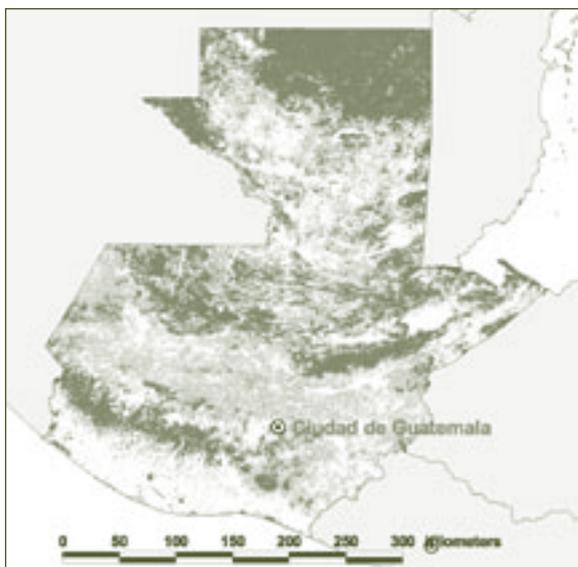


# GUATEMALA



\*For legend see page 58

## Forest resources

With a population of 12.4 million people and a land area of 10.9 million hectares, Guatemala has the lowest forest area per capita in Central America after El Salvador. The country can be divided into three main biogeographical regions. The first, where most of the population lives, comprises highlands made up of several mountain chains stretching from the border with Mexico southwards to the border with Honduras. The highest peaks are steep volcanic cones reaching more than 4,000 m above sea level; the country's main conifer forests are found here. The second is the Pacific plain, stretching along the Pacific coast, which is characterized by rich volcanic soils. Once covered with tropical moist forest and natural grassland, this region is now mainly developed into sugar, banana and rubber tree plantations, and cattle ranches. The third, the Petén, is a flat, low-lying region situated in the north bordering Mexico

and Belize. This is mainly a limestone plateau covered with dense moist tropical forests, swamps and grasslands, and features the ruins of ancient Mayan cities. Estimates of total forest area include 2.85 million hectares (FAO 2005a) and 4.29 million hectares<sup>a</sup>, the latter (for 2002) based on the analysis of satellite imagery.

**Forest types.** Four major forest types can be distinguished:

- tropical hardwood forests (*bosque latifoliado*): more than 300 tree species have so far been identified, but two genera, *Dialium* and *Brosimum*, dominate;
- closed pine forests in the highlands (*bosque de pino denso*): the most commercially important species is *Pinus oocarpa*;
- mixed hardwood and pine forests (*bosque mixto*) covering about 450,000 hectares, composed of two main tree associations: pine-oak and pine-liquidambar (*Liquidambar styraciflua*). *Cupressus lusitanica* (cypress) is also found in these forests; and
- relicts of mangrove forests (*bosque de manglar*) covering about 17,000 hectares on the Pacific coast<sup>a</sup>.

**Dynamics of forest resource change.** The average annual deforestation rate in 1990–2000 was an estimated 54,000 hectares, or 1.7% of the forest area (FAO 2005a). There has been deforestation in the conifer forests of the highlands for centuries, but today it mostly takes place in the Petén, which was an intact and inaccessible forest area up to the 1960s. Large-scale deforestation started there in the 1970s as a result of a land colonization program initiated by the government and accelerated in the 1980s when entire villages of indigenous people

Table 1 PFE

Estimated total forest area, range (million hectares)	Total closed natural forest ('000 hectares) Source: FAO 2001	PFE ('000 hectares)			
		Production		Protection	Total
		Natural	Planted		
2.85–4.29	2,824	1,140 <sup>d</sup>	71 <sup>a</sup>	1,240 <sup>d</sup>	2,451

sought refuge from the country's civil war. An estimated 78% of the deforestation in the Petén is caused by shifting cultivation, the remainder by cattle ranching<sup>a</sup>. The country has about one million hectares of secondary forests (*bosques secundarios, arbustales*).

Uncontrolled forest fires occur regularly at the end of the drier seasons in the conifer forests and the tropical hardwood forests, causing local damage to forest stands that have already been opened up. Uncontrolled fires damaged over 60,000 hectares of forest in 2003<sup>a</sup>. About 4,000 hectares of conifer forests are affected by insect infestations that followed previous fires<sup>a</sup>.

