



**BRAZILIAN FOREST
SERVICE**

BRAZILIAN FORESTS
at a glance

2013

Ministry of Environment
Brazilian Forest Service

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BRAZILIAN FORESTS
at a glance

Data from 2007 to 2012

2013

Ministry of Environment
Brazilian Forest Service
2013

Brazilian Forest Service

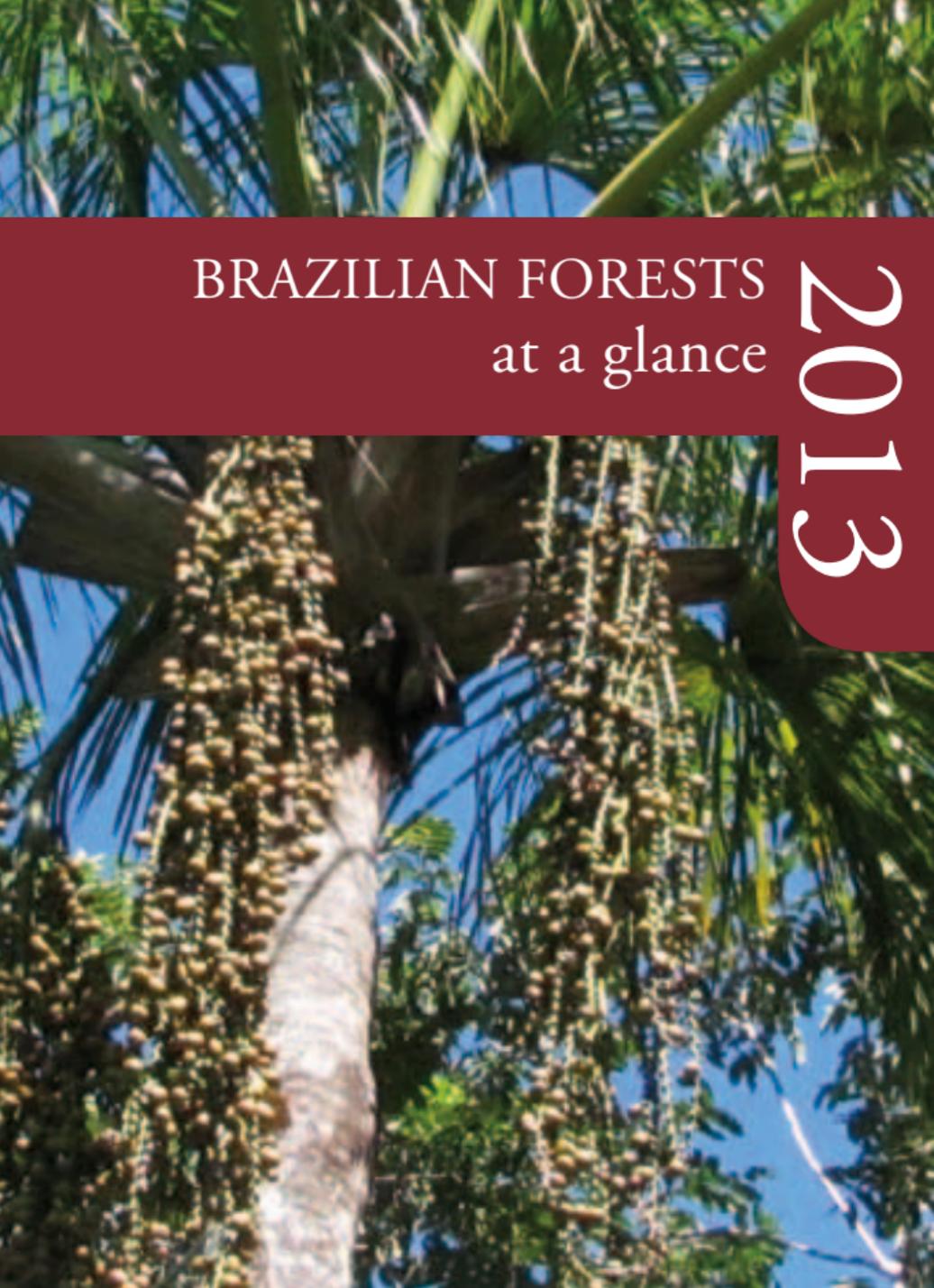
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The cover features a low-angle photograph of a palm tree trunk and its fronds against a clear blue sky. The tree is heavily laden with clusters of small, round, light-brown fruits, likely coconuts, hanging from the branches. The overall scene is bright and tropical.

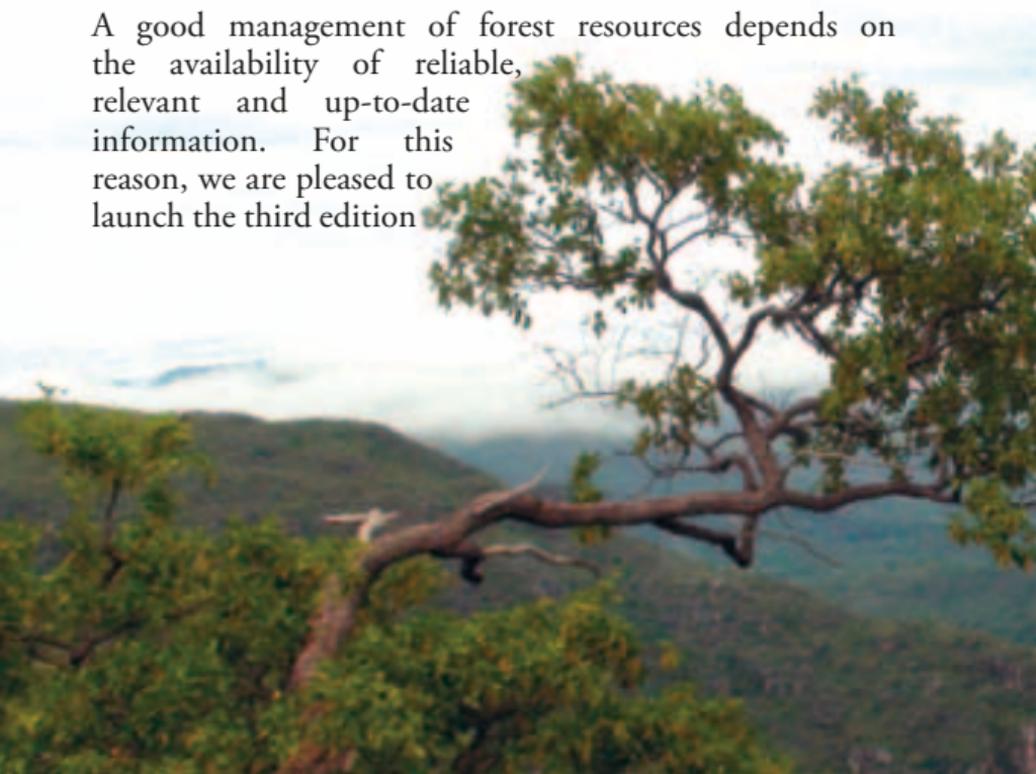
BRAZILIAN FORESTS
at a glance

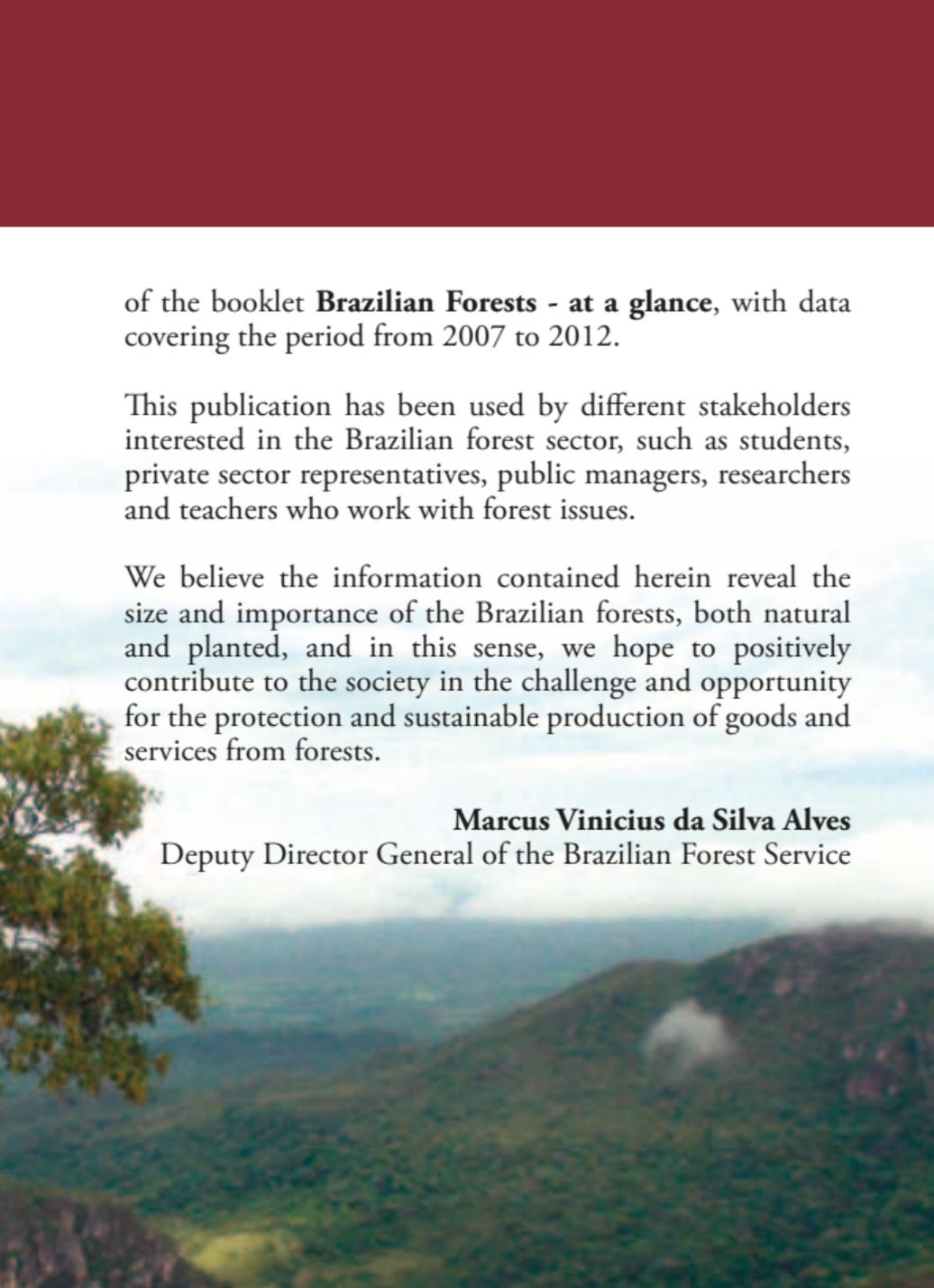
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Foreword

The Brazilian Forest Service has striven to collect data and information as current as possible, from various national sources, produced by the main actors involved in the management, use, conservation and restoration of our forests, and to gather them in a concise format for future reference. This effort is consistent with the mandate/competence of the Forest Service to create and maintain a National Forest Information System.

A good management of forest resources depends on the availability of reliable, relevant and up-to-date information. For this reason, we are pleased to launch the third edition





of the booklet **Brazilian Forests - at a glance**, with data covering the period from 2007 to 2012.

This publication has been used by different stakeholders interested in the Brazilian forest sector, such as students, private sector representatives, public managers, researchers and teachers who work with forest issues.

We believe the information contained herein reveal the size and importance of the Brazilian forests, both natural and planted, and in this sense, we hope to positively contribute to the society in the challenge and opportunity for the protection and sustainable production of goods and services from forests.

Marcus Vinicius da Silva Alves

Deputy Director General of the Brazilian Forest Service



Main National Statistics

Year of reference 2011/2012

Total population	194 million
Total land area	851 million ha
Total forest area	463 million ha
Percentage of forest area compared to the total area	54.4 %
Forest area per capita	2.38 ha
Natural forest area	456 million ha
Plantation forest area	7.2 million ha
Registered public forests area	308 million ha
Federal community forest area	124 million ha
Federal and State public forests area under concession	622.2 thousand ha
Formal employments in forest sector	673 thousand
Certified forests area	8.6 million ha
Sawnwood production (2010)	4.9 million m ³
Panel production (2010)	6.4 million m ³
Pulp production	14.6 million t
Paper production	10.1 million t
Extraction of roundwood for fuel	133.1 million m ³
Extraction of roundwood for industry	139.9 million m ³
Main non-timber products extracted from natural forests	
- Mate	229.7 thousand t
- Açaí berry fruit	215.4 thousand t
- Babaçu almond	102.5 thousand t
- Piaçava fiber	61.4 thousand t
Exports of forest sector	9 billion US\$
Imports of forest sector	2.4 billion US\$
Main importer countries of forest products from Brazil (2011)	
- United States	1.8 billion US\$
- China	1.3 billion US\$
- Holland	1.0 billion US\$

Summary

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The Brazilian Territory



Federative Units / Regions

REPUBLIC



Source: IBGE (2002)

Climate

GEIF-FBR.9.1



- Equatorial
- Temperate
- Tropical Central Brazil
- Tropical Eastern Northeast
- Tropical Equatorial Zone

Source: IBGE (2002)

Soils

GEIF-FBR.6.1



- Acrisols
- Cambisols
- Chernozems
- Spodosols
- Gleysols
- Latosols
- Luvisols
- Entisols
- Nitisols
- Histosols
- Planosols
- Plinthosols
- Vertisols

Source: EMBRAPA and IBGE (2001)

Hydrographic Regions

GEIF-FBR.5.1

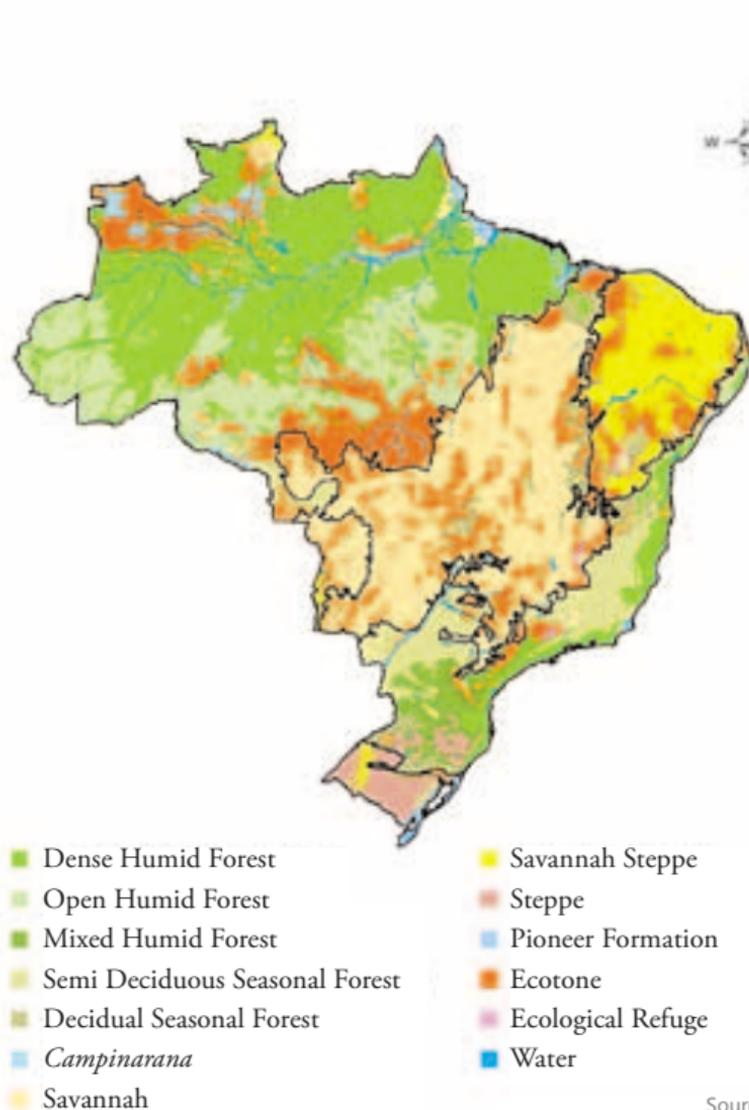


Hydrographic Regions

- Amazon
- *Tocantins - Araguaia*
- Paraguay
- *Parnaíba*
- *São Francisco*
- Western Northeast Atlantic
- Eastern Northeast Atlantic
- East Atlantic
- Southeast Atlantic
- *Paraná*
- Uruguay
- South Atlantic

Source: ANA (2003)

Vegetation Cover



Source: IBGE (2007)





Brazilian Forests



What is a Forest?

The Brazilian Forest Service, when developing its actions and elaborating national and international reports on forest resources in Brazil, considers as forests the following vegetation typologies according to the Classification System of the Brazilian Institute of Geography and Statistics (IBGE)*:

- ✓ Dense Humid Forest;
- ✓ Open Humid Forest;
- ✓ Mixed Humid Forest;
- ✓ Semideciduous Seasonal Forest;
- ✓ Deciduous Seasonal Forest;
- ✓ *Campinarana* (forested and wooded);
- ✓ Savannah (forested and wooded) - *Cerradão* and *Cerrado*;
- ✓ Steppe Savannah (forested steppe and wooded steppe) - Wooded *caatinga*;
- ✓ Steppe (tree steppe);
- ✓ Forest vegetation under marine influence, forest vegetation under fluviomarine influence (wooded);
- ✓ Transitional zones with at least one forest formation;
- ✓ Secondary Vegetation in Forest areas;
- ✓ Reforestation.

