume to be removed. The rate of extraction in evergreen and mixed evergreen forest was set at 30% of the total volume available for harvest. Before 1993, felling was mainly done manually using axes and extraction by buffalo or elephant, but harvesting has been mechanized since the advent of logging concessions.

The hasty introduction of the concession system in 1994 caused widespread damage to the forest. Field inspections and observations indicated that "the state of the current concession forest management is alarmingly at odds with the goal of sustainability" (World Bank 2000). There was no reliable assessment of resources and the processing facilities set up had significant over-capacity. The period 1994–1998 was also one of uncontrolled illegal logging, and wood extraction soon reached unsustainable levels^b. Attempts to get the concessionaires to manage their forests sustainably and pay more taxes did not meet with success. Most companies continued to log high-value species as quickly as possible, without following the prescribed 25-year harvesting cycle (the nominal duration of the concession). The recommended level of harvest was an average of 10 m³ per hectare, but this would scarcely have been economically viable and concessionaires typically harvested four to five times that amount^c.

Between 1994 and 1997, the government granted 36 commercial forest concessions covering about 7 million hectares or around 70% of Cambodia's forests. In this way, the government sought to raise much-needed revenue for national development. Foreign timber companies started investing from late 1994, peaked in 1996, and the last concession was granted in 1997. In 1998, the government

Table 2 Some commonly harvested species for industrial roundwood (2002–2004)^{b,c}

| Timber species | Remarks |
|--|---|
| <i>Dipterocarpus alatus</i> (chhoeuteal tan) | Sawnwood, veneer, plywood |
| <i>Anisoptera glabra</i> (mersawa, phdiek) | Sawnwood, veneer, plywood |
| <i>Hopea odorata</i> (koki) | Sawmilling, construction (bridges, boats) |
| <i>Shorea vulgaris</i> (choë(r) chông) | Sawmilling, construction (housing) |
| <i>Tarrietia javanica</i> | Sawnwood (decorative, furniture) |

began to restructure the sector through the Forestry Reform Program supported by the World Bank. In 2000, the forest administration stipulated that no cutting permits would be issued until 100% inventories of current annual coupes had been completed, 5% inventories had been carried out for the next four annual coupes, and the companies had made the required minimum royalty payments. However, the stipulations were not adequately met. The total official harvest of industrial roundwood was reduced substantially to 123,000 m³ in 2001 compared to about 700,000 m³ in 1997 (ITTO 1999, 2005), although it is likely that much more than this was actually harvested.

In 2001, the government introduced additional legal requirements for concessions such as the preparation of long-term strategic forest management plans consistent with international standards, and the renegotiation of model forest concession investment agreements. In December 2001, the government issued a *Declaration on the Suspension of Forest Concession Logging Activities*, which suspended all logging activities in concessions starting from January 2002 until new forest concession management plans could be prepared and approved. The licences of 17 companies covering 3.50 million hectares in 24 concessions were cancelled and twelve concessions covering a total area of 3.37 million hectares were suspended. In addition the FA closed, and sometimes destroyed, 1,351 illegal sawmills and 653 small wood-processing plants^b. Some concessionaires have prepared new management plans according to the model. However, as of October 2005, all the concessions remained suspended because they were yet to conduct environmental and social impact assessments, which must be incorporated into the plans.

Silviculture and species selection. The model forest concession agreement and the SFM guidelines require that the forests be managed under a selective cutting system based on AAC and size specifications. The guidelines have elaborate provisions for the demarcation of area, inventory, tree-marking, stream buffers and conservation measures, roading standards, skid-trail alignment, directional felling, the location of log landings, post-logging operations, etc. However, little silvicultural effort is currently applied to regenerate previously logged forests (FAO 2005b). A full list of species extracted from natural forests and their respective share in the total is not available; this also varies depending on locality. An indicative list of important timber species is given in Table 2; others include *Pterocarpus pedatus*, *Shorea* spp, *Terminalia* spp, *Eugenia* spp, *Lagerstroemia* spp, *Irvingia* spp, *Xylia dolabriformis* and *Pentacme* spp.

Planted forest and trees outside the forest. Teak is the single most important planted species, covering 7,000 hectares, followed by 9,000 hectares of other broadleaved species (*Acacia auriculiformis*, *Hopea odorata*, *Eucalyptus camaldulensis* and *Dipterocarpus alatus*) and 1,000 hectares of *Pinus merkusii*^f.

Forest certification. No forests have yet been certified in Cambodia. As a first step, the government is considering certification as part of its package of measures to achieve SFM.

Estimate of the area of forest sustainably managed for production. No forests in Cambodia's natural-forest production PFE can be considered to be sustainably managed (Table 3). Since all logging is suspended, there is effectively no legal forest management in the production PFE, although there may be significant illegal logging^b.

Table 3 Management of the production PFE ('000 hectares)

| Total | Natural | | | | Planted | | |
|-------|--|-----------------------|-----------|---------------------|---------|-----------------------|-----------|
| | Allocated to concessions/ under licence | With management plans | Certified | Sustainably managed | Total | With management plans | Certified |
| 3,460 | 3,370 (suspended) | 150 | 0 | 0 | 17 | 7 | 0 |

Timber production and trade. Estimated total roundwood production in 2003 was 9.68 million m³, of which fuelwood accounted for 9.56 million m³ (FAO 2005b). In 1990, Cambodia's forest policy emphasized exports. Royalties and taxes on timber were reduced to encourage local processing for export. The legal export of logs was discontinued in 1996; at the same time, processing technology improved, the conversion factor reaching 0.6. Recorded wood production fell when forest concessions were cancelled or suspended; in 2003, industrial log production was an estimated 125,000 m³ compared to 291,000 m³ in 1999 (ITTO 2004, 2005). Some timber is still legally available from government-approved land conversion activities. However, an ITTO diagnostic mission in 2004 reported allegations that the granting of land-conversion permits, for example for rubber estates, had not followed legal procedures and had sometimes been motivated by the access it gave to the timber resources on the land to be cleared^b. The mission was informed that timber was still available in major towns and prices were reported to have remained stable. It was apparent, then, that the effect of the logging ban had been to stimulate a significant illegal timber industry^b. The decline in legal production is reflected in apparent trade: the export of sawnwood fell from 10,000 m³ in 1999 to 2,000 m³ in 2003, and that of plywood and veneer from 83,000 m³ to 20,000 m³ in the same period (ITTO 2004, 2005).

