

ECUADOR



*For legend see page 58

Forest resources

Ecuador has a land area of 27.7 million hectares and a population of 12.6 million people, and comprises four main biogeographical zones: the Andean mountains (*sierra*); the Pacific coast; the Amazon Basin; and, 1,000 km from the coast in the Pacific Ocean, the Galapagos Islands. Estimates of forest area include 11.4 million hectares (MAE 2000), 10.6 million hectares (FAO 2005) and 8.4 million hectares^c. According to the Ministry of Environment (*Ministerio del Ambiente* – MAE) (2000), there are about 6.98 million hectares of forest in the Amazon, 2.52 million hectares on the wet Andean mountain slopes and 1.95 million hectares in a few remote areas of the Pacific coastal region. The native forest on the Pacific coast is mostly of low crown density and is generally heavily degraded. Intact forest areas are found in the easternmost part of the country (*oriente*).

Forest types. Four major forest types occur at altitudes of up to 2,800 m:

- Amazon rainforest;
- rainforests in the northwest (mainly in Esmeraldas province). Rainfall increases with altitude, ranging from 1,500–3,000 mm at sea level to 6,000 mm and more at 800 m. The most common commercial species are *Protium* and *Dacryodes* spp, Laureaceae, *Brosimum utile*, *Inga* spp, *Pourouma chocoana* and *Ceiba pentandra* (kapok);
- mixed forests of the Andes, on the western and eastern slopes, at lower and upper levels, and towards the Andean high peaks. These include cloud forests; and
- dry forests along the central and southern coast, with *Cordia alliodora*, *Pseudosamanea guachapele*, *Tabebuia* spp and various Bombacaceae (*Ceiba* and *Bombax* spp, and balsa – *Ochroma lagopus*).

Slightly degraded primary forests cover about 3 million hectares, whereas secondary forests and scrublands (*matorrales*) together cover about 4 million hectares^c. Most of the secondary forests are in the Pacific coast region.

Dynamics of forest resource change. FAO (2005) estimated the annual deforestation rate over the years 1990–2000 to be about 137,000 hectares. Deforestation is highest in the dry forest area in the southern coastal region. The cause is mainly conversion – both regulated and unregulated – to agricultural land. Uncontrolled forest fires are a major threat, particularly on the Pacific coast; landslides in mountain regions are also common after heavy rainfall.

Permanent forest estate. Most of Ecuador's forests are owned by communities or privately (see 'forest tenure'). Although most do not yet have land titles,

Table 1 PFE

Estimated total forest area, range (million hectares)	Total closed natural forest ('000 hectares) Source: FAO 2001	PFE ('000 hectares)			Total
		Production		Protection	
		Natural	Planted		
8.40–11.4	10,854	3,100 ^d	164	4,300 ^d	7,564

the area of forest that might be considered PFE is about 7.56 million hectares (MAE 2000), of which only 600,000 hectares are currently considered economically harvestable due to steep slopes in mountainous terrain, low timber density, difficulty of access and social constraints. All forests classified in the national system of protected areas (*Sistema Nacional de Áreas Protegidas – SNAP*) are considered to be in the protection PFE.

Planted forests. The total area of planted forest in 2002 was about 164,000 hectares^b, of which 80% is eucalypt and pine plantations in the Andes; the remaining 20% is mainly in the coastal region (^c, MAE 2000), including stands of balsa.

Institutional arrangements

Forest tenure. The Ecuadorian Strategy for Forest Sustainable Development (2000; *Estrategia para el Desarrollo Forestal Sostenible*) includes legal provisions to allocate forests to indigenous communities, farmers and other groups already in possession of forest lands on the condition that they guarantee the sustainable management and conservation of the allocated forests. Recently, about 4.5 million hectares of potential production forests were allocated to indigenous communities (ancestral indigenous or Afro-Ecuadorian)^b; these are treated as privately owned. The remaining PFE is mostly in farmers' plots, which generally range in size between 30 and 60 hectares; the process by which these farmers might be granted land tenure still needs to be clarified^b.