* According to FAO's definitions, these typologies include forests and other wooded lands.

Definition of Forest adopted by FAO

“Land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 %, or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or urban land use.”

FAO - Food and Agriculture Organization of the United Nations

*FAO (2004). FRA: Terms and Definitions.
<http://www.fao.org/forestry/media/7797/1/0/>*

Extent of Forests

Brazil is a forest country with 463 million hectares (54,4% of its territory) of natural and planted forests - representing the second largest forest area in the world.

Estimated forest areas in Brazil (2012)

Type of Forest	Total area (ha)	% Forests area	% Brazil area
Natural Forests	456,083,955	98.45	53.56
Planted Forests	7,185,943	1.55	0.84
Total	463,269,898	100	54.40

Source: Brasil. MMA (2007b), adapted/SFB.GEIF; ABRAF (2013).

Natural Forests

The estimate of forest areas was calculated by the Brazilian Forest Service based on maps of remnant vegetation in the Brazilian biomes, produced by the Ministry of Environment from Landsat images, for reference year of 2002 (MMA, 2007b), with an updating in 2009.

Available deforestation rates for each biome were applied to estimate Forest area in 2012.

Estimated area of natural forests in Brazilian biomes (2012)

Biome	Area (ha)
Amazon	325,469,969
<i>Caatinga</i>	41,409,651
<i>Cerrado</i>	57,321,446
<i>Pantanal</i>	8,937,485
Atlantic Forest	20,128,299
<i>Pampa</i>	2,817,106
Total	456,083,955

Source: Brasil. MMA (2007b), adapted / SFB.GEIF.

Planted Forests

There are about 7.2 million hectares of planted forests in Brazil, mainly with species *Eucalyptus* and *Pinus*, which represent 92.8% of the total area. This area corresponds to 1.55% of the total forest area.

Composition of forest plantations in Brazil (2012)

Species	Scientific name	Area (ha)	%
Eucalyptus	<i>Eucalyptus</i> spp	5,102,030	71.00
Pine	<i>Pinus</i> spp	1,562,782	21.75
Acacia	<i>Acacia mearnsii</i> / <i>Acacia mangium</i>	148,311	2.12
Rubber tree	<i>Hevea brasiliensis</i>	168,848	2.36
Paricá	<i>Schizolobium amazonicum</i>	87,901	1.22
Teak	<i>Tectona grandis</i>	67,329	0.97
Araucaria	<i>Araucaria angustifolia</i>	11,343	0.16
Poplar	<i>Populus</i> spp	4,216	0.06
Others		33,183	0.12
Total		7,185,943	100

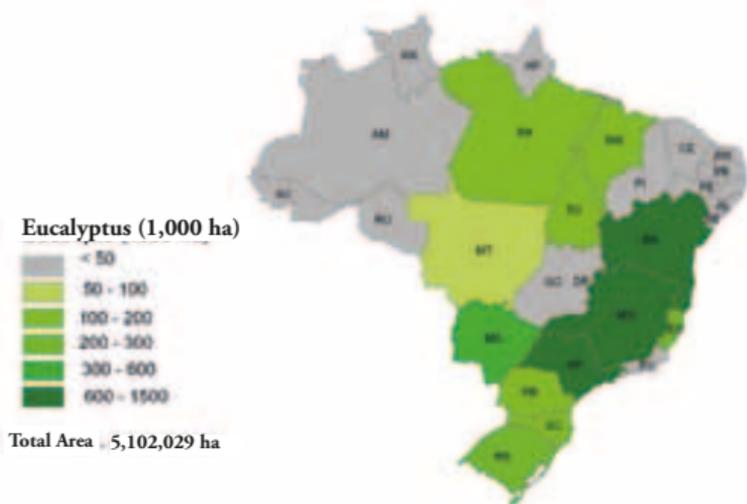
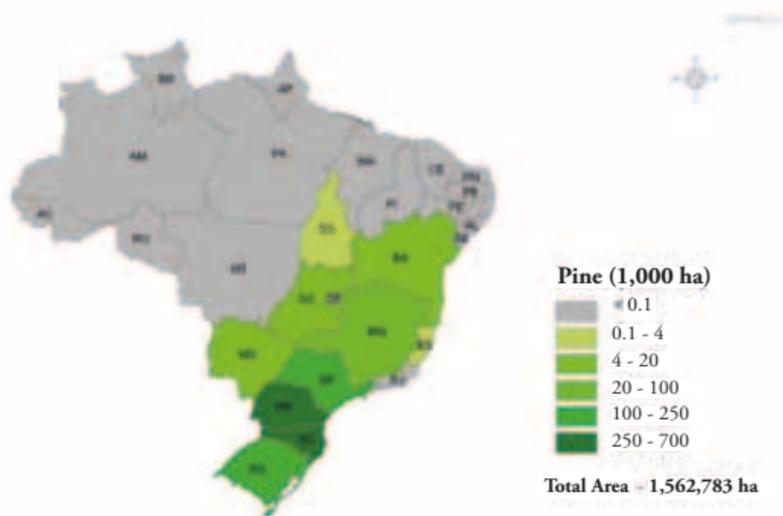
Source: ABRAF (2013).

Distribution of forest plantations with Pine and Eucalyptus in Brazil (2012)

State	Area with Eucalyptus (ha)	Area with Pine (ha)	Total Area (ha)	%
MG	1,438,971	52,710	1,491,681	22.38
SP	1,041,695	144,802	1,186,497	17.80
PR	197,835	619,731	817,566	12.27
BA	605,464	11,230	616,694	9.25
SC	106,588	539,377	645,965	9.69
RS	284,701	164,832	449,533	6.74
MS	587,310	9,825	597,135	8.96
ES	203,349	2,546	205,895	3.09
PA	159,657	0	159,657	2.40
MA	173,324	0	173,324	2.60
GO	38,081	16,432	54,513	0.82
AP	49,506	445	49,951	0.75
MT	59,980	0	59,980	0.90
TO	109,000	853	109,853	1.65
PI	27,730	0	27,730	0.42
RJ	18,368	0	18,368	0.28
Others	470	0	470	0.01
Total	5,102,029	1,562,783	6,664,812	100.00

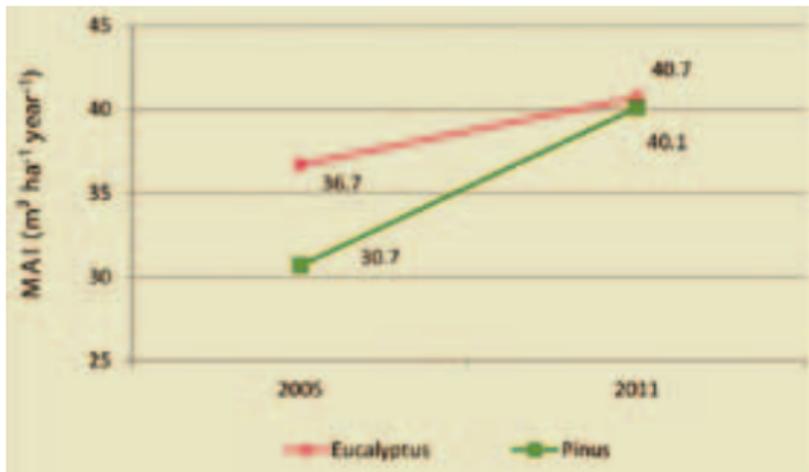
Source: ABRAF (2013).

Forest Plantations of Pine and Eucalyptus



Source: ABRAF (2012)

Brazilian planted forests have shown increasing productivity. Besides environmental factors favouring silviculture, new technologies are being used to enhance productivity, such as genetic manipulation of seeds and the cloning of forest species. Such improvement makes Brazil stand out in both coniferous and broadleaved forest productivity.



Evolution of the Mean Annual Increment (MAI) of planted forests by companies associated to the Brazilian Association of Forest Plantation Producers (Abraf) (2005-2012)

Source: ABRAF (2012).

Public and Private Forests

The areas of public forests in Brazil are under a permanent process of identification and registration by the Brazilian Forest Service. Public forests included in the National Public Forests Registry (CNPFF) by November 2012, comprised an area of about 308 million hectares, representing 36.2% of the national territory. The Brazilian public forests are distributed into different biomes and regions of the country. However, the majority (91%) is in the Amazon biome.

Distribution per biome public forests included in the CNPFF - *Cadastro Nacional de Florestas Públicas* (National Public Forest Registry) until November 2012

Biome	Area 2012 (ha)	(%) Public Forests 2012
Amazon	282,221,415	91.60
<i>Cerrado</i>	18,069,018	5.86
Atlantic Forest	3,523,333	1.14
<i>Caatinga</i>	1,281,423	0.42
<i>Pantanal</i>	861,073	0.28
<i>Pampa</i>	230,510	0.07
Outside IBGE boundary	1,898,595	0.62
Total	308,085,367	100

Private forest areas in Brazil are estimated. (IBGE, 2007a).

Private forests area in rural areas in Brazil (1,000 ha)

	1970	1975	1980	1985	1995	2006
Forests	57,881	70,722	88,168	88,984	94,294	98,480

Source: IBGE (2007a).



Forest Designated Functions

Forests have primary functions according to the uses to which they are designated for. Brazilian forests designations may be distributed according to the categories and definitions established by FAO, such as production, protection and conservation, social services and others.

Area of Brazilian forests distributed per category of primary designated function (2011/2012)

Primary designated functions of forests	Area (1,000 ha)
Production ¹	37,129.44
Protection of soil and water ²	102,500.00
Conservation of biodiversity ³	53,457.50
Social services ⁴	135,106.18
Multiple use ⁵	42,987.00
Unknown ⁶	92,089.77
Total	463,269.89

Source: Brasil. MMA (2012); ABRAF (2013); Sparovek, *et al.* (2010); Funai (2012).

Notes:

¹ Production: National Forests, State Forests and Forest Plantations.

² Protection of soil and water: Estimate of Permanent Preservation Areas provided by the Law, according to Sparovek *et al.* (2010).

³ Conservation of biodiversity: Ecological Station (Federal and State); Biological Reserve (Federal and State); National Park; State Park; Natural Monument (Federal and State); Wildlife Refuge (Federal and State); Area of Relevant Ecological Interest (Federal and State) and Natural Heritage Private Reserve.

⁴ Social Services: Extractivist Reserve (Federal and State); Indigenous Lands; Sustainable Development Reserve (Federal and State).

⁵ Multiuse: Area of Environmental Protection (Federal and State).

⁶ Unknown: Forest areas with unknown designated primary function.

Forest Volume and Biomass

The volume of timber is an important variable to estimate forest biomass and commercial stock, and is also a variable used in forest management.

The biomass of the Brazilian forests was estimated through studies that determine the volume of timber per area unit in the various forest typologies and its relationship with biomass, considering the area occupied by each of these typologies in each Brazilian biome.

Total timber volume and biomass quantity estimated per biome (2012)

Biomass	Total timber volume		Total biomass*	
	Million m ³	%	Million t	%
Amazon	84,749	87.16	88,526	84.18
<i>Caatinga</i>	2,859	2.94	4,095	3.89
<i>Cerrado</i>	4,311	4.43	6,158	5.86
<i>Pantanal</i>	717	0.74	1,083	1.03
Atlantic forest	4,345	4.47	5,009	4.76
<i>Pampa</i>	255	0.26	290	0.28
Total	97,236	100	105,161	100

Source: Brasil. MMA (2007b), adapted/SFB.GEIF.

*Total biomass= Aboveground biomass + belowground biomass

National Forest Inventory



The National Forest Inventory (NFI) is coordinated by the Brazilian Forest Service (SFB) and aims at producing detailed information on forest resources in Brazil. Such information will base the formulation of public policies related to the use, conservation and restoration of forest resources.



The NFI's methodology was developed through a participatory process and has a national standardization, with possible adaptations to the peculiarities of Brazilian biomes. The methodology consists on gathering biophysical, socio-environmental and landscape data in a systematic grid of 20 km x 20 km, covering the entire national territory. Measurements in sample points are carried out every five years, making the NFI a tool for monitoring the quantity and quality of the country's forests.

In 2012, the NFI activities were initiated in the states of *Ceará*, *Sergipe*, *Paraná*, *Rio Grande do Sul* and *Rio de Janeiro* and concluded in *Santa Catarina* and in the Federal District. During the years 2013 and 2014, activities in the states of the Amazon and the *Cerrado* will be initiated.



SisPP - National System of Permanent Plots



The National System of Permanent Plots (SisPP) is a network of institutions working with forest dynamics monitoring. Its main purpose is to produce information on growth and yield based on experimental plots in different Brazilian biomes, to support the definition of standards for sustainable forest management practices. This system congregates subnational networks for all Brazilian biomes.







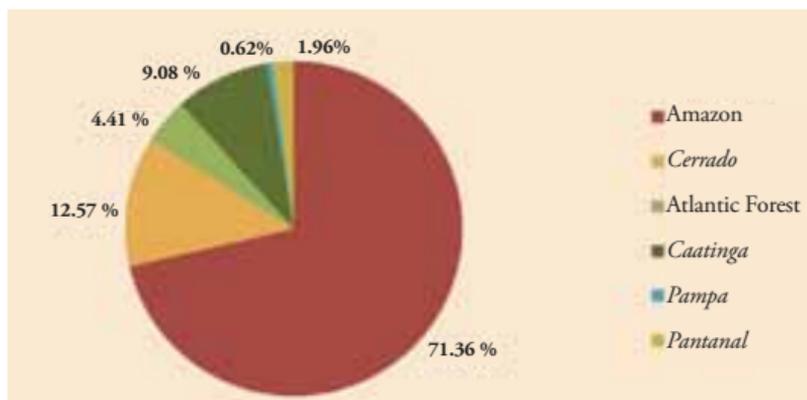
Brazilian biomes and their Forests





Brazil hosts six continental biomes: Amazon, Cerrado, Atlantic Forest, Caatinga, Pampa and Pantanal.

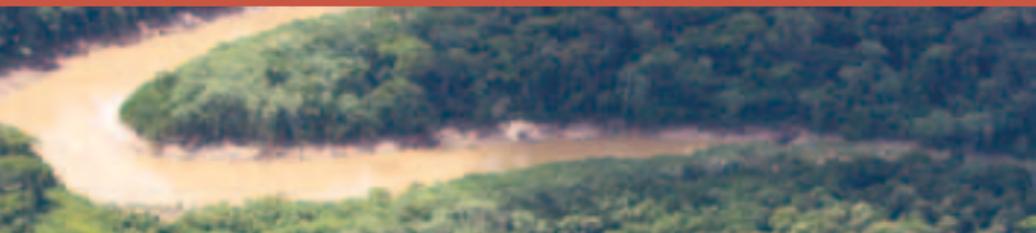
Brazilian natural forests are distributed in these six biomes, of which the Amazon, Cerrado and Caatinga represent more than 93% from the total. Approximately 71.36% of natural forests are in the Amazon biome.



Percentage of natural forest cover per biome (2012)

Source: Brasil. MMA (2007b), adapted / SFB. GEIF.

Biome is a set of life forms (plant and animal) characterized by communities of contiguous and identifiable types of vegetation at regional scale, sharing similar geoclimatic conditions and history of changes, resulting in its own biological diversity (IBGE, 2004a).



Brazilian Biomes

GEIF-FBR.2.1



-  Amazon
-  *Caatinga*
-  *Cerrado*
-  Atlantic Forest
-  *Pampa*
-  *Pantanal*

Source: IBGE and MMA (2004)

Amazon

The Amazon biome represents about 8% of all the world's remaining forests. Its importance is recognized nationally and internationally. This is mainly due to its large extent (4.2 million km²) and huge range of environments, with more than 600 different types of terrestrial and freshwater habitats, resulting in a very rich biodiversity, with about 45,000 plant and vertebrate species.

Amazon biome (2012)

	Total	Biome %
Biome area (ha)	419,694,300	49.3*
Forest cover estimate (ha)	325,469,969	77.5
Protected areas within Conservation Units (Federal and State) (ha)	110,964,400	26.4

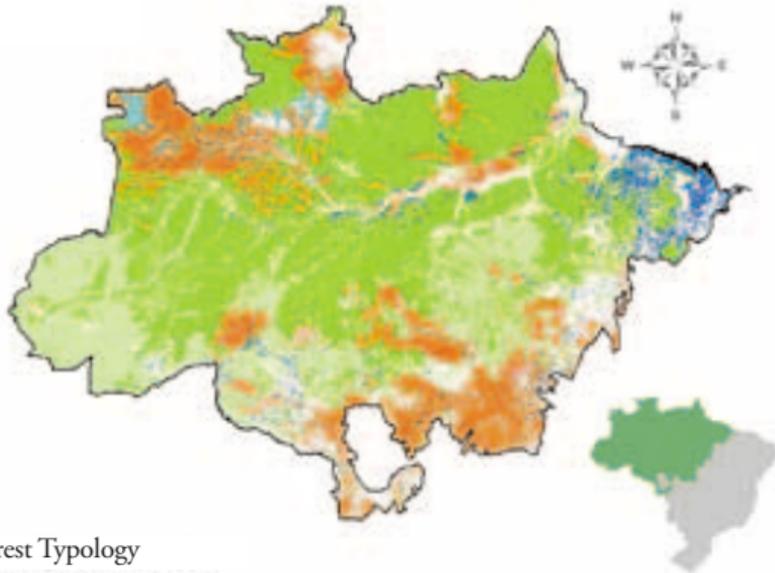
Source: IBGE (2004b); Brasil. MMA (2007b), adapted / SFB.GEIF; MMA (2012).