Non-wood forest products. Although many rural people depend on NWFPs to supplement subsistence needs and generate income, no data are available to quantify their economic importance. Potentially marketable products include *Aquilaria crassna*, the seeds of *Strychnos nux-vomica*, the fruits of *Cinnamomum* and *Diospyros*, resin and rattan. Bamboo shoots are eaten and wildlife is important as a protein source.

Forest for protection

Soil and water. There are laws, rules and regulations (eg the 2003 forest law, Royal decrees 1993 and 1999 and sub-decrees nos 75, 76 and 77 (2002)) addressing the role of forests in the protection of soil and water. The five-year National Environmental Action Plan (1998–2002) also had provisions in this regard. Nearly 40% (4.2 million hectares) of the designated PFE is intended to be managed primarily for the protection of soil and water^a.

Biological diversity. The government of Cambodia estimates that 125 species are endangered^a. Twenty-eight mammals, 26 birds, 15 reptiles, three amphibians and 32 plants are listed as critically endangered, endangered or vulnerable on the IUCN red list of threatened species; of these, 21 mammals, 20 birds and three amphibians are found in forests (IUCN 2004). Three plants are listed in CITES Appendix I and 40 in Appendix II (CITES 2005).

Protective measures in production forests. Detailed guidelines have been developed for commercial forestry operations in order to protect watersheds and to prevent or minimize soil erosion and stream siltation. Regulations also provide for wildlife protection.

Extent of protected areas. According to UNEP-WCMC (2004), 3.36 million hectares of forest are in protected areas that conform to IUCN protected-area categories I–IV, including 1.20 million hectares of deciduous/semi-deciduous broadleaved forest and 897,000 hectares of lowland evergreen broadleaved rainforest. There are 23 protected areas in IUCN categories I and II and 71 in categories III and IV^a. Protected areas are of four main types: national parks, wildlife sanctuaries, protected landscapes and multiple-use areas.

Estimate of the area of forest sustainably managed for protection. No information was available for this report on the management status of the protection PFE (Table 4).

Table 4 Management of the protection PFE ('000 hectares)

| Total | Attributed to IUCN categories I-IV | Allocated for soil and water | With management plans | Sustainably managed |
|-------|------------------------------------|------------------------------|-----------------------|---------------------|
| 4,620 | 3,360 | 4,200 | n.d. | n.d. |

Socioeconomic aspects

Economic aspects. Badly shaken by decades of internal conflict, Cambodia's economy is gradually improving. The recorded contribution of forestry to GDP fell from 5.4% in 1998 to 2.1% in 2001; after the logging ban in 2002 it fell effectively to zero. These figures are misleading, however, because there is no accounting for illegal activities or subsistence and traditional uses. No recent information is available on employment, income, recreational facilities and other benefits.

Livelihood values. The recorded production of fuelwood is close to 10 million m³, but considerable quantities probably remain unrecorded. This applies to all forest products in subsistence use. No quantitative data are available on the role of NWFPs in maintaining livelihoods, although this role is considerable.

Social relations. The participation of indigenous people and local communities in forest management is recognized by law. The country's community forestry program has increased in scope and size since 1992. A sub-decree on community forestry provides for an increase in the number (and area) of community forests and encourages local communities to participate in SFM. An area of 64,900 hectares of forest has been set apart for local community use. There are 159 community forestry sites involving 34,100 families^a. The participation of indigenous people is also promoted by facilitating improved market access for their products.

Summary

Deforestation is expanding rapidly in Cambodia. Nevertheless, the country has a large forest resource with the potential to sustain a robust timber industry and contribute enormously to national development. But the recent history of Cambodian forestry has been turbulent, and the timber sector is in disarray. The concession system has been suspended, yet unauthorized timber

production apparently continues. The implementation of recent reforms, and increased law enforcement, are urgently required.

Key points

- Cambodia's significant reserves of high-value production forests present an important economic resource, the sustainable use of which would be of considerable benefit to the country.
- Cambodia has an estimated 8.10 million hectares of PFE, comprising 3.46 million hectares of natural production forest, 4.62 million hectares of protection forest and 17,000 hectares of industrial timber plantations. However, data on Cambodian forests are often inconsistent and unreliable.
- No part of the production PFE is considered to be under sustainable management; insufficient information was available to estimate the area of protection PFE so managed.
- A significant but unestimated area of forest has been degraded by shifting cultivation, encroachment, the development of agro-industries, illegal logging, over-harvesting and forest fire, as well as by the use of chemicals during war.
- The Forestry Administration was created in 2003, replacing the Department of Forestry and Wildlife; it has responsibility for managing the forest estate, although there may be some overlap in roles with the Ministry of Environment for forests in national parks and related reserves.
- Forest-sector reforms have been developed but are yet to be implemented effectively; the enforcement of existing policies, laws and regulations is weak.
- The management of forest concessions has been poor; the government cancelled some licences and, in 2002, suspended all remaining forest concessions until they fully complied with requirements. One apparent effect of this ban has been to stimulate a significant illegal timber industry.

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