**Permanent forest estate.** Twenty-two per cent of the country's land area (2.36 million hectares) is covered by forests with an integrated land-use plan<sup>a</sup>. The estimated total area of natural-forest PFE is 2.38 million hectares<sup>a</sup> (Table 1), which can be subdivided into 1.14 million hectares of production forest and 1.24 million hectares of protection forest<sup>c,d</sup>. The distribution of the PFE by forest type is as follows: tropical hardwood forest – 1.7 million hectares; conifer forest – 50,000 hectares; mixed hardwood and pine forest – 130,000 hectares; and open woodlands and secondary forests – 500,000 hectares<sup>c</sup>.

**Planted forests.** In 2003, there were an estimated 71,000 hectares of planted forest in Guatemala, mainly of local pine species<sup>a</sup>. About 3 million hectares of non-forested land are considered suitable for tree-planting<sup>a</sup>.

## Institutional arrangements

**Forest tenure.** Forest ownership may be public or private; public is divided into national (federal government), local government or municipal and communal. An estimated 38% (1.5 million hectares) are privately owned, 34% (1.4 million hectares) are national forests and about 930,000 hectares are municipally/communally owned. Indigenous communal lands (*ejidales*) have special status by law. Because of the civil war (which ended formally in 1996), the ownership of about 210,000 hectares is obscure – more than one million people were displaced from their traditional lands in the 1980s and 1990s. Moreover, the complicated system of land tenure has led to many overlapping rights.

As a result, despite recent efforts the problems of insecurity of land tenure and ownership remain critical for the rural poor.

**SFM policy framework.** Guatemala is actively involved in the Lepaterique C&I process of Central American countries. Since 2001, the country has been making a major effort to test and adopt FSC standards as a binding instrument for monitoring forest management. The country is also considering adapting the ITTO C&I as an instrument to monitor progress towards SFM at the national level<sup>c</sup>.

**Forest policy and legislation.** The present forest law (October 1996, Decree 101-96) emphasizes the importance of reforestation and forest conservation and makes reference to SFM. The ministry in charge of rural development until 2000 (*Ministerio de Agricultura, Ganadería y Alimentación – MAGA*) established an environmental policy in 1998, identifying sustainable development as its primary goal. A new forest policy was formulated in 1999; this promotes the concept of productive management of natural forests (*fomento al manejo productivo de bosques naturales*), with the aim of making natural forests a main feature of economic development in order to conserve biodiversity and improve the living conditions of forest-dependent populations. This aim was to be achieved by intensive silvicultural management to increase the quality and quantity of timber and NWFPs. The policy also makes specific reference to restoration and rehabilitation as major elements of forest development. Based on this new policy, a strategic plan was developed that includes new financial mechanisms, such as incentive payments for reforestation, the Clean Development Mechanism and payments for environmental services, particularly water. A national biodiversity strategy was formulated between 1995 and 1999; it regulates *in situ* and *ex situ* conservation and includes long-term planning and management directives for protected areas. The Law on Protected Areas of February 1989, amended in 1996 and 1997, regulates the system of protected areas known as SIGAP (*Sistema Guatemalteco de Areas Protegidas*). A national strategy for the conservation and sustainable use of biodiversity was also approved in 1999.

**Institutions involved in forests.** Through a congressional decree approved in December 2000 (Decree 90-2000), the Ministry for Environment

and Natural Resources (*Ministerio de Ambiente y Recursos Naturales* – MARN) shares authority over natural resources with MAGA, but the relative responsibilities of the two ministries for forest management are not clear. The National Forest Institute (*Instituto Nacional de Bosques* – INAB), created in 1996 out of the former forest service as an independent and decentralized state agency, is responsible for developing SFM in natural forests and for the establishment and management of planted forests. The latter is supported through a national incentive program (*Programa de Incentivos Forestales* – PINFOR) that by the end of 2004 had generated more than US\$50 million for forest development activities<sup>c</sup>. INAB is also responsible for forest inventories and the preparation of forest management plans in both planted and natural forests. INAB is supervised by a national council (*Junta Directiva del INAB*) that comprises representatives of MAGA, the private sector and civil society and the national association of municipalities. The National Council of Protected Areas (*Consejo Nacional de Areas Protegidas* – CONAP), established under MARN in 1989, is responsible for the management of protected areas. CONAP is also in charge of the overall management of natural forests, and in particular of the Maya Biosphere Reserve, the largest tract of closed moist tropical forest in Guatemala, and the biosphere reserve of *Sierra de las Minas*. CONAP's tasks include the delivery and supervision of long-term community and industrial concessions. In the mid 1990s, CONAP established a new system of community concessions as an incentive for SFM in multiple-use zones in the Petén. Some of the communities that became involved in forest management under this novel concept have managed, with international support, to certify their forest operations.