Note: *In relation to the country area.



Forests of the Amazon Biome

GEIF-FBR.12.1



Forest Typology

- Dense Humid Forest
- Open Humid Forest
- Semi deciduous Seasonal Forest
- Forested and Wooded *Campinarana*
- Forested and Wooded Savannah (*Cerradão* and *Campo-Cerrado*)
- Forested and Wooded Steppe Savannah (tree-steppe *Caatinga*)
- Vegetation Under Marine and Fluvio marine Influence (Mangrove / *Restinga*)
- Ecotone (Transitional Zone)
- Secondary Vegetation
- Planted Forests

Source: MMA (2007)

Cerrado

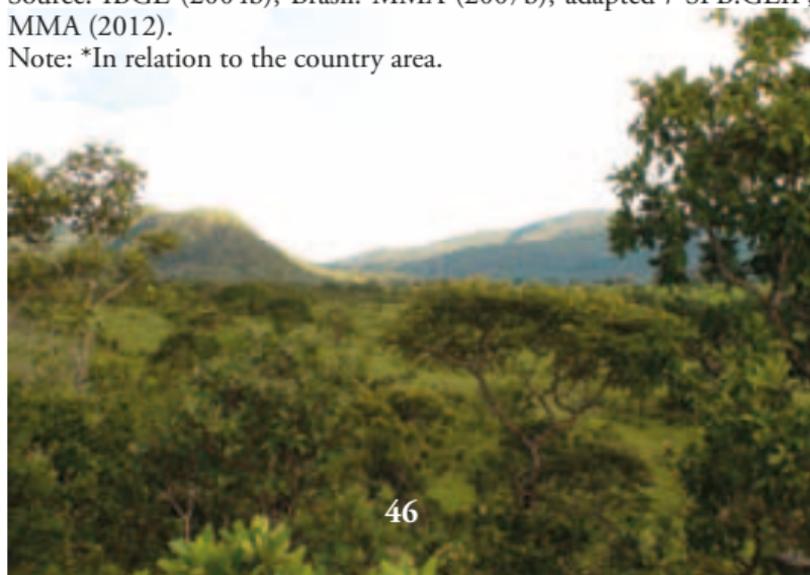
Cerrado is the second largest biome in South America and covers an area of 2,036,448 km² or about 24% of the Brazilian territory. This territorial space holds the springs of three major basins in South America (Amazon/Tocantins, São Francisco and Prata). Regarding biological diversity, the Brazilian *Cerrado* is recognized as the richest savannah in the world, holding 11,627 catalogued native plant species (BRASIL. MMA, 2007a).

Cerrado biome (2012)

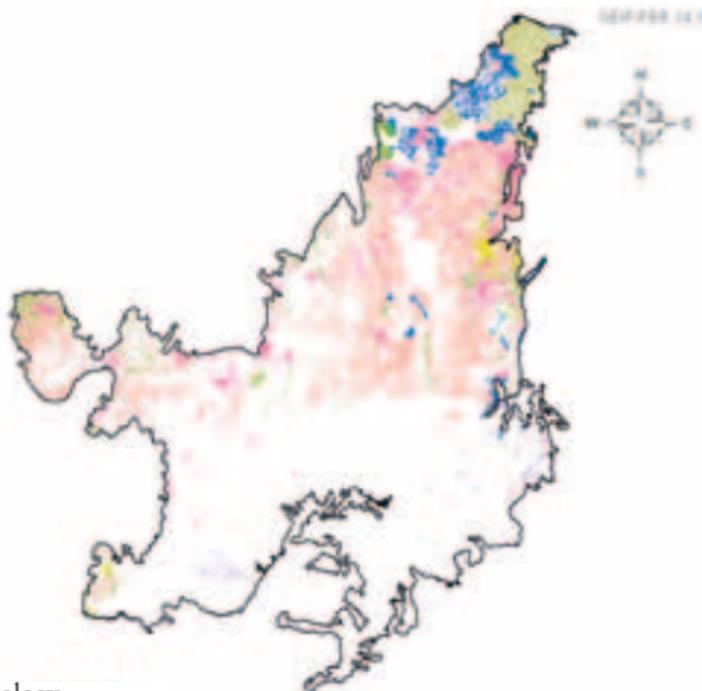
	Total	Bioma %
Biome area (ha)	203,644,800	23.9*
Forest cover estimate (ha)	57,321,446	28.1
Protected areas within Conservation Units (Federal and State) (ha)	16,532,900	8.1

Source: IBGE (2004b); Brasil. MMA (2007b), adapted / SFB.GEIF; MMA (2012).

Note: *In relation to the country area.



Cerrado Biome Forests



Forest Typology

- Forested Savannah (*Cerradão*)
- Wooded Savannah (*Campo-Cerrado*)
- Semi deciduous Seasonal Forest
- Dense and Open Humid Forest
- Vegetation Under Marine and Fluviomarine Influence (Mangrove and *Restinga*)
- Steppe Savannah (wooded *Caatinga*)
- Secondary Vegetation
- Planted Forests

Source: MMA (2007)

Atlantic Forest

The Atlantic Forest biome encompasses an area of 1.1 million km² (13% of the Brazilian territory). However, in the light of centuries of occupation, the forest area in this biome was drastically reduced and is nowadays extremely fragmented. Nevertheless, the Atlantic Forest still hosts a significant portion of Brazil's biological diversity.

Atlantic Forest Biome (2012)

	Total	Bioma %
Biome area (ha)	111,018,200	13.0*
Forest cover estimate (ha)	20,128,299	18.1
Protected areas within Conservation Units (Federal and State) (ha)	10,738,600	9.6

Source: IBGE (2004b); Brasil. MMA (2007b), adapted / SFB.GEIF; MMA (2012).

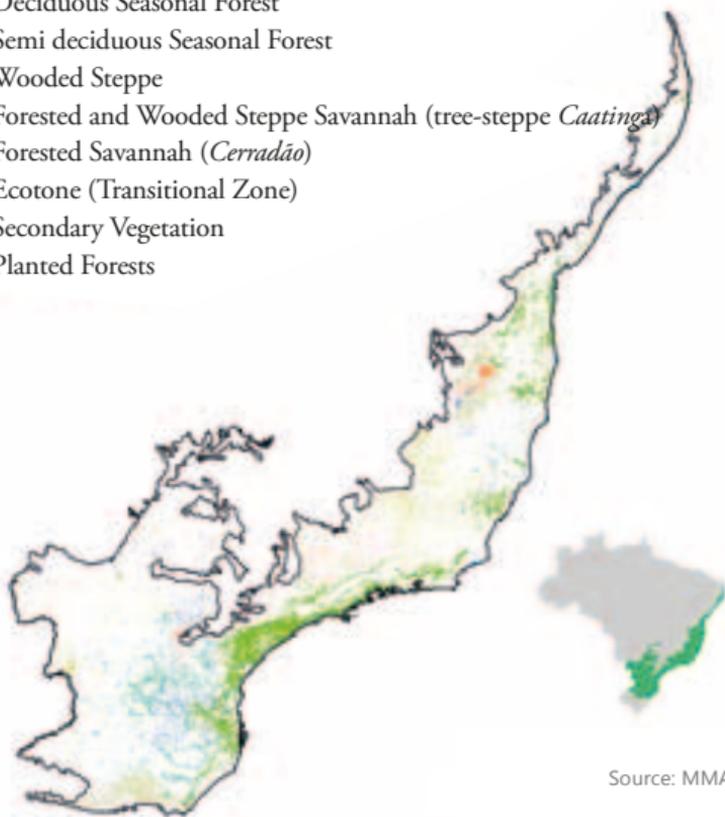
Note: *In relation to the country area.



Forests of the Atlantic Forest Biome

Forest Typology

- Dense Humid Forest (Tropical rain forest)
- Open Humid Forest
- Mixed Humid Forest (*Araucaria* forest)
- Vegetation Under Marine and Fluviomarine Influence (Mangrove and *Restinga*)
- Deciduous Seasonal Forest
- Semi deciduous Seasonal Forest
- Wooded Steppe
- Forested and Wooded Steppe Savannah (tree-steppe *Caatinga*)
- Forested Savannah (*Cerradão*)
- Ecotone (Transitional Zone)
- Secondary Vegetation
- Planted Forests



Source: MMA (2007)

Caatinga

The *Caatinga* biome covers an area of approximately 844,453 km², equivalent to 10% of the national territory and is the only exclusively Brazilian biome. Its vegetation is a mosaic of thorny shrubs and seasonally dry forests and, despite occupying a semiarid region, its biodiversity is extremely heterogeneous, sustaining various economic activities aimed at agrosilvopastoris and industrial purposes.

Caatinga biome (2012)

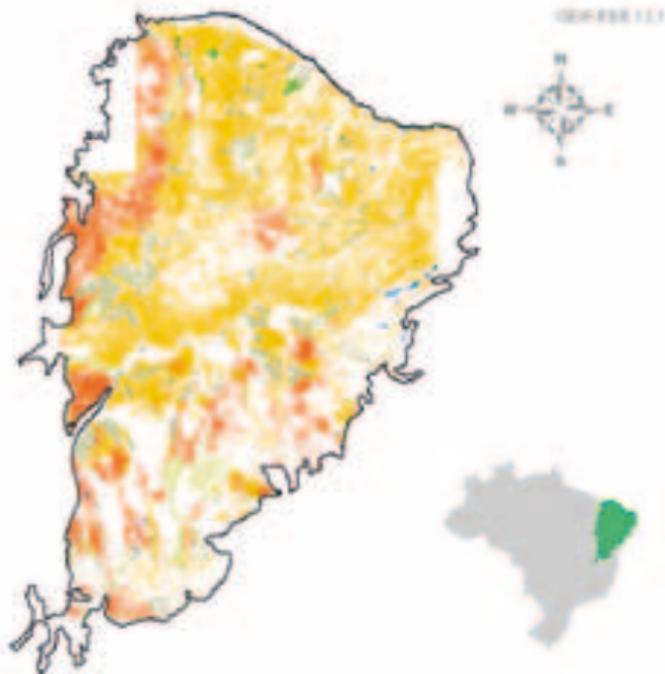
	Total	Biome %
Biome area (ha)	84,445,300	9.9*
Forest cover estimate (ha)	41,409,651	49
Protected areas within Conservation Units (Federal and State) (ha)	6,312,300	7.5

Source: IBGE (2004b); Brasil. MMA (2007b), adapted / SFB.GEIF; MMA (2012).

Note: *In relation to the country area.



Forests of the *Caatinga* Biome



Forest Typology

- Forested Steppe Savannah (dense *Caatinga*)
- Wooded Savannah (open *Caatinga*)
- Dense and Open Humid Forest
- Deciduous and Semi deciduous Seasonal Forest
- Vegetation Under Marine and Fluviomarine Influence (Mangrove and *Restinga*)
- Forested and wooded savannah (*Cerradão* and *Campo-Cerrado*)
- Ecotone (Transitional Zone)
- Secondary Vegetation

Source: MMA (2007)

Pampa

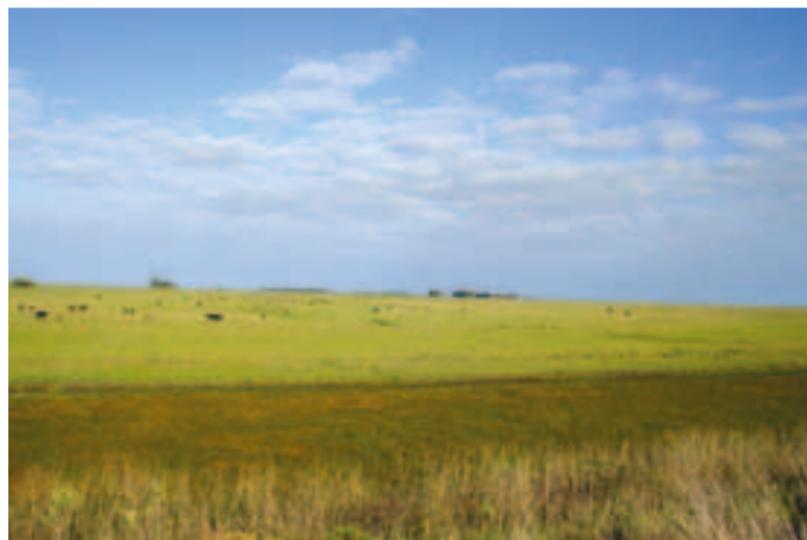
The *Pampa*, also commonly known as the Southern grasslands, occurs in the state of *Rio Grande do Sul* and extends across Uruguay and Argentina. The dominant vegetation consists of pampa grass interspersed with semi deciduous forests, subtropical forests (mainly *Araucaria* forests) and seasonal forests.

Pampa biome (2012)

	Total	Biome %
Biome area (ha)	17,649,600	2.1*
Forest cover estimate (ha)	2,817,106	15.9
Protected areas within Conservation Units (Federal and State) (ha)	475,409	2.7

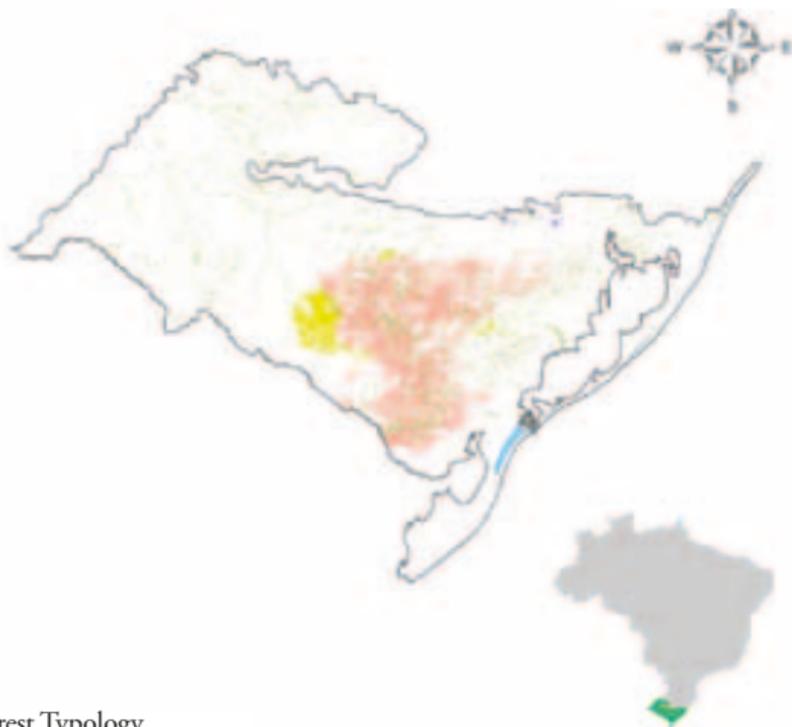
Source: IBGE (2004b); Brasil. MMA (2007b), adapted / SFB.GEIF; MMA (2012).

Note: *In relation to the country area.



Forests of the *Pampa* Biome

GEIF-FBR.13.1



Forest Typology

- Tree Steppe
- Steppe Savannah (*Campanha Gaúcha*)
- Dense Humid Forest (Tropical Rain Forest)
- Deciduous and Semi deciduous Seasonal Forest
- Vegetation Under Marine and Fluviomarine Influence (Mangrove and *Restinga*)
- Planted Forests

Source: MMA (2007)

Pantanal

The *Pantanal* biome is considered one of the largest continuous wetland of the planet. It has an approximate area of 150,355 km², representing 1.8% of the total area of Brazil. Pantanal is under direct influence of three major biomes: Amazon, *Cerrado* and Atlantic Forest. In addition, it is also influenced by the *Chaco* biome (name given to the *Pantanal* located in northern Paraguay and eastern Bolivia).

Pantanal biome (2012)

	Total	Biome %
Biome area (ha)	15,035,500	1.8*
Forest cover estimate (ha)	8,937,485	59.4
Protected areas within Conservation Units (Federal and State) (ha)	440,100	2.9

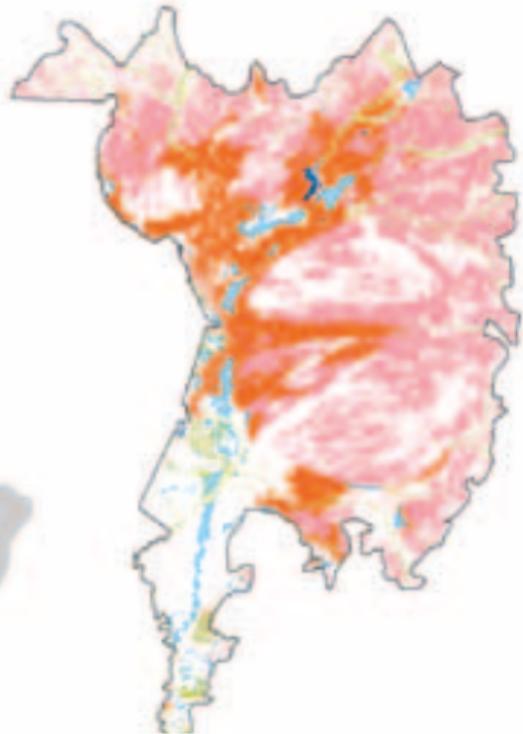
Source: IBGE (2004b); Brasil. MMA (2007b), adapted / SFB.GEIF; MMA (2012).

