BRAZIL

*For legend see page 58

Forest resources

Brazil has a land area of 846 million hectares and a population of about 177 million people. It shares 16,000 km of borders with ten neighbouring countries and its Atlantic coast is 7,370 km long. Ninety-three per cent of the country is below 800 m in altitude. The highest peaks, of about 2,500 m, are found on the northern border with Venezuela in the territory of Roraima and the state of Amazonas, and in the southeast on the Atlantic coast. Two geographic features stand out: the vast Amazon Basin, which contains the world's largest area of tropical rainforest; and the Brazilian Highlands, an eroded plateau in the south and southeast of the country, which separates Brazil's inland regions from a narrow Atlantic coastal plain. The climate of Brazil is largely tropical or subtropical; temperatures average about 26°C with little seasonal variation. Annual rainfall varies from 3,000 mm or more in some parts of the northern region to 1,600 mm in central Brazil and 300 mm in the northeast. Estimates of total forest cover range from 544 million hectares (FAO 2005a) to 444 million hectares (UNEP-WCMC 2000); both estimates include tropical and non-tropical forests, although the area of non-tropical forest is small. According to UNEP-WCMC (2000), 430 million hectares of the total are tropical.

Forest types. Brazilian forests can be classified broadly as Amazon rainforest, Atlantic rainforest, central *cerrado* savanna, arid *caatinga* and the wetlands of Pantanal. About 95% of the existing natural forests (and 98% of the potentially productive natural forests) are in the Amazon (Macqueen et al. 2003). The extent of the major forest types are as follows: lowland evergreen broadleaved forests – 217 million hectares; semi-evergreen moist broad-leaved forest – 48 million hectares; and sparse trees and parkland – 38 million hectares (UNEP-WCMC 2004). Data about the extent of secondary forests are not available. Mangrove forests cover about 1.6 million hectares (ibid.).

Dynamics of forest resource change. The annual rate of change in forest cover in the period 1990–2000 was estimated by FAO (2005a) to be 0.4%, or 2.31 million hectares per year. However, efforts to reduce this rate may be working; according to the Brazilian government, in the twelve-month period August 2004 to July 2005 some 1.89 million hectares were deforested in the Amazon, down

Table 1 PFE

Estimated total forest area, range (million hectares)	Total closed natural tropical forest ('000 hectares) Source: derived from FAO 2001	PFE ('000 hectares)**			
		Production		Protection	Total
		Natural	Planted		
444–544*	489,515	98,100	3,810	271,000	372,910

* Tropical and non-tropical

** Estimate for production and protection PFE are derived from MMA (2001) CIFOR (2003), FAO (2004) and Poore & Thang (2002). Tropical forest area only. The production PFE includes 48.2 million hectares of conservation units for sustainable use and an estimated 50 million hectares of legal reserves for production purposes (CIFOR 2003)

from 2.7 million hectares in the corresponding period in 2003–04 (Damé 2005). While all kinds of forest have been subject to deforestation, it has been most severe in the Atlantic rainforests and in the central plains. Of the original area of Atlantic rainforest, only 7% remains; by comparison, 86% of the Brazilian Amazon remains intact. Many factors contribute to deforestation in the Amazon, the main ones in recent years being the expansion of cattle-raising and commercial agriculture, in particular soybeans. In 2004, about 20% of the total Brazilian cattle herd of 204 million animals was in the Amazon, and the industry is reportedly growing at more than 4% per year (Louven 2005). Other factors in deforestation include unregulated logging, mining and oil extraction, subsistence agriculture and fire.

Natural hazards such as floods, cyclones and droughts are rare, but forest fires have been a conspicuous recent component of forest destruction. Fire is a relatively new phenomenon in the Brazilian Amazon and is mainly human-induced.

Permanent forest estate. In the Amazon the PFE may be considered to comprise 48.2 million hectares of conservation units, 103 million hectares of indigenous lands, 20.4 million hectares of permanent preservation areas and 198 million hectares of legal reserves on private lands, including both production forests and protection areas, amounting to a total of about 370 million hectares[b].

Planted forests. The total plantation forest area was an estimated 4.98 million hectares in 2000 (FAO 2005a), but the split of this between tropical and non-tropical was not reported. Tomaselli and Siqueira (2005) reported a total of 1.96 million hectares of *Pinus* and 3.29 million hectares of *Eucalyptus* plantation (the two genera comprising an estimated 95% of all plantations). Of these 5.25 million hectares, 3.81 million were established in states with a significant proportion or all of their territories in the tropics. Approximately 14,000 hectares of *Tectona grandis* (teak) have been established, and this area is increasing.