SFM policy framework. Ecuador has recently developed its own set of C&I for SFM based on those of ITTO. In 2000, the (1981) forest law (*Ley 74 RO/64 de 4 Agosto de 1981 sobre Ley Forestal y de Conservación de Áreas Naturales y Vida Silvestre*) was revised and a forest policy was formulated that aimed to reduce deforestation and ensure SFM. The law now contains five criteria for SFM: (i) sustainable timber production; (ii) the maintenance of forest cover; (iii) the conservation of biodiversity; (iv) co-responsibility in management; and (v) the reduction of negative social and environmental impacts. The five criteria are accompanied by 33 indicators, which are now being applied but are subject to further evaluation^c.

Forest policy and legislation. Over the past ten years or so, Ecuador has formulated various action plans and policies with the overall aim of promoting the sustainable management of its forest resources. This process has included the formulation of a Forestry Action Plan (1991–1995), a new forest policy (1995), the formulation of strategic goals for national forest actions and a strategy for sustainable forest development in Ecuador (2000), the approval of a law on environmental management (1999), and the formulation of an environmental strategy for sustainable development (2000). The last of these included a number of substantial reforms in the application of the forest law; consequently, Decree 346 was enacted in April 2000 which recognizes that natural forests are highly vulnerable and all interventions should be carried out according to the above-mentioned five SFM criteria.

In 2001, MAE worked with relevant stakeholders representing the private sector and civil society to develop a system of independent monitoring of the forest control system. A forest control entity called *Vigilancia Verde* was created with the overall task of supervising the flow of forest products from the forest to the marketplace, and the *Regencia Forestal* was created to increase the transparency of *Vigilancia Verde*, to provide technical assistance and support law enforcement in forest operations, and to oversee the implementation of the C&I in the management of the forests. In 2002, SGS received a mandate to carry out an independent audit of the new forestry control system under the *Regencia Forestal*. At the end of 2003, however, the Supreme Court of Ecuador declared that the entire control system was incompatible with the country's constitution. As of November 2004, the contractual terms between MAE and SGS were being renegotiated.

Late in 2003, Ecuador launched a process to formulate a national forest and reforestation program with the overall aim of reviving the forest sector and broadening its stakeholder base.

Institutions involved in forests. In early 1999, the Ecuadorian Institute for Forestry, Natural Areas and Wildlife (*Instituto Ecuatoriano Forestal y de Áreas Naturales y Vida Silvestre*) was integrated into the National Directorate of Forests (*Dirección Nacional Forestal*) under MAE – now the sole governing body

Table 2 Some commonly harvested species for industrial roundwood (2001–2003)^c

Timber species	Remarks
<i>Brosimum utile</i> (sande)	Main natural forest species from the Pacific region
<i>Cordia alliodora</i> (laurel)	From forests, secondary forests, pastures and plantations
<i>Cedrela odorata</i> (cedro)	Primary and secondary forests from the Amazonian and Pacific regions
<i>Alnus acuminata</i> (aliso)	In mountainous regions
<i>Humiriastrum procerum</i> (chanul)	From natural forests in the northeast of Ecuador

of the forestry sector. MAE has restructured and modernized the forestry administration in an attempt to decentralize by forming regional centres that have some autonomy in operation and financial control. These centres are, in turn, intended to involve the civil population in planning and decision-making. However, the division of responsibilities between the national and regional levels remains vague and the results of this restructuring are largely unsatisfactory^b.

Both national and international environmental NGOs are very visible in Ecuador. They implement projects in natural resource protection and management and also have an important advocacy role in issues of environmental policy. Forest-owners and timber industries are organized in associations (AIMA, ASOTECA and others). They play an active part in policy-making and forest development.

Status of forest management

Forest for production

There is no coordinated approach to natural forest management in Ecuador; many potential management techniques have not yet been put into practice. There are, however, many examples of management-related activities, including: timber inventories, a system of logging concessions (now dormant), and a continuing program of selection and declaration of protected areas (SNAP), of which a few receive at least some protection and management.