Note: *In relation to the country area.



Forests of the *Pantanal* Biome

GEIF-FBR.17.1



Forest Typology

- Ecotone (Transitional Zone)
- Enclave
- Deciduous Seasonal Forest
- Semi deciduous Seasonal Forest
- Fluvial or Lacustre Influenced Vegetation
- Forested and Wooded Savannah (*Cerradão* and *Campo-cerrado*)
- Forested and Wooded Steppe Savannah
- Secondary Vegetation

Source: MMA (2007)



Forest Protection



Protected Areas

Protected areas are defined as legally protected territories, destined for preservation or conservation of nature and its associated cultural values. In Brazil, protected areas can be public or private. The main public protected areas are the Indigenous Lands, the Conservation Units and the private protected areas, established by Law No. 12,651 of May 25th, 2012, which provides for the protection of native vegetation, named Legal Reserves and Permanent Preservation Areas.

Conservation Units are divided in two groups, Full Protection and Sustainable Use. In Full Protected Areas, in order to preserve the Nature, it is not allowed any direct use of the natural resources. While in Sustainable Use ones activities aimed at forest production are allowed.

There is also a private category included in the Snuc that can be created and maintained by private owners, the Private Natural Heritage Reserve - RPPN.

Conservation Units

Situation of Federal Conservation Units (June of 2012)

Group	Category	No.	Area (ha)
Full Protection	Ecological Station	31	6,923,700
	Natural Monument	3	44,300
	National Park	68	25,265,300
	Biological Reserve	30	3,904,500
	Wildlife Refuge	7	201,900
Subtotal		139	36,339,700
Sustainable Use	Area of Environmental Protection	32	10,014,400
	Area of Relevant Ecological Interest	16	44,800
	National Forest	65	16,343,800
	Sustainable Development Reserve	1	64,400
	Extractivist Reserve	59	12,287,500
	Private Natural Heritage Reserve	574	392,277
Subtotal		747	39,147,177
Grand total		886	75,486,877

Source: Brasil. MMA (2012).

Situation of State Conservation Units (June of 2012)

Group	Category	No.	Area (ha)
Full Protection	Ecological Station	59	4,767,800
	Natural Monument	16	79,600
	State Park	177	9,398,300
	Biological Reserve	21	1,346,600
	Wildlife Refuge	21	167,800
Subtotal		294	15,760,100
Sustainable Use	Area of Environmental Protection	181	32,972,600
	Area of Relevant Ecological Interest	24	44,500
	State Forest	35	13,599,800
	Sustainable Development Reserve	26	10,920,000
	Extractivist Reserve	28	2,021,100
	Private Natural Heritage Reserve	70	142
Subtotal		294	59,558,000
Grand total		658	75,318,100

Source: Brasil. MMA (2012).

Amazon Region Protected Areas Program (Arpa)

The Amazon Region Protected Areas Program (Arpa), coordinated by the Ministry of Environment, was created in 2003 with the main objective of assuring and supporting financial resources for the creation, consolidation and maintenance of 60 million hectares of Brazilian Amazon Conservation Units. During its first phase, concluded in 2009, the program supported the creation and consolidation of 62 Conservation Units, totaling more than 32 million hectares of Protected Areas. From this total, 31 are Full Protection Units (21.1 million ha) and 31 are Conservation Units of Sustainable Use (10.9 million ha) (WWF, 2010b). The second phase of the program (Arpa II), planned for the period 2010-2015, has as main objectives the consolidation of all Conservation Units created in the first phase, the creation of new preservation areas and the operation of the Protected Areas Fund - FAP with US\$ 70 million (BRASIL. MMA, 2011b).

Indigenous Lands

Situation of Brazilian Indigenous Areas (2012)

Situation	Quantity	Area (ha)	Indigenous Lands %
Regularized ¹	422	104,117,642	94.81
Delimited ²	28	2,775,364	2.53
Declared ³	47	1,849,890	1.68
Homologated ⁴	18	1,025,672	0.93
Under process as Indigenous Reserves ⁵	36	44,612	0.04
Total	551	109,813,180	100
		12.9% of the country area	

Source: FUNAI (2012).

Note: Besides the areas shown in the table, there are 138 under study.

Note:

¹ Indigenous land registered at the Registry of Property Registration and Secretariat Equity Union;

² Indigenous land with anthropological report and boundaries approved by FUNAI;

³ Indigenous land with anthropological report and limits approved by the Ministry of Justice;

⁴ Indigenous land with demarcation approved by the President of Republic;

⁵ Indigenous land acquired, under procurement process or recorded as dominial.

Permanent Preservation Areas

Permanent Preservation Areas (PPA) are lands protected by Law No. 12,651 of May 25th, 2012, which can be covered or not by native vegetation, having the environmental role of preserving water resources, landscape, geological stability, biodiversity, genetic flow of fauna and flora, protecting the soil and ensuring the well-being of human populations. The Permanent Preservation Areas are usually those located:

- I. Along rivers or any water stream;**
- II. Around natural lakes and lagoons;**
- III. Around artificial water reservoirs;**
- IV. Around springs and perennial water sources;**
- V. On slopes or part of them greater than 45°;**
- VI. On coastal pioneer vegetation such as dune or mangrove stabilizers;**
- VII. On mangroves, in all their extension;**
- VIII. On mesa or plateau edges;**
- IX. On hilltops, hills, mountains, and mountain ranges, with minimum height of 100 m and slope greater than 25°;**
- X. On areas situated at altitudes over 1,800m;**
- XI. On veredas, the marginal strip with a minimum width of 50 m.**

For further details see: <http://www.florestal.gov.br/pngf/>

Legal Reserve

A Legal Reserve is defined as “an area within any rural property or holding, designated as status of permanent conservation, necessary for the sustainable use of natural resources, by conservation and rehabilitation of ecological processes, by biological conservation and shelter and protection of the native fauna and flora.” (Law 12,651, of May 25th, 2012).

This Law determines the maintenance of the minimum area below as Legal Reserve in all private properties:

- 80%, in rural property located in forest areas within the Legal Amazon;
- 20%, in rural property located in grassland areas within the Legal Amazon;
- 35%, in rural property located in *Cerrado* areas within the Legal Amazon;
- 20%, in rural property located in other regions of the country.

For further details see: <http://www.florestal.gov.br/pngf/>

Biodiversity

Brazil hosts one of the most diverse and exuberant floras of the planet. Studies point to the existence of at least 103,870 animal species and 43,020 plant species in Brazil. On average, 700 new animal species are described each year in Brazil (BRASIL MMA, 2011).

The Amazon forest occupies a prominent place in this scenario and its importance is recognized worldwide. About 10% of all the diversity of the planet is in the Amazon region (MPEG, 2001). In the last ten years, 637 plants have been discovered in this region. (WWF, 2010a).

Endangered and Protected Species

Unfortunately, 472 species are enlisted in the “Endangered Species of the Wild Brazilian Flora List” (BRASIL, MMA, 2008). Biomes with the highest number of threatened species are: Atlantic Forest (276), *Cerrado* (131) and *Caatinga* (46). The Amazon biome appears with 24 species, *Pampa* with 17 and *Pantanal* with just two.

Brazil has some tree species protected by federal law. These tree species cannot be cut. They are:

- Brazilian nut tree (*Bertholetia excelsa*) Decree 5,975/2006;
- Rubber tree (*Hevea* spp.) Decree 5,975/2006; and
- Mahogany (*Swietenia macrophylla king*) Decree 4,722/2003).

There are other tree species protected by State laws.



Endangered Tree Species (2008)

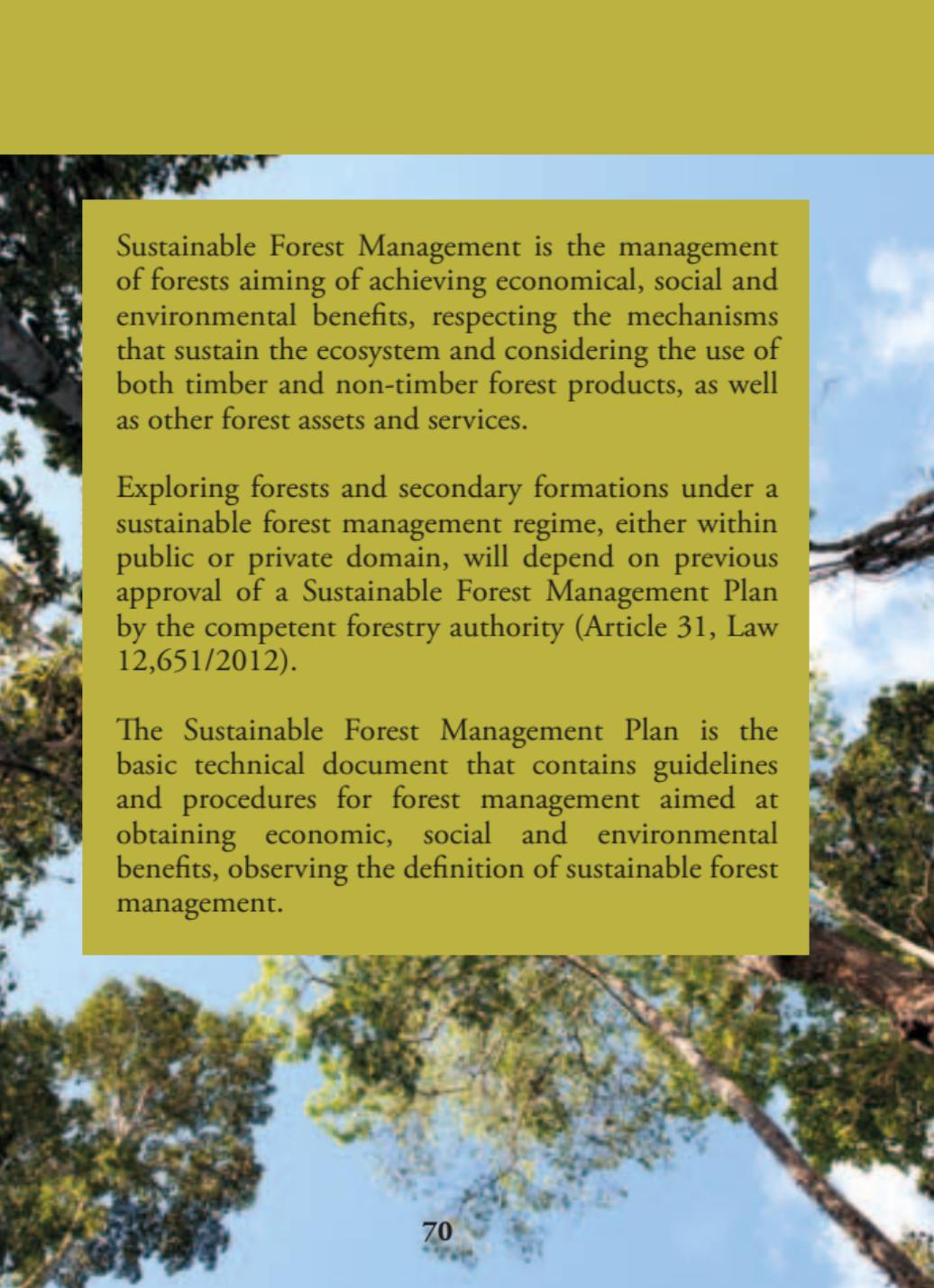
Common name	Scientific name	Family	Biome
Aroeira, Aroeira do Sertão	<i>Myracrodruon urundeuva</i>	Anacardiaceae	Cerrado/ Caatinga
Baraúna	<i>Schinopsis brasiliensis</i>	Anacardiaceae	Cerrado/ Caatinga
Brazilian Pine	<i>Araucaria angustifolia</i>	Araucariaceae	Atlantic Forest
Cerejeira	<i>Amburana cearensis</i> <i>var. acreana</i>	Fabaceae	Amazon
Pau-brasil	<i>Caesalpinia echinata</i>	Fabaceae	Atlantic Forest
Jacarandá-da-bahia	<i>Dalbergia nigra</i>	Fabaceae	Atlantic Forest
Braúna	<i>Melanoxylon brauna</i>	Fabaceae	Atlantic Forest
Pau-roxo	<i>Peltogyne maranhensis</i>	Fabaceae	Amazon
Canela-preta	<i>Ocotea catharinensis</i>	Lauraceae	Atlantic Forest
Canela-sassafrás	<i>Ocotea odorifera</i>	Lauraceae	Atlantic Forest
Imbuia	<i>Ocotea porosa</i>	Lauraceae	Atlantic Forest
Brazilian nut tree	<i>Bertholletia excelsa</i>	Lecythidaceae	Amazon
Mahogany	<i>Swietenia macrophylla</i>	Meliaceae	Amazon
Pau-amarelo	<i>Euxylophora paraensis</i>	Rutaceae	Amazon

Source: Brasil. MMA (2008), adapted.



Sustainable Forest Management





Sustainable Forest Management is the management of forests aiming of achieving economical, social and environmental benefits, respecting the mechanisms that sustain the ecosystem and considering the use of both timber and non-timber forest products, as well as other forest assets and services.

Exploring forests and secondary formations under a sustainable forest management regime, either within public or private domain, will depend on previous approval of a Sustainable Forest Management Plan by the competent forestry authority (Article 31, Law 12,651/2012).

The Sustainable Forest Management Plan is the basic technical document that contains guidelines and procedures for forest management aimed at obtaining economic, social and environmental benefits, observing the definition of sustainable forest management.

Sustainable Forest Management in Amazon

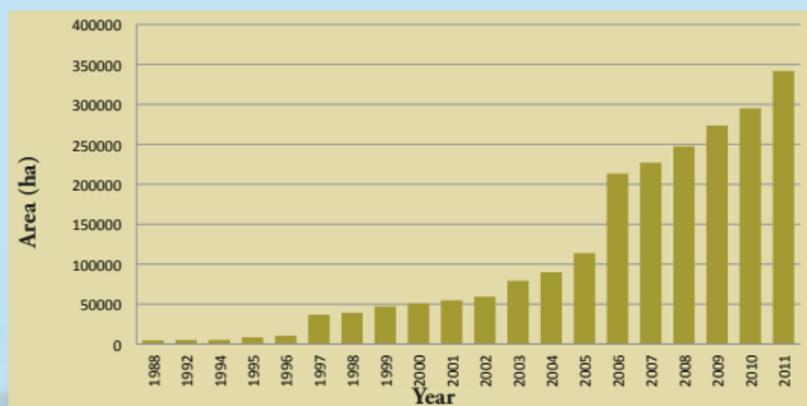
In the last 30 years, Brazil has developed a forest management system for timber production in the Amazon forests that combines use and conservation of forest resources. Meanwhile, the country has developed an adequate regulatory framework, enhanced over the years by a set of standards that include the elaboration of Sustainable Forest Management Plans, Annual Operating Plans and monitoring of forest management through technical inspections.

The forest management system used in the Amazon is polycyclic, based on a 35-year cutting cycle with a maximum cutting intensity of $30 \text{ m}^3 \text{ ha}^{-1}$, and a tree selection based on technical and environmental criteria to promote the regeneration of the managed forest species. In practice, only 4-6 trees per hectare are felled, through techniques of reduced-impact logging (RIL), in order to protect the soil and the remaining forest.



Sustainable Forest Management in *Caatinga*

Forest management in *Caatinga* is extremely important, especially to meet the high demand for forest products for firewood and charcoal. This management is based on a monocyclic system, with a rotation period estimated between 12-15 years. The system is based on the application of simple coppice in annual stands, which consists on cutting trees near the base to allow sprouting regeneration by regrowth.



Area of Sustainable Forest Management Plans approved in the Northeast region (*Caatinga* biome).

Sustainable Forest Management in Public Forests (Forest Concessions)

Forest concession is one of the modalities of public forest management stipulated by Law 11,284 of March 2nd, 2006. It allows the Federal Government, states and municipalities to grant, through bidding, the legal right for private companies to manage the forests in public domain in a sustainable way and through fee payment.

The first three forest concessions initiated in 2008, in Forest Management Units (FMU) located in the Jamari National Forest, State of Rondônia, totaling 96,361 hectares. In 2011 two more contracts were signed for FMU in Saracá-Taquera National Forest, State of Pará, totaling 48,703 hectares. Currently, there are five forest concession contracts of federal scope, totaling 145,000 hectares of public forests under sustainable production. Additionally, five more contracts with approximately 200,000 hectares are under bidding process.

The Amazon region States also hold large areas of public forests and are setting up state programs for public forests concession. The State of Pará already has six contracts totaling approximately 477,000 hectares of forests under forest concession. In 2013, three concession contracts were to be signed in the State Forests of Pará, comprising an area of 108,000 hectares.

In total, the country has 622,200 hectares of public forests under forest concession regime.

Community Forestry

Community forests are forests designated for the use by traditional people and communities, indigenous people, family farmers and settlers registered in the national land reform program. The Brazilian Constitution safeguards the right of indigenous peoples and *quilombola* groups to their ancestral territories, and the Public Forest Management Law (No. 11,284, of March 2nd, 2006) reinforces the right of local communities to manage their forest resources without without any charge.

The efforts of the Brazilian Government to recognize these rights are evident in the area of public forests designated for community use, which is currently about 62% of the national registered public forests. Furthermore, in 2009 a Presidential Decree was issued establishing the Federal Program for Family and Community Forestry (Decree 6,874/2009).