Institutional arrangements

Forest tenure. About 70% of the production PFE in the Amazon is owned privately (FAO 2004). There are legal stipulations to set aside conservation areas within each private forest property and requirements for 'legal reserves' in private forest areas are also defined by law. According to the 1965 forest code and subsequent regulations (eg Decree 1.282 of 1994), 80% of the forest property is to be kept as legal reserve in the Amazon, 35% in the *cerrado* and 20% in other areas. Legal reserves in private lands cover 198 million hectares, and indigenous lands (Indian reserves) cover 103 million hectares (ibid.). Parts of these forests have been set apart as 'extractive reserves' for the harvesting of latex, nuts, fruits, oils and other products as a way of providing sustainable economic benefits from the rainforest. The extractive reserves, which are administered by the Brazilian Institute of Environment and Renewable Resources (*Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis* – IBAMA), now make up about 4 million hectares (0.8%) of the Brazilian Amazon (IBAMA website). The National Council of Rubber Tappers of Brazil has set 10% of the Amazon as its target for extractive reserves. Despite the fact that much production forest land is privately owned, the forests are considered under the Brazilian constitution to be a common asset for all inhabitants, and ownership and tenure disputes are a major problem. Private owners are only able to exercise their rights within the limits imposed by the forest law of 1965, which regulates the harvesting of timber resources.

SFM policy framework. A new national forest policy was launched in 2001. During 2004, the creation of the Coordinating Commission for the National Forestry Program (*Comissão Coordenadora do Programa Nacional de Florestas* – CONAFLOR), made up of 42 representatives of major public, private and civil-society interest groups, has added a participative dimension to policy identification and formulation in the country. Policies relating to forestry aim to achieve: better cooperation between the federal and state governments; the creation of national and state forests and extractive reserves; the stimulation of wood and NWFP production; the creation of national parks and biological reserves; the removal of undue incentives for deforestation; new instruments for financing SFM; the elimination of local structural imbalances in forestry enterprises; the establishment of state-level forest programs; the change-over from increased government presence to enhanced people's participation and private investment; and continuous monitoring and evaluation.

Forest policy and legislation. Brazil is a federation of 26 states, a federal district and more than 5,500 local governments (*municípios*). The adoption of a new constitution in 1988 prompted powerful decentralization in the management of natural resources and in the implementation of development programs. Considerable political and tax power and fiscal revenue shifted from the central government to states and *municípios,* and privatization and economic liberalization policies were also pursued. However, unclear rules and the ensuing friction have made it difficult for the state and municipal governments to have a more intense and direct involvement in the management of forestry resources. Moreover, efforts to define the relative responsibilities of different layers of government have proved inadequate, as have efforts to exert sub-national power to improve the management of the sector (Gregersen et al. 2004).

The National Forest Program 2000–2010 (*Programa Nacional de Florestas* – PNF) seeks to ensure the sustainability of the forests. One of the aims is to establish 50 million hectares of sustainably managed national forests (*Florestas Nacionais* – FLONAs) by 2010 and to achieve a target of 20 million hectares of forest plantations on private land. It incorporates six broad program areas, focusing on: the encouragement of the sustainable use of forests; fostering reforestation; the recovery of permanent preservation areas and reserves; the support of indigenous people; the control of deforestation and illegal activities; and the prevention of forest fires. Forest legislation includes: the forest law of 1965 (as amended); the Law of Protection of Fauna of 1967; the National Environmental Policy of 1981; the Water Resources Policy of 1997; Law No 9605 of 1998 on environmental crimes; Decree No 3179 of 1999, establishing penalties for forest crimes; and Decree No 3420 of 2000, creating the PNF. These are complemented by regulations from the National Environmental Council and instructions from the Ministry of the Environment, Water Resources and Amazon (*Ministerio de Medio Ambiente* – MMA) and IBAMA, which provide for a national system of conservation units, penalties for all damages caused to nature, obligatory forest replacement, as well as norms related to felling quotas, land conversions, the prevention of forest fires, etc.