Before 1980, several licensed logging concessions operated in defined areas with defined annual yields. The legal and practical provisions were similar to those operating in many other countries and, as elsewhere, there were serious difficulties of control,

supervision and protection. Due to uncontrolled land reform and subsequent pressure from squatters, concessionaires were forced to withdraw from concessions in the early 1980s and effectively abandoned the use of such agreements as a tool of forest management. Ecuador now uses a system of short-term logging licences which, in addition to its impact on the quality and efficiency of logging operations, has encouraged foresters to consider other ways of ensuring future long-term supplies of timber, particularly through agroforestry. There is strong pressure on the resource from informal and illegal operators who resist regulations they see as unrealistic, and illegal logging is widespread; it may constitute as much as 50–70% of total production^b. SFM is a long way from being achieved in most of Ecuador's PFE: "the forest stock of Ecuador, in view of its importance for national development, has been exploited irrationally. The forest sector presents a picture giving evidence of a clear failure in sustainability" (MAE 2000).

Most timber-harvesting today is done on indigenous and small-farmer community lands and private lands. Legal harvesting is carried out under three kinds of permit: (i) cutting permits (the great majority); (ii) areas harvested according to simplified forest management plans (PAFSIs), which mainly involve non-mechanized extraction; and (iii) areas with integrated management and sustainable management areas (PAFSUs), which are bigger and suitable for industrial harvesting; however, no PAFSUs have been established in the field. More than 1,000 cutting permits were issued in 2003, varying in size from less than one hectare to more than 150, with allowable cuts ranging from less than 5 m³ to more than 2,000 m³ ^c.

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

Total	Natural			Planted		
	Allocated to concessions/ under licence	With management plans	Sustainably managed	Total	With management plans	Certified
3,100	n.d.	65	101	164	65	21.3*

* This area comprises forest described as 'plantation' (1,341 hectares) and 'semi-natural and mixed plantation and natural forest' (20,000 hectares)

Silviculture and species selection. About 120 timber species are used in the domestic market. The prime species harvested in the past include *Swietenia macrophylla* (mara), *Cedrela odorata* (cedro) and *Anacardium excelsum* (marañón), but these have become scarce. Today, 80% of the harvesting volumes from native forests come from about 25 species^c. Besides those listed in Table 2, the more important species are *Virola*, *Otoba glycyarpa* (sangre de gallina), *Cedrelinga catenaeformis* (chuncho), *Podocarpus* spp and *Prumnopitys* spp (romerillo, azucena) from the southeastern forests, and *Trattinnickia glaziovii* (copal).

Planted forest and trees outside the forest. It is estimated that about 1 million hectares of forest land are suitable for forest plantations^b; however, so far there is no firm plan to effectively support an increase in the forest plantation area. The main planted forest species include pines and eucalypts, as well as *Cordia alliodora* (laurel), *Schizolobium parahybum* (pachao) and *Tectona grandis* (teak, teca) in lowland areas and *Alnus acuminata* (aliso) in the mountains. A private company (Durini Group) owns more than 20,000 hectares of plantations. The group established long-rotation plantations (eg with *Cordia alliodora* and *Jacaranda copaia*) in harvested forest plots and has managed these forests for more than 20 years. Balsa, a major export timber from natural forests, is planted today on a limited scale.

Forest certification. Certification is an emerging topic in Ecuador, promoted by NGOs, private enterprises and communities. A first project involving Afro-Ecuadorian communities near Esmeraldas did not succeed. In 2000, the indigenous community, Awa, on the border with Colombia, initiated a

certification process with FSC covering 2,000 hectares, but this was not successful either^c.

The Durini Group, the principal investor in forestry, is engaged with FSC in certifying 10,900 hectares of natural forests; the same group owns 16,220 hectares of certified planted and semi-natural forest (FSC: 9,220 hectares, ISO 14001: 7,000 hectares). Currently, 21,341 hectares are certified under the FSC umbrella (FSC 2005).

Estimate of the area of forest sustainably managed for production. The estimated area of natural-forest production PFE under SFM is at least 101,000 hectares (Table 3); this area includes forests currently in the process of becoming certified as well as some 37 FMUs considered to be sustainably managed^c. The latter areas include private forest lots and planted and natural forests in the *sierra* managed by communities.