Federal communitaire forests (2012)

Reserves	Area (ha)
Extractivist Reserves (RESEX)	11,735,793
Sustainable Development Reserve (RDS)	64,550
Indigenous Lands	102,817,112
Agrarian Reform Settlement (PAF), Agro-Extractive Settlement Project (PAE) and Sustainable Development Program (PDS)	9,954,142
Total	124,571,597

Source: SFB (2012).

*Data from the National Register of Public Forests



Deforestation and Forest Degradation



Deforestation

Deforestation is the direct human-induced conversion of forested land to non-forested land. (UNFCCC, 2001). The areas chosen for alternative land use are those destined for population settlements, agriculture, industries, power generation, mining, plantation and transport (IBAMA, 2002).

Amazon

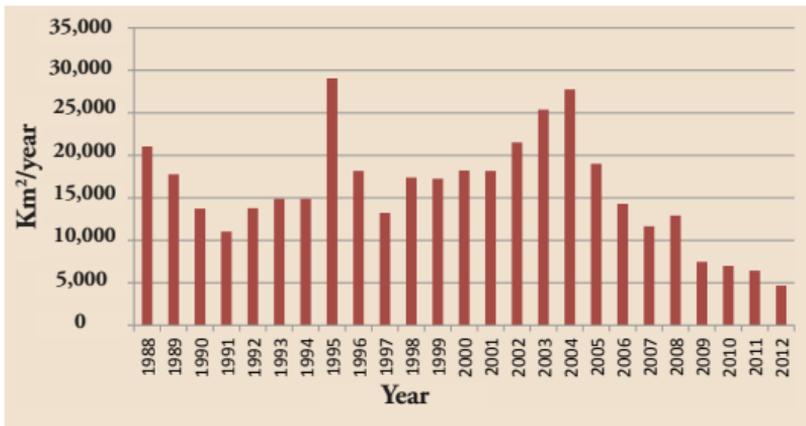
The INPE - National Institute for Space Research monitors the Amazon forest cover by satellites, through different systems, detecting deforestation in areas down to 6.25 ha since 1980's. Major operating systems are: Prodes, Deter and Degrad. These systems are complementary to each other and are designed to meet different purposes.

Prodes

The Amazon Forest Satellite Monitoring Project (Prodes) uses Landsat images to measure annual deforestation rates for periods ranging from August of the preceding year to July of the current year, since 1988.

Between August 2011 and July 2012, the deforestation rate dropped 29% in relation to the previous period, recording the lowest annual deforested area in the Amazon in the last 24 years, equivalent to 4,571 km².

Deforestation rates reduction is even greater when comparing the current data with the year of 2004, when the Action Plan for Protection and Control of Deforestation in the Amazon (PPCDAM) began. Since then, the decrease was 84%.

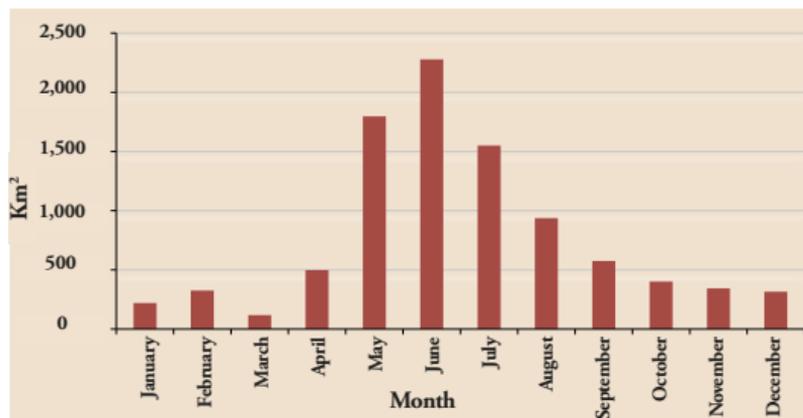


Annual deforestation rates 1988 - 2012 in the Legal Amazon (Prodes)

Source: INPE (2012a).

Deter

The Real Time Detection Deforestation System (DETER), developed by INPE in 2004, uses data from the Modis Sensor of Terra/Aqua satellite and the WFI Sensor of CBERS satellite, to monthly publish an alert map of areas with more than 25 hectares, indicating completely deforested areas (clear-cutting) as well as areas undergoing deforestation by gradual forest degradation.



Monthly average deforestation area in the Brazilian Amazon (Deter) (May 2004 - September 2012)

Source: INPE (2012b).

Degrad

The Degrad System, developed by INPE in 2007, uses Landsat and CBERS satellite imagery to annually map areas undergoing deforestation process, where forest cover has not been completely removed and therefore not detected by the Prodes system. Out of 24,417 km² mapped as degraded forest areas in 2008, 328 km² were converted to clear-cutting in 2009, and thus calculated by Prodes. In 2009, 13,301 km² were mapped as degraded forest areas, and in 2010, this area was 7,508 km².

Forest degradation in the Brazilian Amazon (2007 - 2010) (km²)

State	2007	2008	2009	2010
Acre	122.8	121.34	31	76
Amazonas	257.6	412.42	181	459
Amapá	50.42	63.18	61	20
Maranhão	1,976.75	4,230.70	2,423	383
Mato Grosso	8,951.14	12,987.74	8,486	2,502
Pará	3,899.23	8,264.82	1,559	3,499
Rondônia	412.32	643.32	232	315
Roraima	137.28	171.39	99	61
Tocantins	179.71	522.18	229	194
Total	15,987.25	27,417.10	13,301	7,508

Source: INPE (2011).

Atlantic Forest

The NGO *SOS Mata Atlântica*, in partnership with INPE, has carried out the monitoring of deforestation rates in the Atlantic Forest biome through CBERS and Landsat satellite imagery. Such effort showed a drop in the annual deforestation rate averaging of 34,313 ha in 2005-2008 to 12,875 ha in 2010-2011.

Deforested area in the Atlantic Forest Biome (2005 - 2011) (ha)

State	2005 - 2008	2008 - 2010	2010-2011
Bahia	24,148	*	4,493
Espírito Santo	573	160	364
Goiás	733	161	33
Minas Gerais	32,728	12,524	6,339
Mato Grosso Sul	2,215	154	588
Paraná	9,978	2,699	71
Rio de Janeiro	1,039	315	92
Rio Grande do Sul	3,117	1,897	111
Santa Catarina	25,953	2,149	568
São Paulo	2,455	743	216
Total	102,939	20,802	12,875

Source: *Fundação SOS Mata Atlântica*; INPE (2009, 2010, 2012).

Note: *Not available.

Cerrado

Within the scope of the Satellite Monitoring of Deforestation in Brazilian Biomes Project, by the Ministry of Environment, the deforestation situation in *Cerrado* was mapped based on the comparison of images from Landsat and CBERS satellites.

Deforested area in the Cerrado biome (2002 - 2010) (km²)

State	2002 - 2008	2008 - 2009	2009 - 2010
Maranhão	14,825	2,338	1,587
Bahia	9,266	1,000	726
Mato Grosso	17,598	833	770
Minas Gerais	8,927	534	522
Piauí	4,213	701	979
Tocantins	12,198	1,311	970
Mato Grosso do Sul	7,153	241	310
Goiás	9,898	664	596
Paraná	0.5	1	1
Rondônia	8	0.8	-
São Paulo	903	7.5	3
Distrito Federal	84	1	5
Annual Average	14,179	7,636	6,469

Source: IBAMA (2009).

Other Biomes

Deforested areas in *Caatinga, Pampa and Pantanal* biomes (2002 - 2009) (km²)

Biome	Before 2002	2002-2008	2008-2009	Total
<i>Caatinga</i>	358,540	16,576	1,921	377,037
<i>Pampa</i>	93,448	2,179	331	95,958
<i>Pantanal</i>	18,662	4,279	188	23,129

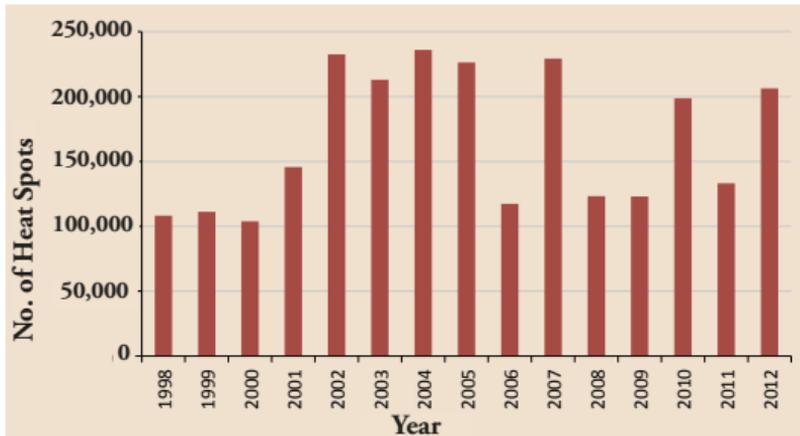
Source: IBAMA (2009).



Forest Fires

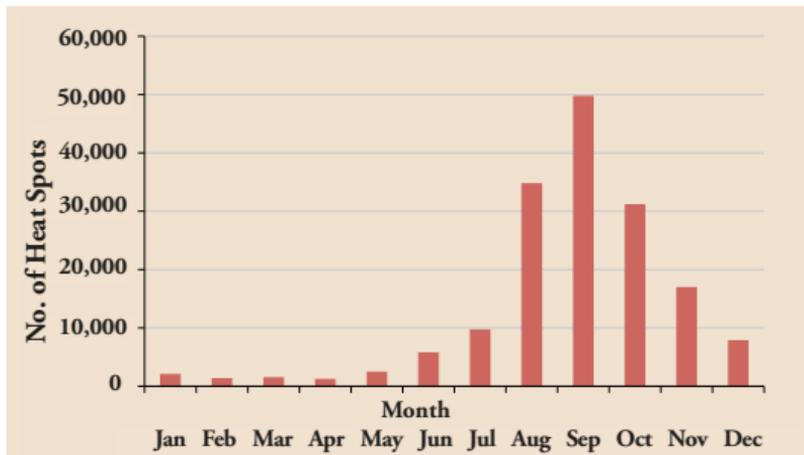
Since 1998, INPE provides daily data on heat spots received from several satellites. Data on the night passages of the satellite NOAA and the satellite Terra and Aqua (MODIS sensor) are loaded into the IBAMA information system, agency responsible for the National Forest Fire Prevention and Suppression System (Prevfogo). Using a geographic information system, satellite images and several databases with detailed information on the entire national territory, the monitoring team identifies areas at risk of fire outbreaks.

The heat spots detected in risk areas enter into an alert system that classifies them according to persistence, location and risk posed.



Total annual heat spots detected in Brazil (May 1998 - December 2012)

Source: IBAMA (2012).



Monthly average of heat spots (May 1998 - May 2012)

Source: IBAMA (2012).



INTERAÇÕES DA NATUREZA

Interactions in Nature

Em uma floresta a flora e a fauna interagem permanentemente. As árvores são uma fonte de alimento para vários animais que, por sua vez, contribuem no processo de reprodução das espécies vegetais, polinizando suas flores ou dispersando suas sementes.

Forest and forest animals interact permanently in a forest. Trees are a source of food for many animals which, in turn, contribute to the reproduction process of plant species by pollinating their flowers or dispersing their seeds.



F orest Management



Forest Governance Institutions

The responsibility of managing the Brazilian forests involves different institutions and the three levels of government: federal, state and local. At the **Federal Government level**, forest management lies under the direct responsibility of four institutions.



The **Ministry of Environment (MMA)** is responsible for the formulation of forest policies. It is the granting authority for sustainable forest production activities and it is responsible for signing forest concession contracts (www.mma.gov.br).



The **Brazilian Forest Service (SFB)** is the managing agency of federal public forests for sustainable production of goods and services. It also holds the responsibility of generating information, training and promotion of the forest sector (www.florestal.gov.br).



The **Brazilian Institute of Environment and Renewable Natural Resources (Ibama)** is the environmental and inspection agency responsible for the environmental licensing and control of Brazilian forests (www.ibama.gov.br).



The **Chico Mendes Institute for Biodiversity Conservation (ICMBio)** is responsible for proposing, implementing, managing, protecting, inspecting and monitoring the Conservation Units instituted by the Federal Government (www.icmbio.gov.br).

State and Local Forest Management

Within the scope of the States and the Federal District, the institutional arrangement has some variations, but in general, the State departments of environment are responsible for the formulation of forest policies and regulation, while the State environmental agencies are responsible for licensing, supervision and control of forestry practices and conservation actions. Some states have created specific bodies for the management of public forests.

In municipalities that have structure for forest management, the arrangement is similar.

Institutional arrangement for forest management in the governmental levels

Main functions of the Institutions	Federal	States	Municipalities
Forest Policies/Grantor	Ministry of the Environment	State Secretariats of Environment	Municipal Secretariats of Environment
Environmental Control and Surveillance of Forests	IBAMA	State Agency or Department of Environment	Municipal Agency of Environment
Forest Conservation	ICMBio	State Agency of Environment	Municipal Agency of Environment
Management of Public Forests/Concessions	Brazilian Forest Service	State Agency of Public Forests Management	-
Collegiate bodies for participation in forest management	CONAMA CONAFLOP/ CGFLOP	State Council of Environment	Municipal Council of Environment

Social Participation in Forest Management

In addition to the public hearings and consultations held in local communities, according to specific situations provided by law, there are three collegiate institutions that enable social participation in the forest management decision-making process.

The **National Environmental Council (Conama)** is the consulting and deliberative body of the National Environmental System (SISNAMA). It is a collegiate body representing federal, state and municipal environmental agencies, the private sector and civil society.

The **National Forest Commission (Conaflor)** provides guidelines for implementing actions of the National Forest Program (NFP) and coordinates the joint participation of different stakeholders in the development of public policies for the Brazilian forest sector.

The **Public Forest Management Comission (CGFLOP)** is the Brazilian Forest Service, advisory board whose purpose is to advise, assess and propose guidelines for the management of public forests in Brazil and to contribute to the Annual Forests Concessions Plan.

Social participation in forest management, in the states, occurs in most cases under the state councils of environment.

Native Vegetation Protection Law

The Law N° 12,651 of May 25th, 2012 provides rules for protection of native vegetation.

The Law lays down general rules on the protection of vegetation, Permanent Preservation Areas and Legal Reserves; forest exploitation, the supply of forest raw materials, forest products chain of custody, the prevention and control of forest fires, and provides economic and financial instruments for achieving its goals.

Further details on the Native Vegetation Protection Law in the following address:

<http://www.florestal.gov.br/pngf/>



Government Plans for Forest Protection

The Brazilian government has implemented several plans aiming at promoting sustainable development and reducing deforestation and greenhouse gas emissions, which directly affect the management of the country's forests.

Action Plan for Prevention and Control of Deforestation in the Legal Amazon (PPCDAM)

Launched in 2004, the PPCDAM goal is to reduce deforestation in the Legal Amazon region. The Plan is organized in three axes: Territorial and Land Region Tenure Organization; Monitoring and Environmental Control; Promoting Sustainable Productive Activities (BRASIL. Casa Civil, 2004).

For more information see: <http://www.mma.gov.br>

National Plan on Climate Change (PNMC)

Launched in 2008, the PNMC goal is to identify, plan and coordinate the actions and measures that are able to mitigate greenhouse gas emissions generated in Brazil, as well as other activities required for society's adaptation to the impact of climate change. Two of PNMC's main targets are related to the forest sector:

1. Seek sustained reduction of deforestation rates, in four-year averages, in all Brazilian biomes, until

achieving zero illegal deforestation. In practice, it means reduction of 40% in the average deforestation rate by 2006-2009 period, in relation to the average rate of the ten-year period of 1996 to 2005, and 30% more in each of the two following four-year periods, in relation to the preceding periods. In the case of Amazon biome, reaching this specific goal may avoid emissions of around 4.8 billion tons of carbon dioxide, in the period of 2006 to 2017, considering the magnitude order of 100 tC/ha.

2. Eliminate the net loss of forest cover area by 2015, which means that, in addition to preserving forests at the levels stipulated by the previous goal, the area of planted forests should double from the 5.5 million ha in 2008 to 11 million ha until 2020, of which 2 million ha will be planted with native species, especially in areas of degraded pastures, aiming their economic and environmental restoration.

For more information see: <http://www.mma.gov.br>

Action Plan to Prevent and Control Deforestation and Wildfires in Cerrado (PPCerrado)

Launched in 2009, the PPCerrado aims at coordinating, articulating and carrying out initiatives to reduce deforestation in this biome, establishing targets for deforestation reduction rates and providing the foundation for estimating greenhouse gas emissions. Such estimates will be used to define emission reduction targets under the National Plan on Climate Change (BRASIL. MMA, 2009).

For more information see: <http://www.mma.gov.br>

Payment for Environmental Services

“Bolsa Verde” Federal Program

Launched in October 2011 by Law No. 12,512 and the Environmental Conservation Support Program, known as the *“Bolsa Verde”* Program, awards quarterly financial benefits of R\$ 300 (~ US\$ 130) to the families in situations of extremely poverty who live in environmental protection priority areas.

The program purpose is to combine population income increasing up with ecosystem conservation and sustainable use of natural resources, once 47% of the 16.2 million

people in extreme poverty live in rural areas. The first phase of the “*Bolsa Verde*” Program was applied primarily in the Legal Amazon area in October 2011 and in 2012 it was expanded to the whole country.