The process of decentralization is recent and an expression of national reconciliation after the civil war. Each national institution has its own criteria for decentralization. By the end of 2004, a total of 105 municipal forest offices had been established<sup>c</sup>. Municipalities are required to create environmental offices and are encouraged to conduct reforestation projects; municipalities can keep 50% of the revenues from concessions and harvesting licences (Ferroukhi 2003).

Guatemala contains 24 ethnic groups; more than two-thirds of the population is of indigenous descent and 61% is rural. There is a long tradition of forest conservation, particularly in the highlands. Local institutions are in charge of forest administration, and a village council generally deals with forest-related issues. However, such local institutions, communities and local NGOs have long been excluded from forest management, except for a few cases in the Petén. Since the end of the civil war there has been some participation in the classification and management of protected areas through national and regional roundtables (*mesas de diálogo*) and in forest development through consultation roundtables convened by INAB together with the National Forest Program Unit. An association of NGOs (*Asociación Nacional de Recursos Naturales y Medio Ambiente*) participates in the supervisory committee of INAB and in the consultative groups of MARN and CONAP.

## Status of forest management

### Forest for production

The forest law of 1996 made the preparation of forest management plans compulsory for long-term forest users. The management plan itself, however, is in many cases only an improved timber harvesting plan and often does not prescribe any silvicultural prescriptions or measures to conserve biodiversity. To improve the situation, INAB has adopted a methodology prepared by the former Regional Forest Program for Central America (PROCAFOR) and the Tropical Research and Higher Education Centre (*Centro Agronómico Tropical de Investigación y Enseñanza* – CATIE). The method includes the preparation of 'simplified management plans for hardwood forests' and 'forest management plans for conifer forests in Central America'.

The two main forest types harvested over the past century are the conifer forests and the mixed pine/hardwood forests of subtropical areas. Today, the greatest production potential is in the tropical hardwood forests and in secondary forests.

In 2003, a total area of 697,000 hectares in the PFE was covered by management plans, 483,000 hectares in tropical hardwood forests, 172,000 hectares in mixed forests and 37,200 in pine forests<sup>a</sup>.

**Table 2 Some commonly harvested hardwood species for industrial roundwood<sup>c,\*</sup>**

Timber species	Remarks
<i>Swietenia macrophylla</i> (caoba)	15% of export volume in sawnwood and 40% of total export value in 2003
<i>Lonchocarpus castilloi</i> (manchiche)	Mainly for domestic uses
<i>Calophyllum brasiliense</i> (santa maria)	Mainly for domestic uses
<i>Bucida buceras</i> (pucte)	Increasingly exported as a new species for flooring and parqueting

\* Tropical hardwood species only; overall, the most important group of commercial timbers in Guatemala is *Pinus* spp

Since 1998, forest concessions have been granted to communities, who manage for both timber and NWFPs. At the beginning of 2004, twelve community concessions and two industrial concessions had been granted, all of them located in the Petén<sup>a</sup>. The total area under forest concessions was 463,423 hectares, most of them community based; the smallest concession was 4,149 hectares and the largest 83,558, and the two industrial concessions were 64,869 hectares and 66,548 hectares in size<sup>a</sup>. Forest concessions are managed according to a polycyclic silvicultural system with a 40-year rotation<sup>a</sup>. All concessions are required by law to obtain certification under the FSC scheme within three years of establishment.

The most serious problem in forest management is small-scale illegal logging of single trees over wide areas. In the tropical hardwood forests, *Swietenia macrophylla* (caoba) and the various species of *Cedrela* are the species most targeted by illegal logging. In the highlands, illegal logging threatens in particular *Abies guatemalensis* (pinabete) and cypress.

**Silviculture and species selection.** Of the 424 known indigenous tree species, 320 are considered to have some use<sup>a</sup>; about 25 species are traded. The main traditional commercial species in the mountainous areas are pines (*Pinus oocarpa*, *P. pseudostrobus*, *P. maxiinoi*), cypress and *Quercus* spp (roble). Caoba and *Cedrela odorata* (cedro) are the main commercial species in the hardwood forests of the Petén; despite heavy logging over the past 60 years or so, both species occur in abundance in all forest layers and cannot be considered threatened<sup>c</sup>. The two species constitute the main valuable species for the majority of the certified FMUs<sup>c</sup>. FMUs are

closely monitoring regeneration of the two main species and are promoting enrichment planting after harvesting, particularly with caoba. The minimum cutting diameter for caoba and cedro is 60 cm (55 cm in certain FMUs); for other species it is 45 cm.