Timber production and trade. Total production of logs for industrial purposes was 1.24 million m³ in 2003, down from 1.44 million m³ in 2000. Total sawnwood production was an estimated 52,000 m³, up from 36,000 m³ in 2000. Ecuador exported 11,000 m³ of logs in 2003, down from about 91,000 m³ in 2000. Plywood exports were 70,000 m³ in 2003 (ITTO 2005).

Non-wood forest products. A number of NWFPs are important, in particular fibres; bamboo (*Guadua*); latex; gum; palm products, particularly palm hearts; and medical plants. Tagua or vegetable ivory (seed of the palm *Phytelephas macrocarpa*) is used commercially in handicrafts, as are fibres of *Bactris gasipaes* and *Carludovica palmata* (paja toquilla). A number of ecotourism centres, mostly in the Amazon, attract international visitors.

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
4,300	1,790	2,450*	513	n.d.

* Designated for protection under SNAP but timber production is not excluded

Forest for protection

Soil and water. Protection forest lands include all present, former and potential forest lands that are of special importance for the protection of soil or water resources or for preventing erosion or flooding. They include state land as well as privately owned or occupied land on steep slopes or water catchments and other areas unsuitable for agriculture or livestock production. These areas are distributed in many parts of the country and vary greatly in size and importance; in total they amount to about 2.45 million hectares (Egas 2003).

Biological diversity. Ecuador has a wide range of ecosystems and is considered a mega-biodiverse country. It has more than 16,000 plant species from 273 families, including more than 1,200 ferns and 3,200 orchids. There are 369 native mammals, 1,616 birds, 394 reptiles and 415 amphibians. Thirty-five mammals, 79 birds, eleven reptiles, 163 amphibians and 1,832 plants are listed as critically endangered, endangered or vulnerable on the IUCN red list of threatened species; of these, 13 mammals, 65 birds, 145 reptiles and 1,162 plants are found in forests (IUCN 2004). Eleven plants are listed in CITES Appendix I and 1,293 in Appendix II (CITES 2005).

Extent of protected areas. Protected areas on the Ecuador mainland amount to 4.67 million hectares (18% of the total land area), distributed in 31 different legal categories (national parks, biological reserves, ecological reserves, geo-botanical reserves, bird reserves, wildlife reserves, etc). In addition, the biological reserve of the Galapagos Islands covers 14.1 million hectares of land and marine ecosystems. According to UNEP-WCMC (2004), 1.79 million hectares of forest are in protected areas conforming to IUCN protected-area categories I-IV, including 1.55 million hectares of lowland evergreen broad-leaved rainforest. However, some areas that have been officially declared as protection forests are claimed by indigenous communities and colonists.

Estimate of the area of forest sustainably managed for protection. Little information was available for this report on the quality of management in the protection PFE (Table 4). Up to 500,000 hectares are reportedly covered by management plans^c. Management plans have been prepared (under an ITTO project) for two small reserves (totalling 13,000 hectares) and are now starting to be implemented.

Socioeconomic aspects

Economic aspects. Forest-based activities contribute around 2% of GDP^b. However, data are quite unreliable due to the high level of informality in the forest sector. The forest and timber industry is characterized by a high number of small timber extractors and wood-processing units with low capital input and by poor working conditions; it has difficulty delivering high-quality processed products. It is estimated that there are more than 500 units of active extractors and timber companies, most of them producing less than 2,000 m³ annually. An estimated 235,000 people are in employment linked to forestry and timber industries, which is 8% of the country's active economic population^b.

Livelihood values. Forests have great value for local forest dwellers, with hunting and fishing the most important activities. Forests are also considered as a land reserve and are converted for subsistence agriculture.

Social relations. Illegal harvesting is widespread^b and illicit crops are found in certain forest areas. Forest tenure remains a significant problem and there are many conflicts between communities, government and the private sector. The legal system has not yet been able to resolve such issues, to the extent that signed contracts between the forest industry and the communities may remain unfulfilled for many years^b.