For more information see: <http://www.mma.gov.br/desenvolvimento-rural/bolsa-verde>.
stare

“*Bolsa Floresta*” Program of the State of Minas Gerais

“*Bolsa Floresta*” Program of Minas Gerais state, established by Law No. 17,727 of 2008 and regulated by Decree No. 45,113 of 2009, preceded the national initiative. In 2011, the program had a budget of R\$ 8.5 million (~US\$ 3.7 million), with approximately 900 landowners participating in the Program. The plan provides that each landowner receives R\$ 200 (~US\$ 87) per year for each hectare covered with native vegetation.

More information is available in the site: <http://www.ief.mg.gov.br/bolsa-verde>. (MINAS GERAIS. IEF, 2011).

“Bolsa Floresta” Program of the State of Amazonas

In June 2007, in a pioneer initiative, the Amazonas State Government launched the *“Bolsa Floresta”* Program. The Program is focused on populations living in Conservation Units (CUs). The *“Bolsa Floresta”* establishes an annual payment R\$ 1,360 per family (~US\$ 590), divided into four components: 1) *“Bolsa Floresta”* which provides direct payments to the woman representative of each family; 2) Income Forest Grant, directed for income generation (production of Brazilian nuts, arapaima fish, açai berry, tourism, etc.); 3) Social Forest Grant, which focuses on social investments, especially education and health; 4) *“Bolsa Floresta”* Association, which foresees investments in strengthening community-based organizations. In order to be eligible to participate in the Forest Grant Program, families must be living for two or more years in the Conservation Units. This rule tends to avoid migration to these areas motivated by the Program’s benefits.

Sustainable Forest District of Road *BR-163*

A Presidential Decree of February 13th, 2006, established the geo-economic and social complex named Sustainable Forest District (DFS) of the road *BR-163*, with the purpose of implementing public policies to stimulate sustainable forest production in that region. The legal act also established the Interagency Working Group (IWG), with representatives of the Presidency Civil House and other 13 ministries. Its purpose is to propose actions aimed at fostering socioeconomic development based on sustainable forestry and environmental conservation in the Sustainable Forest District of road *BR-163*, as well as to elaborate an implementation plan for the proposed actions.

It covers the municipalities of Altamira, Aveiro, Belterra, Itaituba, Jacareacanga, Juriti, Novo Progresso, Óbidos, Placas, Prainha, Rurópolis, Santarém and Trairão.

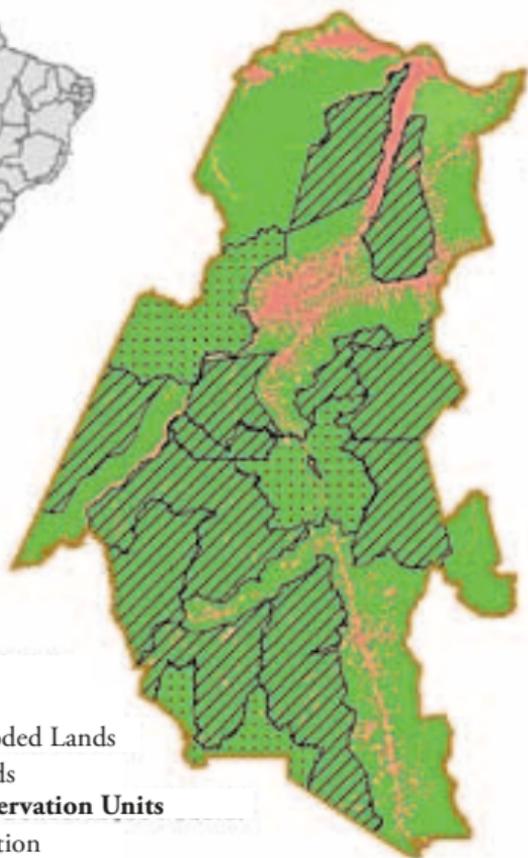
Approximately 57% of the area of SFD BR-163 is comprised by federal Conservation Units, totaling 10.8 million hectares, of which 8.3 million belong to the category of Federal Conservation Units of Sustainable Use. The mosaic of federal Conservation Units includes three National Parks, two Extractivist Reserves, one Environmental Protection Area and eight National Forests.

It covers the municipalities of Altamira, Aveiro, Belterra, Itaituba, Jacareacanga, Juriti, Novo Progresso, Óbidos, Placas, Prainha, Rurópolis, Santarém and Trairão.

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Sustainable Forest District of Road BR-163

0019-0001-224



Land Cover

- Forest
- Other Wooded Lands
- Other Lands

Federal Conservation Units

- Full Protection
- Sustainable Use

Source: MMA (2010)

National Forest Development Fund (FNDF)

Created by Law N°. 11,284/2006 (Public Forest Management Law) and regulated by Decree N°. 7,167/2010, the National Forest Development Fund is a public fund of financial nature, which is part of the Federal Government budget and it is managed by the Brazilian Forest Service. It aims at fostering the development of forest-based sustainable activities in Brazil and promoting technological innovation in the sector.

The FNDF supports actions in eight priority areas: (I) research and technological development in forest management; (II) technical assistance and forestry extension; (III) restoration of degraded areas with native species; (IV) sustainable exploitation of forest resources; (V) control and monitoring of forestry activities and deforestation; (VI) training in forest management and training of multipliers in forestry activities; (VII) environmental education; and (VIII) environmental protection and conservation of natural resources.

The main financial source of the FNDF is the forest concession contracts in federal public forests, as shown in the table below. Additionally, the Fund may receive donations from national or international, public or private entities.

Destination of resources from federal forest concessions

Institution	Concession in National Forests	Concession in other Public Forests
ICMBio	40%	-
States	20%	30%
Municipalities	20%	30%
FNDF	20%	40%

Amazon Fund

The Amazon Fund aims at raise donations for non-reimbursable investments to prevent, monitor and combat deforestation and promote the conservation and sustainable use of forests in the Amazon biome, according to Decree No. 6,527 of August 1st, 2008.

The Amazon Fund is managed by the National Bank for Economic and Social Development (BNDES), which also undertakes fund-raising, contracting and monitoring responsibilities for the supported projects and activities.

The Amazon Fund supports projects in the following areas:

- Management of public forests and protected areas;
- Environmental control, monitoring and enforcement;
- Sustainable forest management;
- Economic activities from sustainable forest use;
- Ecological and economic zoning, spatial planning and land tenure regulation;
- Conservation and sustainable use of biodiversity, and
- Restoration of deforested areas.

The Amazon Fund may use up to 20% of its resources to support the development of deforestation monitoring and control systems in other Brazilian biomes and tropical countries. 30 Projects had been contracted by November 7, 2012, totaling R\$ 315.2 million (~US\$ 137 million)

for financial support and 4 projects were approved, totaling R\$ 81.1 million (~US\$ 35 million). In the same period, disbursements amounted to R\$ 119 million (~US\$ 52 million).

The Amazon Fund also relies on donations from foreign governments and companies, and is getting structured to receive donations from multilateral institutions, non-governmental organizations and individuals. By October 4th 2012 the Amazon Fund had received donations from the Government of Norway (R\$ 903,465,000 equivalent to ~US\$ 392,810,870), the Federal Republic of Germany-KFW (R\$ 55,185,900.00, equivalent to ~US\$ 23,993,870) and the *Petróleo Brasileiro S.A. - Petrobrás* (R\$ 7,929,444 (~US\$ 3,447,584). Total contribution R\$ 966,580,344 (~US\$ 420,252,324). (BRASIL. MMA. FUNDO AMAZÔNIA, 2012).

Source Control of Forest Products

The source control of timber, charcoal and other forest products or by-products is carried out through a national system that integrates data from states and federal entities, being coordinated, supervised and regulated by IBAMA.

Any kind of transport and storage of timber, firewood or charcoal and other forest products or sub-products from native species forests for commercial or industrial purposes require licensing by the relevant agency, called the Forest Source Document - DOF. This license must follow the product to the final processing facilities.

Source analysis on timber coming from natural forests, based on transport authorizations granted by the integrated entities of the DOF System, in the 2007-2010 period, showed that approximately 49% of timber come from sustainable forest management and 51% from authorized deforestation.

Out of the percentage of timber from authorized deforestation, 46% come from areas of alternative land use such as livestock and agriculture and the remaining 5% from areas where vegetation removal is permitted for implementation of projects such as highways, industries and other.

National Forest Information System - Nfis

The National Forest Information System - Snif is a national database of forest information, composed by collecting, producing, treating, organizing, storing, processing and disseminating data, information and knowledge on forest related issues, from diverse sources, which allows easy access to all interested parties.

The Brazilian Forest Service is responsible for creating and maintaining the National Forest Information System, in accordance with Law 11,284/2006. The main information axes are: **Forest Resources** (information provided by several institutions and by the National Forest Inventory - NFI), **Forest Management** (information provided by governmental agencies), **Forest Production** (information produced by the forest sector and federal institutions, including exploration, production, consumption and market), information on **Education and Forest Research** (information collected in education institutions and forest research centers).

For more information see: www.florestal.gov.br/snif



Socioeconomic Aspects of the Forest Sector





Employment

Number of formal employments per forest sector segment

Forest sector segment	2007	2008	2009	2010	2011 ¹
Supporting forest production activities	60,787	52,376	44,419	53,425	54,151
Wood processing	99,183	87,929	83,114	85,302	86,123
Pulp and paper production	158,676	161,354	163,182	173,219	174,244
Wood structures and artifacts production	45,407	45,061	43,742	47,559	50,000 ²
Veneers and plywood production	50,786	45,089	39,491	42,045	41,600
Forest production - native forests	8,671	6,443	6,382	7,160	7,742
Forest production - forest plantations	62,499	65,454	62,877	67,097	68,481
Furniture manufacturing	168,139	171,218	172,740	188,178	190,826
Total	654,148	634,924	615,947	663,985	673,167

Source: Brasil. MTE (2012).

Note:

¹ Includes the number of formal employments until September 2011.

² Estimated.

Forest Exploration and Production

Timber Products

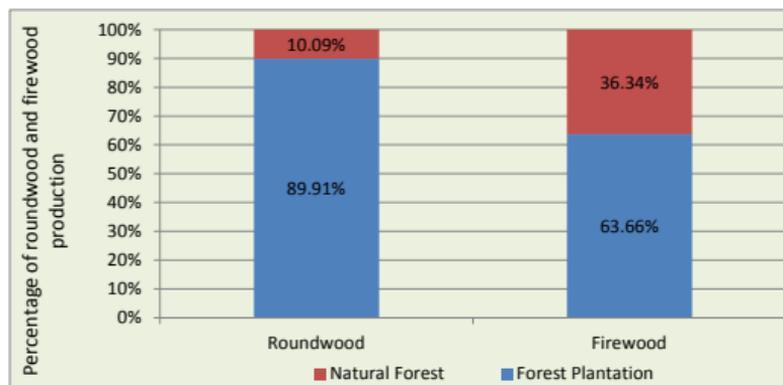
Quantity and value of roundwood from native forests and forest plantations and their main uses

Roundwood		Quantity (1,000 m ³)				
Source	Use	2007	2008	2009	2010	2011
Native forest	Fuel	64,153	59,894	54,558	50,230	48,384
	Industry	16,389	14,127	15,248	12,655	14,116
Subtotal of native forest		80,542	74,021	69,806	62,885	62,500
Forest plantation	Fuel	69,538	73,841	68,439	75,688	84,763
	Industry	105,132	101,262	106,911	115,742	125,852
Subtotal of forest plantation		174,670	175,103	175,350	191,430	210,615
Total		255,212	249,124	245,156	255,273	273,115

Source: IBGE. PEVS (2012).

Note: Fuel value is achieved by the sum of firewood and charcoal turned into firewood (1m^3 firewood = $(1\text{t charcoal} \times 1000/250) \times 2$).

Value (million R\$)				
2007	2008	2009	2010	2011
1,392	1,439	1,304	1,274	1,321
1,801	1,822	2,571	2,156	2,709
3,193	3,261	3,875	3,430	4,030
2,698	3,282	2,839	3,315	4,135
5,481	5,424	6,083	7,246	8,862
8,179	8,706	8,922	10,561	12,997
11,372	11,967	12,797	14,000	17,027



Participation of natural and planted forests in the production of roundwood and firewood.

Source: IBGE. PEVS (2012), adapted / SFB.GEIF.

Annual production of wood-based panels

Panels produced (1,000 m ³)	2007	2008	2009	2010	2011
Plywood (veneers and laminates)	3,790	3,188	2,354	2,207	--
Particle board (MDP + OSB)	2,784	2,768	2,623	3,194	3,069*
Hardboard	527	511	400	380	362
Medium Density Fiberboard (MDF)	1,879	2,074	2,395	3,036	3,039
Total	8,980	8,541	7,772	8,817	6,470

Source: ABIPA (2012); ABRAF (2012); IBGE. PIA (2008, 2009, 2010, 2011a, 2012). *This information did not include OSB.

Annual production of wood pulp and paper

Wood pulp and paper produced (1,000 t)	2007	2008	2009	2010	2011
Wood pulp	12,520	13,199	14,510	14,615	14,639
Newsprint paper	144	140	127	124	129
Printing and writing paper	2,575	2,534	2,622	2,733	2,745
Household and sanitary paper	812	850	868	905	961
Wrapping and Packaging Paper	4,424	4,775	4,649	4,994	5,168
Paperboard	645	713	748	799	754
Other kinds of paper	409	397	414	423	402
Total	21,529	22,608	23,938	24,593	24,798

Source: BRACELPA (2012).

Annual production of sawnwood

Sawnwood produced (1,000 m ³)	2007	2009	2010
Sawnwood, planed or polished	7,241	4,713	4,098
Boards and laths	669	578	536
Planks	708	124	292
Joists, rafters, beams and similar for construction	74	87	63
Total	8,692	5,502	4,989

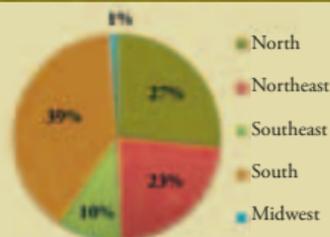
Source: IBGE. PIA (2008, 2009, 2011a, 2012).

Non-timber Forest Products

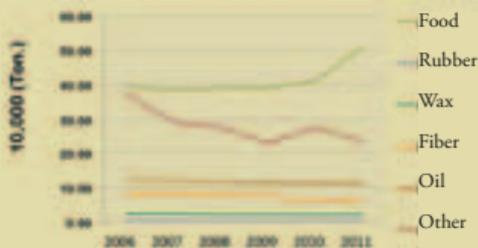
Non-timber products derived from natural forests:



Percentage of each product produced (2011);



Percentage produced per region (2011) and;



Quantity produced(2006 - 2011).

Source : IBGE. PEVS (2012).

Quantity and value of main non-timber products extracted from forest plantations

Product	Quantity produced (t)				
	2007	2008	2009	2010	2011
Bark of black wattle	172,090	158,548	109,010	107,171	105,578
Eucalyptus leaf	53,084	58,326	64,077	96,907	56,797
Pine resin	65,652	58,061	56,565	71,073	71,619
Total	290,826	274,935	229,652	275,151	233,994

Source: IBGE. PEVS (2012).

Product	Production value (1,000 R\$)				
	2007	2008	2009	2010	2011
Bark of black wattle	18,201	14,064	10,554	9,586	11,799
Eucalyptus leaf	1,745	2,245	2,459	4,064	2,544
Pine resin	79,065	66,832	76,331	126,026	137,528
Total	99,011	83,141	89,344	139,676	151,871

Source: IBGE. PEVS (2012).

Quantity and value of main non-timber forest products extracted from native species

Product	Quantity (t)				
	2007	2008	2009	2010	2011
Açaí berry	108,033	120,890	115,947	124,421	215,380
Cashew-nut	5,480	4,447	4,238	4,030	3,179
Brazilian nut	30,406	30,815	37,467	40,357	42,152
Mate	225,957	219,773	218,102	227,462	229,681
Palm heart	6,037	5,873	5,076	4,920	5,563
Pine nut	4,887	4,768	5,066	5,715	8,032
Umbu (berry)	8,619	9,268	9,428	9,804	9,323
Latex (Hevea)	3,958	3,625	3,463	3,516	3,005
Carnauba wax	22,464	21,511	21,131	21,462	21,274
Buriti fiber	500	610	803	465	465
Piaçava fiber	82,096	78,167	72,232	63,776	61,409
Carnauba fiber	1,488	1,517	1,540	1,552	1,640
Licuri (coconut)	5,355	4,649	4,654	4,307	4,213
Copaiba oil	523	514	538	580	214
Babaçu almond	114,874	110,636	109,299	106,055	102,499
Cumarú almond	97	86	97	95	103
Pequi almond	5,363	5,531	5,992	5,786	7,047

Source: IBGE. PEVS (2012); IBGE. PAM (2011).