#### **Planted forest and trees outside the forest.**

Relatively small areas of tree plantations are scattered throughout the country; these are often established without a clear purpose<sup>c</sup>. Four conifer species (*P. caribaea*, *P. maximinoi*, *P. oocarpa* and *C. lusitanica*) and two broadleaved species (*Tectona grandis* (teak, teca) – 4,000 hectares, and *Gmelina arborea*) make up 70% of existing plantations. *Hevea brasiliensis* is planted for both rubber and timber. Some 18,400 hectares of new plantations were established between 1997 and 2002, mainly through an incentive program for private investors and communities, with an emphasis on teak plantations and agroforests. The present reforestation policy aims to establish another 240,000 hectares of plantation between 2003 and 2016.

**Forest certification.** The National Council of Sustainable Forest Management Standards (*Consejo Nacional de Estándares de Manejo Forestal Sostenible*) has developed national certification standards for both natural and planted forests. Since December 2003, these standards have been tested at the national level and were expected to be widely implemented by 2005. With international support, a considerable effort has been made to certify forests in the PFE. As of December 2005, 15 FMUs covering a total area of 522,870 hectares had been certified by SmartWood or SGS according to FSC standards (FSC 2005). Of these, 520,410 hectares were in natural forests and 7,566 hectares

**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
1,140	540	697	520	672 <sup>d</sup>	71	25	7.57

in plantations; most are located in the Maya Biosphere Reserve in the Petén. After Bolivia and Brazil, Guatemala has the largest extent of FSC-certified forests in the tropics.

**Estimate of the area of forest sustainably managed for production.** About 700,000 hectares of the production PFE are subject to some sort of management, of which an estimated 265,000 hectares are conifer and mixed forests, both natural and planted, outside the moist tropical forest zone. Assessments of the management of community forest concessions indicate that forest management has improved there<sup>c</sup>. At least 672,000 hectares of natural-forest production PFE are considered to be under SFM, composed of the certified forest concessions in the Petén and natural pine forests managed according to defined management principles<sup>d</sup>. Table 3 summarizes the forest areas managed for production purposes.

**Timber production and trade.** Total roundwood production in 2002 was an estimated 16.1 million m<sup>3</sup>, up from 14.7 million m<sup>3</sup> in 1999 (FAO 2005b). Total industrial roundwood production in 2003 was an estimated 492,000 m<sup>3</sup>, of which 392,000 m<sup>3</sup> was coniferous. Total sawnwood production was 200,000 m<sup>3</sup> (including about 160,000 m<sup>3</sup> of conifers); veneer and plywood production each amounted to about 20,000 m<sup>3</sup> in 2003 (ITTO 2005). Some of the sawnwood and most of the veneer and plywood production is exported to other countries in Central America and the Caribbean and to North America, mostly as certified products. Firewood and charcoal are important products for the local market for cooking food and for generating energy for small artisanal industries (brick-making, molasses-making, lime-making, etc).

**Non-wood forest products.** Among the internationally tradable NWFPs are pine resin, pine seeds, copal (*Bursera bipinnata*, *Protium copal* and other species), xate leaves (from the *Chamaedorea* palm), *Pimenta dioica* (pimiento) and *Manilkara zapota* (chicle gum), a dominant tree in the primary forests of the Petén. Pine resin and copal are mainly produced in private forests and chicle, xate and pimiento in public forests<sup>a</sup>. Another species used is *Quassia amara*, known as hombre grande, a natural biocide used in organic agriculture in the Petén.

### Forest for protection

**Soil and water.** The system of protected areas in Guatemala, SIGAP, comprises nearly 950,000 hectares of special protection forests (*zonas de amortiguamiento*)<sup>a</sup>. An estimated 184,000 hectares of forest land are managed primarily for soil and water protection<sup>a</sup>.