Summary

SFM is a long way from being achieved in most of Ecuador's PFE. National forestry institutions remain weak. One reason for this is that there has been no organizational or staffing continuity in the ministry responsible for forests, MAE, and also a lack of clarity in the decentralization process. On the positive side there is a declared political willingness to designate state forests to communes, indigenous communities, settlers and other interested groups if they can prove that they have the capacity to manage and conserve forest resources. Nevertheless, there is little sign of consistent progress towards SFM.

Key points

- Information on the forest sector is quite often poor and contradictory.
- The PFE is estimated to be 7.56 million hectares, of which 3.26 million hectares (including 164,000 hectares of plantations) may be regarded as production PFE.
- At least 101,000 hectares of natural forest in the production PFE are under SFM. Insufficient information was available for an estimate to be made of the extent of protection PFE so managed.
- Native forests are under threat mainly because of the expansion of the agricultural frontier near the coast and in the Amazon area.
- There is strong pressure on the forest from informal and illegal operators resisting change towards SFM, and illegal logging is widespread in all three forest regions.
- Many accessible forests are now degraded and secondary.
- The capacity to implement the national forest program and other forest-related policies and laws is low.
- In many cases, and despite new legislative provisions, forest tenure remains unclear.
- There is a discrepancy between actual harvesting practices and forestry regulations. Harvesting is generally unsustainable, and legal provisions for harvesting operations are unrealistic and may push forest-users towards illegality.
- Institutional weaknesses have created bureaucracy and additional costs, which have been transferred to the private sector. High transaction costs stimulate informality and corruption and increase timber volumes from illegal sources.
- The effective management of protected forests is inhibited by a lack of funding, a lack of sufficient political support to the forest sector and, in some areas, disputes over tenure.

References and other sources

- ^b ITTO 2004. *Consecución del Objetivo 2000 y la Ordenación Forestal Sostenible en Ecuador*. Report of the Diagnostic Mission. Presented at the thirty-sixth session of the International Tropical Timber Council, July 2004. ITTO, Yokohama, Japan.
 - ^c Information derived from the report of, and discussions with participants at, a training workshop on ITTO criteria and indicators, held 15–19 December 2003, Esmeraldas, Ecuador, attended by 43 people from government, civil society and the private sector.
 - ^d ITTO estimate
- CITES 2005. CITES-listed Species Database. Available from: <http://www.cites.org/eng/resources/species.html> (accessed September 2005).
- Egas, D. 2003. *Tendencias y Perspectivas del Sector Forestal Ecuatoriano al Año 2020*. FAO, Rome, Italy.
- FAO 2001. *Global Forest Resources Assessment 2000*. FAO Forestry Paper 140. FAO, Rome, Italy.
- FAO 2003. *State of Forestry in the Latin American and Caribbean Region 2002*. FAO Regional Office for Latin America and the Caribbean, Santiago, Chile.
- FAO 2005. *State of the World's Forests 2005*. FAO, Rome, Italy.
- FSC 2005. FSC – Certificates Worldwide. FSC International Center & Working Group, Germany. Available from: <http://www.fsc-info.org> (accessed December 2005).
- ITTO 2005. *Annual Review and Assessment of the World Timber Situation 2004*. ITTO, Yokohama, Japan.

IUCN 2004. 2004 IUCN Red List of Threatened Species. Available from: <http://www.redlist.org> (accessed September 2005).

MAE 2001. *Ecuadorian Strategy for Forest Sustainable Development*. National Report in Preparation for Rio+5 Forum. Ministerio del Ambiente, Quito, Ecuador.

MAE 2000. Informe de Progreso para Lograr el Objetivo del Año 2000 de la OIMT. Submitted to ITTO, January 2000. Ministerio del Ambiente, Quito, Ecuador. Unpublished.

UNEP-WCMC 2004. Spatial analysis of forests within protected areas in ITTO countries. UNEP-WCMC, Cambridge, UK. Data prepared for ITTO (see Annex 1).