Value (1,000 R\$)					Main Biome
2007	2008	2009	2010	2011	
106,664	133,746	160,528	179,378	304,566	Amazon
5,853	4,161	4,013	4,774	3,820	Caat./Atl.F./Cerr.
45,492	45,732	52,261	55,194	69,404	Amazon
87,667	102,635	86,587	100,526	118,049	Atlantic Forest
9,903	5,988	7,353	8,691	9,535	Amazon
5,473	6,229	6,878	9,120	10,955	Atlantic Forest
5,092	6,413	6,671	7,499	7,600	Caatinga
7,705	7,894	7,603	8,235	8,202	Amazon
78,672	80,884	97,136	103,603	108,268	Caatinga
1,150	1,269	1,404	1,693	2,054	Amazon
97,857	104,120	110,245	117,706	123,435	Amaz./Atl.F.
822	905	1,019	1,226	1,387	Caatinga
4,508	3,714	3,816	3,623	4,105	Caatinga
3,790	3,788	4,148	4,908	2,178	Amazon
113,268	115,636	121,351	130,940	142,208	Cerrado
542	644	710	744	925	Amazon
6,035	6,818	8,793	10,688	11,113	Cerrado

Note: Production of permanent crops in 2011 (t): Rubber - 274,163; Cashew-nut - 230,785; Mate - 443,635; Palm heart - 103,419.

Exports of Forest Products

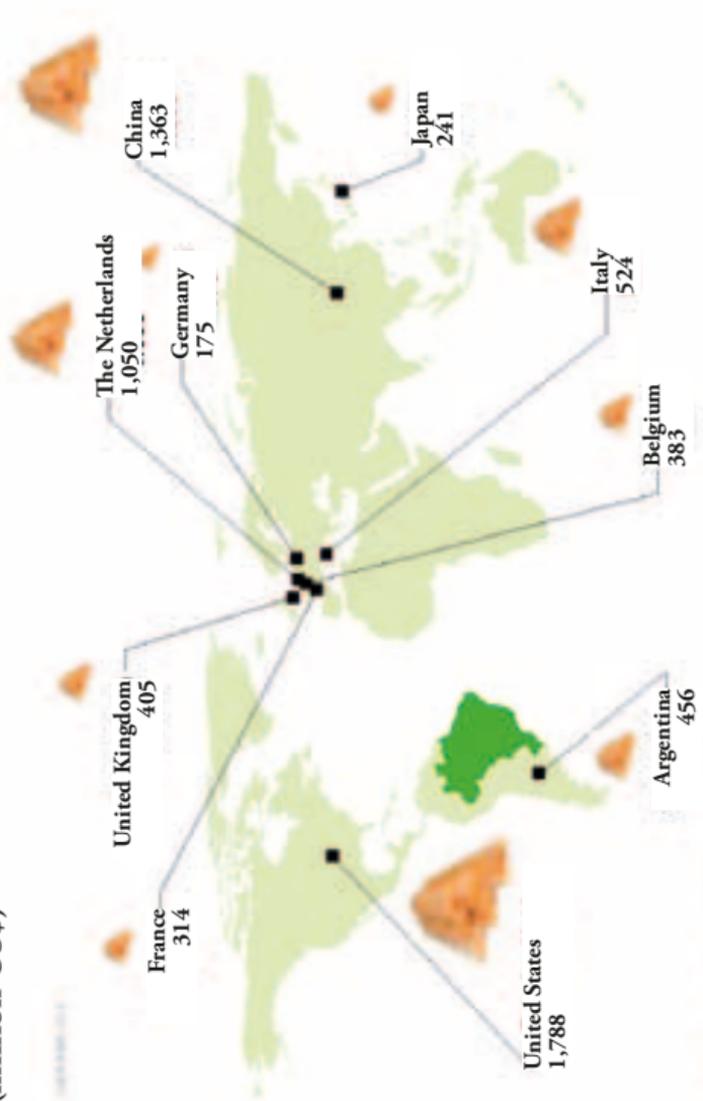
Quantity and value of main timber forest products exports

Product	Unit	Quantity				
		2008	2009	2010	2011	2012
Wood pulp	1,000 t	7,202	8,586	8,793	8,880	8,912
Paper and paperboard	1,000 t	1,856	1,910	1,969	1,942	1,764
Wood Charcoal	1,000 t	5	6	3	1	1
Recovered paper	1,000 t	3	2	5	27	29
Other fiber pulp	1,000 t	11	4	6	4	--
Wood chips and particles	1,000 m ³	5,658	4,100	4,744	4,249	4,371
Sawnwood	1,000 m ³	2,120	1,394	1,359	1,325	1,222
Plywood	1,000 m ³	2,144	1,496	1,447	1,217	1,348
Fiberboard	1,000 m ³	236	192	141	147	204
Veneer sheets	1,000 m ³	120	33	42	69	55
Agglomerate	1,000 m ³	71	59	77	85	98
Roundwood	1,000 m ³	22	6	24	75	66
Wood residues	1,000 m ³	4	4	1	1	2

Source: Brasil. MDIC (2013).

Value (1,000 US\$)				
2008	2009	2010	2011	2012
3,901,136	3,308,862	4,750,531	4,984,783	4,700,438
1,663,955	1,480,177	1,784,148	1,916,305	1,716,063
1,609	2,200	1,116	560	457
1,009	437	1,459	6,682	5,432
15,225	5,978	9,688	10,153	--
142,180	91,187	110,807	107,490	116,865
679,549	398,922	418,128	408,696	351,757
632,173	343,453	418,259	370,360	408,101
101,534	69,107	57,966	67,790	88,487
55,978	25,571	30,290	36,091	34,427
26,293	16,698	23,747	26,776	28,152
5,752	1,144	5,045	11,943	12,655
67	98	29	23	103

Main destinations for Brazilian timber forest products exports (2012) (million US\$)



Source: MDIC (2013)

Quantity and value of some non-timber forest products exports

Product	Quantity (t)				
	2008	2009	2010	2011	2012
Cashew-nut	35,414	48,245	42,175	26,301	25,431
Brazilian nut	13,749	9,884	8,998	10,350	11,118
Vegetable wax	15,195	12,245	17,661	15,827	15,289
Yerba Mate	31,607	31,051	33,270	35,436	36,272
Vegetable oil*	138.2	355.1	456.3	546	240
Resinoids	0.07	0.17	0.24	0.10	0.04

Source: Brasil. MDIC (2013).

Note: *Includes oil of babaçu, jojoba, cedro, eucalyptus and rosewood.

Product	Value (1,000 US\$)				
	2008	2009	2010	2011	2012
Cashew-nut	196,074	231,988	229,572	226,657	186,390
Brazilian nut	20,319	11,792	13,447	14,175	25,156
Vegetable wax	85,236	60,508	100,400	108,108	119,411
Yerba mate	45,862	42,764	50,958	60,985	68,721
Vegetable oil*	2,511	5,198	4,816	7,776	2,922
Resinoids	2	8	7	18	5

Source: Brasil. MDIC (2013).

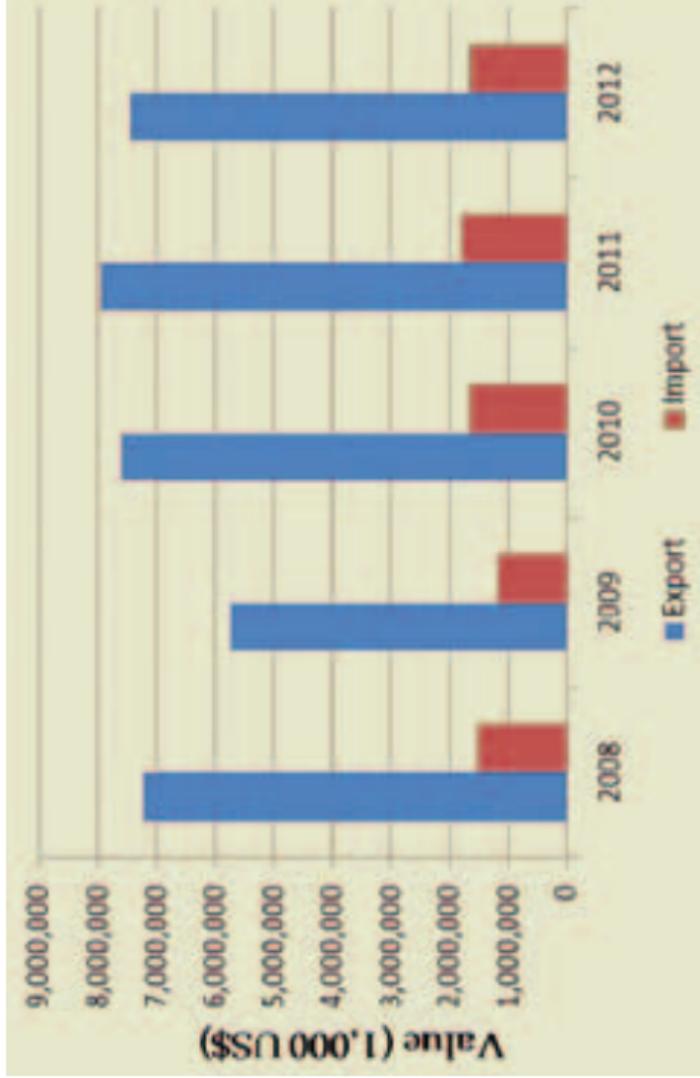
Note: *Includes babaçu oil, jojoba, cedar, eucalyptus and rosewood.

Imports of Forest Products

Quantity and value of the main timber forest products imports

Product	Unit	Quantity					Value (1,000 US\$)				
		2008	2009	2010	2011	2012	2008	2009	2010	2011	2012
Wood charcoal	1,000 t	355	85	124	110	77	19,164	6,934	11,541	12,177	8,667
Paper and paperboard	1,000 t	1,201	1,006	1,389	1,315	1,279	1,104,856	869,886	1,216,170	1,292,957	1,234,505
Recovered paper	1,000 t	19	13	20	11	8	2,121	973	3,027	2,599	1,778
Wood pulp	1,000 t	341	376	424	410	423	264,089	228,926	341,533	354,464	316,083
Other fiber pulp	1,000 t	4	8	9	8	11	8,068	11,765	15,522	17,312	21,319
Wood residues	1,000 m ³	296	263	275	245	150	450	688	747	840	741
Sawnwood	1,000 m ³	113	100	84	58	45	18,157	15,395	14,735	18,808	22,618
Fiberboard	1,000 m ³	182	103	146	172	104	69,957	34,410	55,281	74,170	48,344
Agglomerate	1,000 m ³	52	40	18	4	5	16,017	8,927	5,384	1,957	2,808
Veneer sheets	1,000 m ³	14	10	10	9	8	14,764	9,456	9,875	9,095	8,034
Roundwood	1,000 m ³	19	26	26	9	25	1,373	2,611	1,154	1,338	1,124
Plywood	1,000 m ³	4	4	4	2	2	3,006	1,617	2,386	1,748	2,658
Wood chips and particles	1,000 m ³	1,9	0,2	11	1	0,3	74	306	177	353	385

Source: Brasil, MDIC (2013).



Comparison of main timber forest products exports and imports in Brazil

Source: Brasil. MDIC (2013).

Domestic Trade of Timber in the Legal Amazon

The total volume of roundwood from Legal Amazon native forests legally traded in 2011 was 12.9 million m³, of which 89% were from the states of Pará, Mato Grosso and Rondônia. An amount of 5.9 million m³ of sawnwood was produced this year, generating around R\$ 4.3 billion reais (~US\$ 1.9 billion).

Roundwood consumption and sawnwood production in the Legal Amazon (2011)

State of origin	Roundwood consumption (m ³)	Sawnwood production (m ³)*	Values (million R\$)
Acre ¹	414,215	142,488	62
Amapá ¹	131,768	89,907	56
Amazonas ¹	429,683	212,009	108
Maranhão ¹	218,965	196,597	89
Mato Grosso ²	4,937,976	1,425,985	1,218
Pará ²	4,245,326	2,319,020	2,044
Rondônia ¹	2,234,206	1,328,945	613
Roraima ¹	261,899	204,165	74
Tocantins ¹	15,101	27,228	16
Legal Amazon	12,889,139	5,946,342	4,280

Source: ¹ IBAMA. DOF (2012); ² OEMAs. Sisflora (2012).

Note: * Sawnwood in the following forms: planks, rafters, squared or sliced boxboards, scantlings, benefitted planks, boards, rods, beams, joists, laths, battens and sleepers.

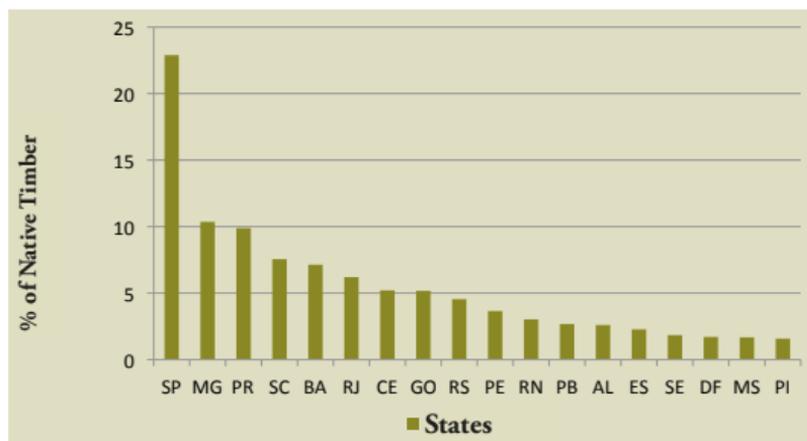
The volume of timber extracted from the Legal Amazon states and traded to other states outside this region in 2011 was 5.5 million m³. Approximately 60% was sold to the States of São Paulo, Minas Gerais, Paraná, Santa Catarina and Bahia, from which São Paulo represents alone 23%.



Volume of timber from the Legal Amazon traded in other states (2011)

State	Volume (m ³)	State	Volume (m ³)
São Paulo	1,268,383	Pernambuco	202,452
Minas Gerais	574,201	Rio Grande do Norte	167,818
Paraná	547,736	Paraíba	148,002
Santa Catarina	418,869	Alagoas	144,072
Bahia	395,688	Espírito Santo	125,880
Rio de Janeiro	343,813	Sergipe	101,855
Ceará	288,615	Distrito Federal	94,404
Goiás	286,334	Mato Grosso do Sul	93,173
Rio Grande do Sul	252,205	Piauí	87,166
Total		5,540,666	

Source: IBAMA. DOF (2012).



Percentage of total native timber volume from the Legal Amazon traded in other states (2011)

Source: IBAMA. DOF (2012).

Volume of timber from the Legal Amazon traded outside the region, per product type (2011)

Product type	Volume (m ³)	Product type	Volume (m ³)
Squared or sliced boxboards	42,892	Rod	162
Briquette	112	Beam	1,401,913
Scantling	404	Joist	149,521
Wood chips	8,406	Batten board	9,773
Plywood	229,122	Fence Post	586
Decking	48,665	Wooden flooring	82,082
Sleepers	10,428	Round logs	7
Stakes	167	Finished product	288,370
Parallel lumber	183,089	Blade residues	22,721
Sliced lumber	54,186	Sawmill residues	5,682
Planned lumber	160	Lath	318,551
Rafter	696,176	Batten	95,250
Plank	657,072	Parquet flooring	3,565
Large plank	37,261	Roundwood	1,249
Board	1,191,565	Post	1,529
Total		5,540,666	

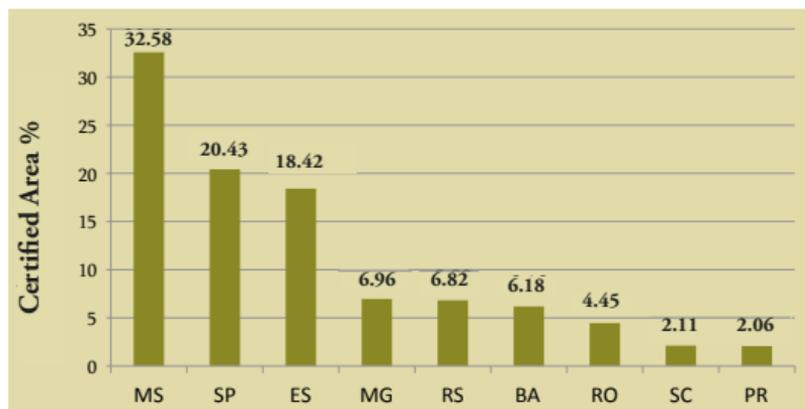
Source: IBAMA. DOF (2012).

Forest Certification

The forest and chain of custody certification in Brazil is carried out by several certification companies, through two certification systems: the Brazilian Program for Forest Certification (Cerflor), bound to the Program for the Endorsement of Forest Certification Schemes (PEFC), and the Forest Stewardship Council (FSC).

Cerflor - Brazilian Program for Forest Certification

Cerflor aims at forest management and chain of custody certification. By the end of November 2012, there were in Brazil 34 chain of custody certifications for forest products and 16 forest management certifications by Cerflor, totaling 1,463,308 hectares of forests, of which 65,078 ha are native forests and 1,398,230 ha are planted forests.

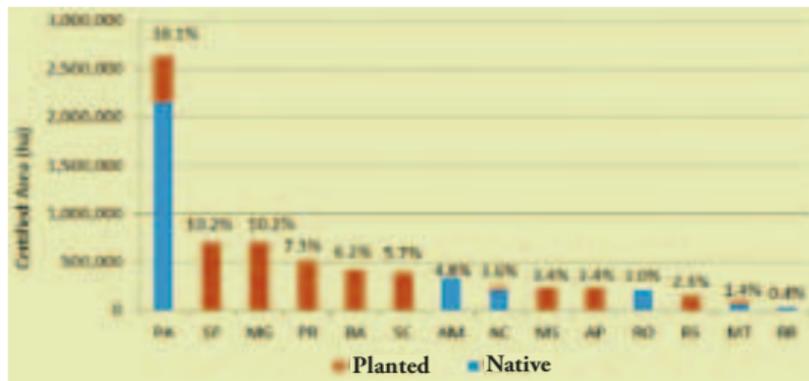


Percentage of forest area certified by Cerflor stamp in Brazil per State (2012)

FSC - Forest Stewardship Council

The FSC aims at the dissemination of good forestry practices according to principles and criteria that bring together ecological safeguards, social benefits and economic viability, and are the same for the whole world.