Institutions involved in forests. The MMA is responsible for forestry as well as for planning, coordinating and controlling activities related to the National Environment Policy and policies for developing the Amazon. It supervises the activities of IBAMA, chairs the National Council for the Environment (*Conama Conselho Nacional do Meio Ambiente* – CONAMA) and takes part in the President's Chamber for Natural Resources Policies, which coordinates various aspects related to forests. In addition to MMA, other agencies also have responsibilities related to forest resources, such as the National Colonization and Agrarian Reform Institute (*Instituto Nacional de Colonização e Reforma Agrária* – INCRA). Another federal agency with an important impact on land management is the Indian National Foundation (*Fundação Nacional do Índio* – FUNAI), which is responsible for the preservation of Indian culture. In 1999, a Secretariat for Biodiversity and Forests was created in MMA.

IBAMA, established in 1985, implements and coordinates national forest policy. It was created by merging several earlier federal agencies, including the Brazilian Forest Development Institute; it is responsible for the coordination of national environmental issues. In general, IBAMA administers forests nationwide, monitors and controls forestry programs, and conducts environmental awareness campaigns. It also has authority to transfer some of these powers and responsibilities to sub-national governments, although reportedly this has not happened on a significant scale (Toni 2003). IBAMA has no control over the 113 million hectares of indigenous lands, which remain the responsibility of FUNAI, nor has it any control over conversions in settlement areas.

Forestry research is carried out mainly by the Brazilian Agricultural Research Corporation (*Empresa Brasileira de Pesquisa Agropecuária* – EMBRAPA) through its National Forestry Research Center located in Colombo in the state of Paraná. EMBRAPA has groups of forestry research staff at various centres: for the savanna in Brasília; for the humid tropics in Belém do Pará; and for the *caatinga* in Petrolina, Pernambuco state. It also has forestry research units in the states of Acre, Rondônia, Roraima, Amapá and Amazonas. The National Institute of Amazonian Research (*Instituto Nacional de Pesquisas da Amazonia* – INPA), an autonomous

institution in Manaus, conducts research on forest products and silviculture. Universities, large forestry enterprises, and NGOs such as the Amazon Institute of People and the Environment (*Instituto do Homem e Meio Ambiente da Amazônia* – IMAZON) also engage in forestry research. University education in forestry started in 1960; forest engineering courses are now offered by 20 universities. There are some 7,000 forest engineers working in Brazil, 1,600 with master's degrees and 300 with PhDs.

Various national and international NGOs participate in programs and projects and contribute to raising awareness, increasing political pressure for action and supplying some of the technical expertise that may be lacking in some regions. The federal government and its community program have been fostering linkages between local governments and the local population. Under this program, *municípios* stimulate discussions for the preparation of sustainable local development plans. At the beginning of 2002, some 157 *municípios* (less than 3% of all *municípios*) had participated in the program. In certain cases the priorities of poor local populations have clashed with the interests of entrenched and powerful elites of loggers and cattle ranchers (Toni 2003).

Status of forest management

Forest for production

Even though the need for managing forests according to approved management plans was specified in the 1965 forest law, this was almost completely ignored until 1994 when the government defined SFM in practical terms through Decree 1.282. In 1995, Brazil adopted the Tarapoto Proposal of C&I for the Sustainability of the Amazon Forest, sponsored by the Amazon Cooperation Treaty. This, along with the ITTO C&I, form the basis of sustainable management in Brazil's tropical forests.

Brazilian legislation does not yet provide for forest-utilization concessions in FLONAs or other publicly owned forest areas; thus, there are no conventional forest concessions in Brazil, and almost all production management is conducted by private enterprises in privately owned forests. In line with its desire to introduce SFM to 50 million hectares of FLONAs by 2010, the government has been investigating options for allocating timber production in these areas, including the introduction of a concession system (Veríssimo & Cochrane 2003). An estimated 43.9 million hectares of the production PFE in the Amazon are owned privately; of these, an estimated 21.9 million hectares of accessible forest could produce a sustainable yield of 15.2–21.9 million m^3 per year (Tomaselli & Siqueira 2005). By law the use of natural forest resources on private land requires the presentation of a sustainable forest management plan (*plano de manejo florestal sustentável* – PMFS) to IBAMA. Timber may also be harvested when land is converted to other uses such as agriculture. Present legislation allows the conversion of a specified percentage of land into other uses, while the remainder must be maintained under forest cover and requires a PMFS for harvesting. The requirements for the authorization of deforestation are much easier to fulfil than the highly bureaucratic requirements for the approval of forest management plans and annual operation plans. However, control and law enforcement in the Amazon are extremely difficult because of the vastness of the area, poor infrastructure, a lack of capacity and the large number of actors contributing to deforestation[b]. Other problems facing forestry in Brazil are: the remoteness of many forests from centres of commerce and control; the weak competitiveness of SFM as a land-use; the lack of competitiveness of the tropical timber industry, for various reasons; extensive degraded forests; lack of full-cost pricing and the abundant availability of low-cost timber; and a serious shortage of management skills[b]. In 2001, IBAMA suspended 23% of forest management operations for poor inventory, lack of compliance, lack of zoning and other reasons (Macqueen et al. 2003). It has been reported that only about 7% of forest production is under proper forest management (FAO 2004). However, a new and positive trend is emerging. A few private forestry operations have introduced SFM, incorporating scientific planning, multipurpose management, environmental conservation, social service programs and R&D; these include Orsa Florestal, which restructured its Jari operations, and Cikel Brasil Verde, a fully integrated timber company.