**Biological diversity.** The forests of Guatemala are extremely rich in biodiversity and are characterized by flora and fauna representative of both temperate and tropical America. Ten mammals, eleven birds, eleven reptiles, 74 amphibians and 87 plants are listed as critically endangered, endangered or vulnerable on the IUCN red list of threatened species; of these, six mammals, ten birds, two reptiles, 74 amphibians and three plants are found in forests (IUCN 2004). Guatemala has listed six plant species in CITES Appendix I and 363 plant species, including *Abies guatemalensis*, in Appendix II (CITES 2005).

**Protective measures in production forests.** Concession-holders are required to, among other things, conserve seed trees, set aside areas from which tree-felling is excluded, make special provisions for biological corridors, regulate hunting, and conserve endangered plants and animals.

**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
1,240	836	184	n.d.	n.d.

**Extent of protected areas.** Forty-seven (39%) of the 120 protected areas in Guatemala are inter-connected<sup>a</sup>. Legally protected areas that include forest and non-forest land cover 3.1 million hectares, or 28% of the national territory. Forty-three are smaller than 1,000 hectares and five are bigger than 100,000 hectares. According to Guatemala's 1999 forest resource assessment<sup>a</sup>, about 2.26 million hectares of forests have some protected area status, as follows:

- conifer forests: 42,000 hectares;
- tropical hardwood forests: 1,820,000 hectares (including IUCN Category VI – multiple use);
- mixed conifer/hardwood forests: 140,000 hectares;
- mangrove forests: 4,000 hectares; and
- secondary forests/matorrales: 250,000 hectares.

Of these, about 45% are in IUCN Protected-area Category I (21 areas, 209,000 hectares), Category II (40 areas, 160,000 hectares) and Category III (seven areas, 102,000 hectares); they include national parks, biological reserves, protected biotopes, cultural monuments and wildlife sanctuaries. The estimate by UNEP-WCMC (2004) of the area of forest in protected areas conforming to IUCN protected-area categories differs, putting no hectares in Category I, 382,000 hectares in Category II, 453,000 hectares in Category III (including 119,000 of 'unclassified' forest), and 1,000 hectares in Category IV, for a total of 836,000 hectares in the four categories.

**Estimate of the area of forest sustainably managed for protection.** Insufficient information was available for estimating the extent of protection PFE managed sustainably.

## Socioeconomic aspects

**Economic aspects.** The forest sector contributed approximately 2.5% to GDP in 2003<sup>a</sup>. In 2003, the forest sector directly employed an estimated 37,000 people<sup>a</sup>.

**Livelihood values.** Hunting and the gathering of edible plants such as the fruits of chicle have been of great importance for the Mayan culture for centuries. Both indigenous communities and colonists in the tropical moist forest zone use forest products in their households; products include the fibres of bayal (*Desmoncus* spp) and palm leaves (*sabal*) for housing. In the highlands (the most populated areas), fuelwood from the forests is the most important source of energy.

**Social relations.** A specific program was launched in 2001 known as the communal forestry program (*Proyecto Fortalecimiento Forestal Municipal y Comunal – BOSCOM*) to counter pressure on natural resources and to provide work for the unemployed; it involves 102 municipalities that carry out reforestation and protection measures. The program also provides incentives for small-scale timber producers in forest management.

## Summary

Forests play an important role in Guatemala. They provide a source of income and household products for many poor and a resource for the commercial timber sector. However, SFM has been hindered in the past by, among other things, a protracted civil war, and deforestation was widespread. As the lowland rainforests of the Petén are also opened up, the sector is attempting to improve forest management. Great strides are being made by both private operators and communities, to the extent that more than half the production PFE is now considered to be under SFM.

## Key points

- The PFE comprises an estimated 1.14 million hectares of natural-forest production forest, 71,000 hectares of plantations and 1.24 million hectares of protection forest.
- At least 672,000 hectares of production PFE are estimated to be under SFM; insufficient data were available to estimate the area of protection PFE so managed.
- The system of protected areas and the monitoring of biodiversity have both been long established. However, information on the status of their management is lacking.
- A large part of the natural forest estate in the highlands has been over-harvested, and development is proceeding rapidly in the Petén.
- Enormous efforts have been made since the end of the civil war to reorganize the control and management of forest resources; this has included the decentralization of management and monitoring. But support for existing community forest management institutions remains weak.
- There is long-standing experience in the management of conifer forests. The recent implementation of a well-defined concession management policy in moist forest areas also constitutes a solid basis for SFM.
- Forest management certification has been widely introduced with the support of international donors in the community concessions in the Petén, but its long-term prospects will depend on its financial viability once donor support is withdrawn.

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