Silviculture and species selection. Technical requirements for logging include inventory and the preparation of stock maps, estimation of the AAC, the fixing of cutting size, harvesting rules, conser-

Table 2 Some commonly harvested tropical timber species for industrial roundwood

Timber species	Remarks
Parkia spp (faveira)	At least five different species are used as plywood
Calophyllum brasiliense (jacareuba)	Widely used for exterior construction, furniture, etc
Hymenaea courbaril (jatobá)	Main dark hardwood for multiple uses
Brosimum utile (amapa)	Widely harvested in the Amazon
Erisma uncinatum (cedrinho)	Widely used locally in the Amazon

vation measures and silvicultural treatment (FAO 2004). The cutting cycle has been reduced from 50 to 30 years, and recently to 25 years. Initially, selective logging was confined to very valuable species such as *Swietenia macrophylla* (mogno) and *Virola surinamensis* (virola), which are both under harvesting moratoriums, but, with increasing demand, the number of species extracted has increased. More and more new species are finding markets, and some 150 species are now being logged in Amazon forests (Macqueen et al. 2003). Nevertheless, the issue of lesser-known and lesser-utilized species is still real, as there is insufficient demand for them and they do not command high prices. Table 2 lists some commonly harvested tropical timber species.

Planted forest and trees outside the forest. Even though planted forests account for only about 1% of the total forest in Brazil, their contribution to industrial development has been significant. The main industrial tree species used today are various species of *Pinus* and *Eucalyptus*. *E. grandis, E. saligna* and *E. urophylla* are the species commonly planted in southern Brazil, and *E. citriodora* and *E. camaldulensis* in the drier parts. The pulp and paper and charcoal industries are dependent on eucalypt plantations and there are plans to expand them. After the failure of large-scale *Gmelina arborea* plantations in the Jari project in the Amazon, there have been considerable improvements in the silviculture and management of hardwood plantations, now being managed on a 25- to 30-year rotation. *Tectona grandis* (teak) has become a favourite (eg in Mato Grosso and Rondônia) because of its high value and quality and its amenability to being raised in an agroforestry environment.

Forest certification. As of December 2005, a total of 3.46 million hectares of natural and planted forests, including Mil Madeireira, ORSA Florestal, Cockel, and Guavirá Industrial e Agroforestal, had been certified under the FSC umbrella in Brazil. Of this, an estimated 1.16 million hectares were natural tropical forest and 1.35 million hectares planted tropical forest (FSC 2005). The Brazilian forest certification system CERFLOR was started in the 1990s and became operational for planted forests in 2003; a system for natural forests is under development with financial assistance from ITTO.

Estimate of the area of forest sustainably managed for production. An estimated 7% of the timber of the Amazon comes from areas covered by approved forest management plans and 25% from approved forest conversion areas (FAO 2004; CIFOR 2003). As described earlier, there is no concession system in Brazil; most legally produced timber in the Amazon is harvested from private lands subject to the approval by IBAMA of a management plan. Information on the implementation of such plans was generally not available for this report. A small amount of state-owned forest is also producing timber. The 65,714-hectare Antimary State Forest in the state of Acre is being managed sustainably according to a management plan developed under an ITTO project; some 16,713 m^3 were produced in 2003 from an area of 2,200 hectares; annual production is expected to increase to 52,000 m^3 (data supplied by ITTO project PD 94/90 Rev.3 (I)). Some 3,222 hectares of the Tapajòs FLONA near Santarém in Pará state is also being managed according to a management plan developed under another ITTO project (PD 68/89 Rev.1 (F)); the management plan covers a total area of 136,000 hectares of

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

Natural					Planted		
Total	Allocated to concessions/ under licence	With management plans	Certified	Sustainably managed	Total	With management plans	Certified
98,100	n.a.	5,250	1,160	1,360	3,810	1,350*	1,350

* Estimate based on the assumption that at least the certified planted forests have management plans

production forest within the FLONA. An estimated 1.16 million hectares of natural tropical forest are certified under the FSC umbrella. Available information indicates that at least an estimated 1.36 million hectares of natural tropical forest are being sustainably managed (Table 3).

Timber production and trade. Total roundwood production amounted to an estimated 236 million m^3 in 2003, including 133 million m^3 (56%) of fuelwood (FAO 2005b). In 2001, the contribution of plantations to total wood production was 83 million m^3 (35% of the total); eucalypts alone accounted for 56 million m^3, providing raw material for pulp, fibreboard, particle-board and charcoal (FAO 2003). Brazil produced an estimated 29.7 million m^3 of tropical logs in 2003, up slightly from 27.3 million m^3 in 1999 (ITTO 2004, 2005). About 15.9 million m^3 of tropical sawnwood were produced in 2003, of which 1.32 million m^3 were exported. In the same year, Brazil produced an estimated 1.2 million m^3 of tropical plywood, of which 738,000 m^3 were exported; Brazil does not export logs. Brazil also produces substantial volumes (nearly 80 million m^3 in 2003) of non-tropical timber (ibid.). According to an ITTO diagnostic mission, a key constraint to the development of a sustainable timber industry based on natural tropical forests is the fragility of the supply chain, which is subject to disturbance by several factors. Moreover, the financial competitiveness of SFM in natural forests with alternative land-uses is often low, leading to significant deforestation[b].

Non-wood forest products. Brazil owes its name to *brazilin*, a red dye from *Caesalpinia echinata*, and to the dye extractors, *brasileiros*. A large number of NWFPs (food, medicinal plants, perfumes, dyes and tannins, natural rubber, Brazil nut, handicraft and construction materials, exudates, honey and wax) are used locally. The list of plants providing NWFPs is substantial.

Forest for protection

Soil and water. The Amazon River Basin produces 20% of all freshwater in the world; it is therefore vital that its soil and water resources are properly protected. However, no information on the area of forest set aside primarily for soil and water protection was made available for this report.

Biological diversity. Brazil's forests contain a significant share of the world's biodiversity, including an estimated 56,000–62,000 higher plant (not including mosses, lichens and fungi) and mammal species. The Amazon is home to 20% of the world's plant species, 20% of bird species and 10% of mammal species. Seventy-four mammals, 123 birds, 22 reptiles, 24 amphibians and 381 plants are listed as critically endangered, endangered or vulnerable on the IUCN red list of threatened species; of these, 45 mammals, 77 birds, five reptiles, 18 amphibians and twelve plants are found in forests (IUCN 2004). Brazil has listed 59 plant species in CITES Appendix I and 610 in Appendix II (CITES 2005). The Brazilian National Policy and Strategy for Biodiversity (ESNABIO) and the National Biodiversity Programme are designed to address the situation through *in situ* and *ex situ* measures and the management of biotechnology.

Protective measures in production forests. Measures taken to protect the production forests as part of the country's forest conservation strategy include, among others: a moratorium on the harvesting and sale of over–harvested species such as mogno and virola; the introduction and implementation of measures to control illegal logging through high-tech devices for timber-tracing and satellite data transfer; limiting the area allowed for farming in forest properties in the Amazon; yield regulation in natural selection forests; restoration forestry programs; the establishment of ecological

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
271,000	19,000*	n.d.	n.d.	n.d.

* Includes tropical and some non-tropical forest

corridors; incentives for *municípios* that have environmental conservation areas through the transfer of a 'products and services tax'; and broadening the scope of eligible activities for Clean Development Mechanism support.

Extent of protected areas. There is great uncertainty about the extent of protected areas in Brazil, with figures ranging from 27 million hectares to 271 million hectares; partly this stems from differences in the definition of 'protected' and the extent to which extractive uses are permitted. The estimate given in Table 1 and Table 4 includes indigenous reserves and protected areas on private land. According to UNEP-WCMC (2004), 19.0 million hectares of forest (tropical and non-tropical) are in protected areas conforming to IUCN protected-area categories I–IV, including 10.4 million hectares of lowland evergreen broadleaved rainforest and 5.41 million hectares of unclassified tropical and non-tropical forest. Law 9.985 of 2000 created a National System of Nature Conservation Areas (*Sistema Nacional de Unidades de Conservação*), consisting of two main categories: (i) strictly protected areas (exclusively serving forest and biodiversity conservation), in which timber harvesting and the extraction of NWFPs are not allowed – these include national parks, biological reserves, ecological reserves, national monuments and wildlife refuge areas (IUCN categories I–IV); and (ii) sustainable-use protected areas, where controlled utilization is allowed – these cover national forests, environmental protection areas and extractive reserves. The combined total of 69 million hectares (about 8% of the national territory) is categorized, in terms of responsibility, as federal conservation units (45 million hectares) and state conservation units (24 million hectares).

Estimate of the area of forest sustainably managed for protection. No data were available on the status of management of the protection PFE (Table 4). However, vast areas of the Amazon are currently under no threat from deforestation or other significant human-induced disturbance due to their remoteness.

Socioeconomic aspects

Economic aspects. Forestry contributes about 5% to Brazil's GDP. It is estimated that 1.8 million people have employment directly related to forests (Virgílio et al. 2002). The timber industry employs, on average, 4% of the total workers in the manufacturing sector. Data on the number of people employed in that part of the sector specifically utilizing natural tropical forests were not available for this report.

Livelihood values. The indigenous communities in the Amazon, dwellers in extractive reserves and rubber tappers, and *caatinga* forest users in the northeast depend in large measure on forests for subsistence; however, no data on the extent of this dependence were available for this report.

Social relations. The majority of the Amazon's inhabitants are recent settlers and the differences in their backgrounds lead to frequent friction. While indigenous peoples comprise 0.2% of Brazil's total population, indigenous lands and ancestral domains – mostly in the Amazon – cover about 11.5% of the total land area[b]. Of the 586 indigenous areas, 138 have been recognized formally and 326 areas have reached the final stage of such recognition; in 27 areas, boundaries have been demarcated but in only 19 have the boundaries been fully approved[b]. The slow process of recognition and approval of tenure causes dissatisfaction on the part of the indigenous communities. Nevertheless, the situation of indigenous communities has improved in some areas; indigenous organizations are now both stronger and more numerous and the indigenous population has started to grow, thus reducing fears of extinction. On the other hand, the majority of indigenous people still suffer from economic marginalization, malnutrition and inadequate assistance and protection (as they remain under the guardianship of the federal government)[b].

Summary

Brazil is endowed with an incredible abundance and variety of flora and fauna; it has more known species of plant than any other country. The Amazon represents the single largest tract of tropical rainforest and is still 86% intact; in contrast, the Atlantic forest covers less than 7% of its original area (although it still harbours a wide variety of biodiversity). Some of the most significant problems facing forestry in Brazil are: poor infrastructure; the remoteness of many forests from centres of commerce and control; the weak competitiveness of SFM as a land-use; the lack of competitiveness of the tropical timber industry; lack of full-cost pricing and the abundant availability of low-cost timber; a serious shortage of management skills; and a lack of enforcement of laws and regulations. To date, the high level of biodiversity in the Amazon has not been a development asset. Given that development will continue in the region, probably at an accelerated rate, there is an urgent need to find ways of using the biodiversity resource in financially remunerative and sustainable ways. Government has been working to address institutional barriers to SFM and a number of recent initiatives offer hope that the area of production PFE in the Amazon under SFM will expand significantly in the future.

Key points

- Brazil is a forest-rich country with a tropical-forest PFE of 370 million hectares. Despite deforestation in certain parts, there are still huge forest resources in the Amazon region.
- An estimated 1.36 million hectares of natural tropical forest production PFE are being sustainably managed; insufficient information was available to estimate the area of protection PFE so managed.
- Vast areas of the Amazon are currently under no threat from deforestation or other significant human-induced disturbance due to their remoteness.
- Brazil has successfully raised large-scale industrial forest plantations through private investment to ensure a sustainable supply of raw material.
- The majority of the production forest is under private ownership, although ownership and tenure disputes are a major problem.
- A wide range of policies, strategies, laws and regulations have been developed to facilitate forest administration and to achieve SFM.
- Institutional weaknesses and an inadequate capacity for enforcing policy and policy instruments have been a significant constraint.
- Only a small portion of the forest is under management plans; the bulk of wood production, though derived from private sources, is reported to be unauthorized because it is not based on official approvals. Harvests are often not based on any SFM criteria.
- A number of companies have come forward for the voluntary certification of their forest management operations. However, the financial competitiveness of SFM in natural forests with alternative land-uses is often low, leading to significant deforestation and threatening the long-term viability of sustainably managed natural forests.

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