By the end of November 2012, there were in Brazil 919 chain of custody certifications for forest products and 93 forest management and chain of custody certifications by the FSC, covering 7.2 million hectares of forests, of which 3.9 million hectares are planted forests, 3 million hectares are native forests and 300 thousand hectares are mixed forest management.

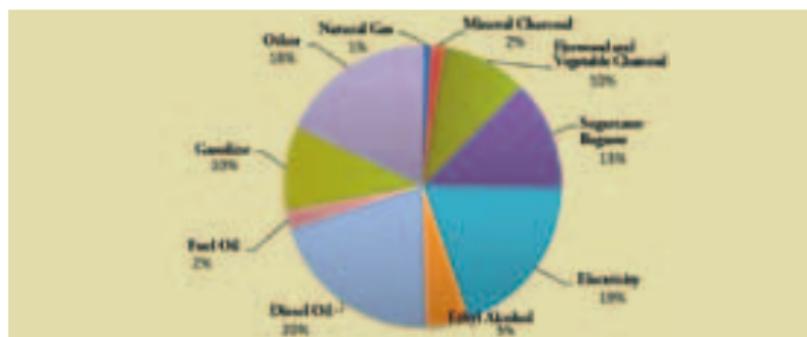


Certified forest areas with FSC stamp in Brazil per state (2012)

Source: FSC (2012).

Forests in the Energy Mix

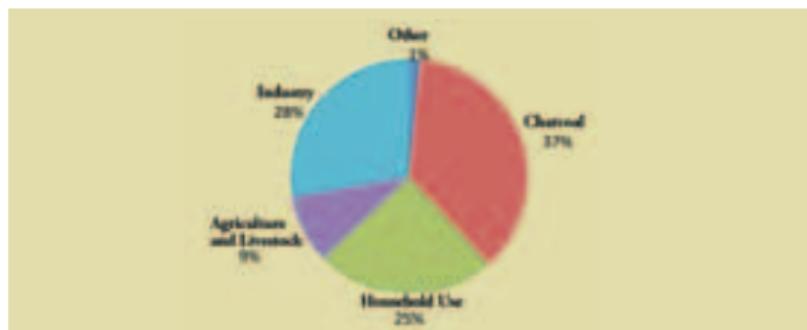
Firewood and charcoal accounted for 10% of Brazil's energy mix in 2011.



Energy consumption in Brazil (2011)

Source: Brasil. MME (2012).

The domestic use of firewood for cooking food is still significant in the country, representing 25% of its total allocation.



Use of firewood from native forests and forest plantations (2011) (%) Source: MME (2012).

Forest Financing

To meet the great demand for information on how to finance the various forestry activities (such as reforestation of Legal Reserves and Permanent Preservation Areas; planting native species; implementation of agroforestry and silvopastoral systems; industrial forest plantations in order to supply mainly demands for charcoal, energy and wood pulp), the Brazilian Forest Service prepared a Forest Financing Guide, which provides key information about credit lines and financing programs, beneficiaries, value limits, interest rates, reimbursement terms and grace periods, safeguards and financial agents that operate them. The full text of the Forest Financing Guide can be accessed on the website <http://www.florestal.gov.br>.





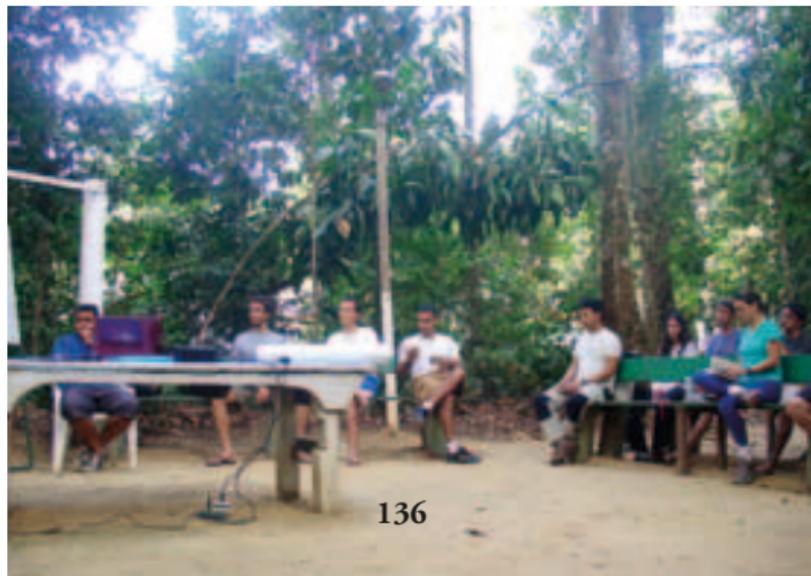
F orest Education



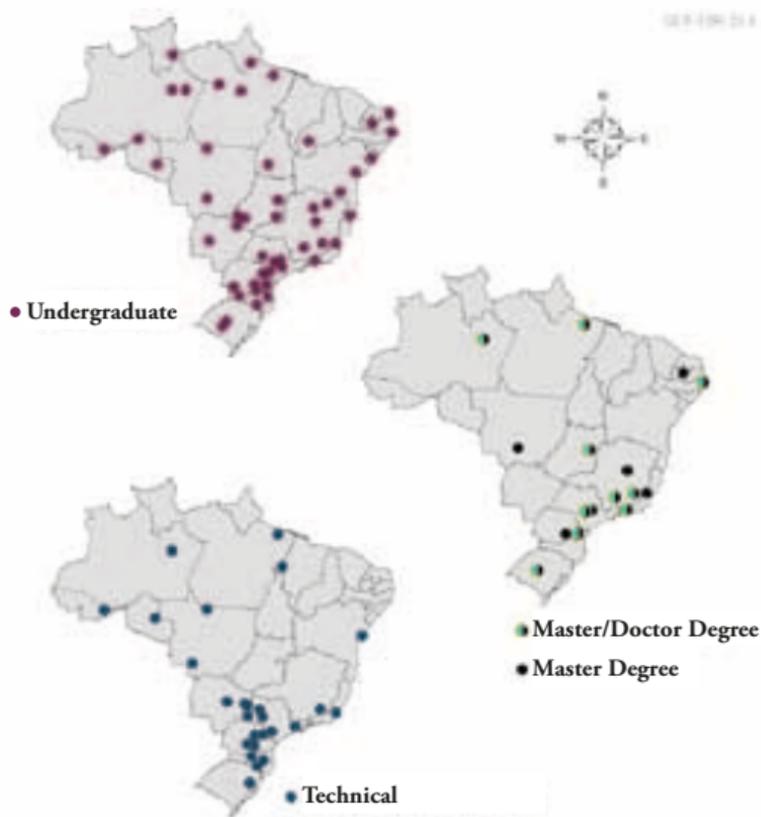
In Brazil, 55 undergraduate courses in Forest Engineering are offered by 50 Universities, and 21 postgraduate courses in Forest Engineering and Forest Sciences (BRASIL. MEC, 2012).

Moreover, there are 2 forest-related technical courses (1 in Silviculture and 1 in Pulp and Paper) and 30 forest-related High School courses (21 for Forest Technicians, 7 for Pulp and Paper Technicians, 1 for Agroforestry Technicians and 1 for Indigenous Agroforestry Agents) (BRASIL. MEC, 2012).

For more information see Snif website - Forest Education and Research: <http://www.florestal.gov.br/snif/>



Distribution of undergraduate, postgraduate and technical forest-related courses



Source: MEC (2010)

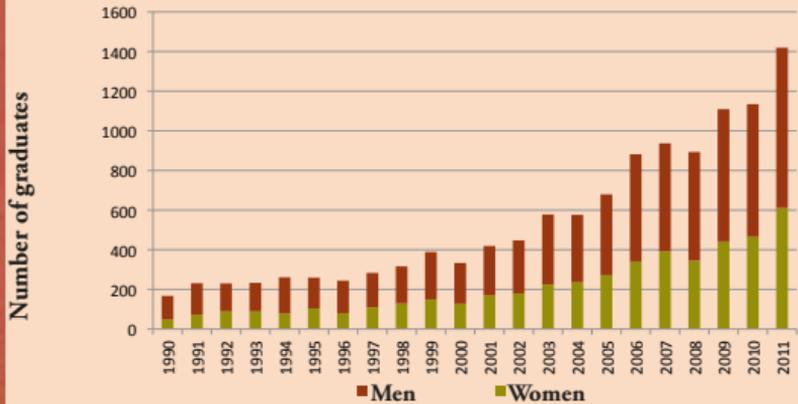
Undergraduates and Postgraduates

Number of graduates in Forest Engineering Undergraduate and Postgraduate courses

Courses	2005	2006	2007	2008	2009	2010	2011
Graduation	679	882	937	893	1,109	1,134	1,419
Master's Degree	181	200	177	199	249	239	362
Doctor's Degree	63	49	71	73	74	103	83
Total	923	1,131	1,185	1,165	1,432	1,476	1,864

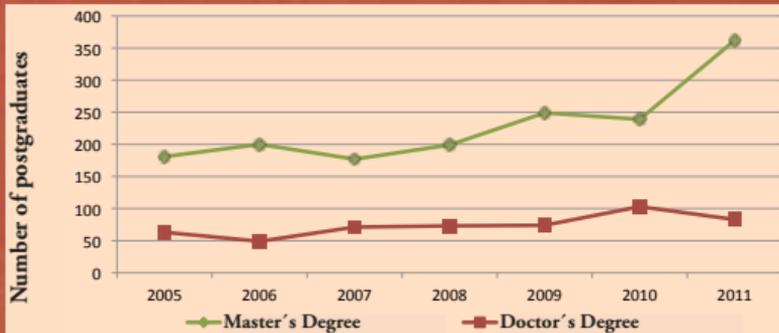
Source: INEP (2011, 2012); CAPES (2012).

In the 2005-2011 period there was a relevant increase in the number of graduates in Forest Engineering and Forest Sciences in Brazil.



Number of Forest Engineering graduates, per year and gender

Source: INEP (2011, 2012).



Number of Forest Engineering and Forest Sciences postgraduates, per year

Source: CAPES (2012).

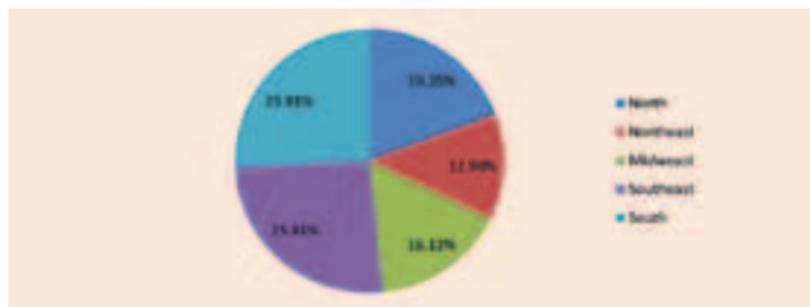
Technical Education

Forest-related technical education in Brazil is divided into 4 types of expertises: Indigenous Agroforestry Agent, Agroforestry Technician, Pulp and Paper Technician, and Forest Technician. These courses are distributed in all regions of the country.

Quantity of Technical Courses by Expertise (2011)

Speciality	Number of Courses					Total
	North	Northeast	Midwest	Southeast	South	
Indigenous Agroforestry Agent	1	0	0	0	0	1
Agroforestry Technician	1	0	0	0	0	1
Pulp and Paper Technician	0	1	1	1	4	7
Forest Technician	5	1	4	7	4	21
Total	7	2	5	8	8	30

Source: Brasil. MEC. (2012).



Technical Courses by Region of Brazil (2011) (%)

Source: Brasil. MEC. (2012).

Florestabilidade Project

Florestabilidade is an education project for forest management, created by *Fundação Roberto Marinho* in partnership with Fundo Vale and the Brazilian Forest Service. It aims at raising young people's awareness to an important mission: to become the managers of the largest rainforest on the planet.

The content of *Florestabilidade* encompasses the techniques of forest management for timber products, non-timber products and environmental services. The extractivist, riverine and indigenous populations and the forest technicians are the educators that tell the stories about the opportunities and challenges of those who live and work in the Amazon.

All didactic material of the project can be found on the website: www.florestabilidade.org.br (access *Aulas* and *Biblioteca*); as well as information on the used teaching methodology and also about how *Florestabilidade* comes to public school teachers and rural extension professionals in the Amazon.

In the years 2012 and 2013, the *Florestabilidade* will reach the States of Acre, Amapá, Amazonas and Pará, in partnership with the Departments of Education and the Environmental and Rural Extension Agencies, such as the Technical Assistance and Rural Extension Agency of Pará (EMATER-PA).

About 2,000 teachers and 100 rural extension technicians will be trained to use the teaching materials with students and communities in the Amazon (*Roberto Marinho* Foundation, 2012).

More information at: www.florestabilidade.org.br.



F orest Research



Main Research Centers

Forest Products Laboratory - LPF

It is a Specialized Center of the Brazilian Forest Service that has been functioning since 1973 developing wood and other forest products technologies, generating and transferring knowledge to contribute to sustainable development in the forest sector. The lines of research are:

- Sustainability of tropical forests resources, especially in the Amazon;
- Multiple use of planted forests; and,
- Agroforestry products and environment.

Brazilian Enterprise for Agricultural Research - Embrapa

Founded in 1973, under the Ministry of Agriculture, Livestock and Food Supply, its mission is to facilitate solutions for the sustainable development in rural areas. Embrapa has specialized research centers, and among these there are research centers focused on forest issues:

- Embrapa Forests - Curitiba/PR
- Embrapa Eastern Amazon - Belém/PA
- Embrapa Western Amazon - Manaus/AM
- Embrapa Amapá - Macapá/AP
- Embrapa Roraima - Boa Vista/RR
- Embrapa Rondônia - Porto Velho/RO
- Embrapa Acre - Rio Branco/AC

National Institute of Amazonian Research - INPA

Conducts scientific studies on the physical environment and livelihoods of the Amazon region to promote human welfare and regional socio-economic development.

Currently, INPA is a global reference in Tropical Biology, with the following lines of research in the forest area:

- Forest products; and,
- Tropical silviculture.

Institute for Technological Research of the State of São Paulo - IPT

The Institute for Technological Research of the State of São Paulo hosts the Technology Center of Forest Resources (CT-Floresta), with specialized laboratories in the field of wood technology. The lines of research of IPT in the forest area are:

- Wood and derived products;
- Wood Preservation and Biodeterioration of Materials;
- Pulp and Paper; and,
- Sustainability of Forest Resources.

Paraense *Emilio Goeldi* Museum - MPEG

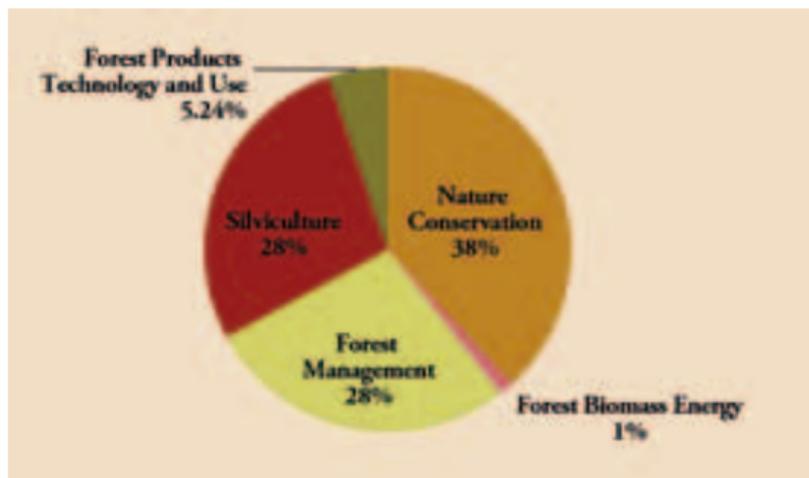
It is a research institution under the Ministry of Science, Technology and Innovation. Its main mission is to conduct research, promote scientific innovation, train human resources, conserve collections and spread knowledge in the areas of natural sciences and humanities related to the Amazon. The main lines of research in the forest area are: plant systematics, economic botany, landscape ecology, plant ecology, conservation and management.

Number of researchers per research center

Research Centers	Quantity of Professionals (2008/2012)					
	Post Doctorate	Doctor's Degree	Master's Degree	Specialization	Bachelor	Total
Forest Products Laboratory (LFP)/ SFB (2012)	1	12	4	3	10	30
Embrapa (Forests, Western Amazon, Rondônia, Acre, Roraima) (2012)	ND*	88	10	ND*	ND*	98
Inpa (Silviculture and Forest Products) (2012)	2	28	7	1	ND*	38
IPT (Wood Technology) (2008)	ND*	4	12	35	ND*	51
Paraense <i>Emílio Goeldi</i> Museum (MPEG) (2008)	ND*	3	4	ND*	ND*	7
Total	3	135	37	39	10	224

Note: * Not declared

Forest Research Financing



Investment in forest research by CNPq per line of research * (2012)(%)

Source: CNPq (2013).

* Reported by researchers

Number of researchers that received funding from CNPq for forest research, per degree and gender (2012)

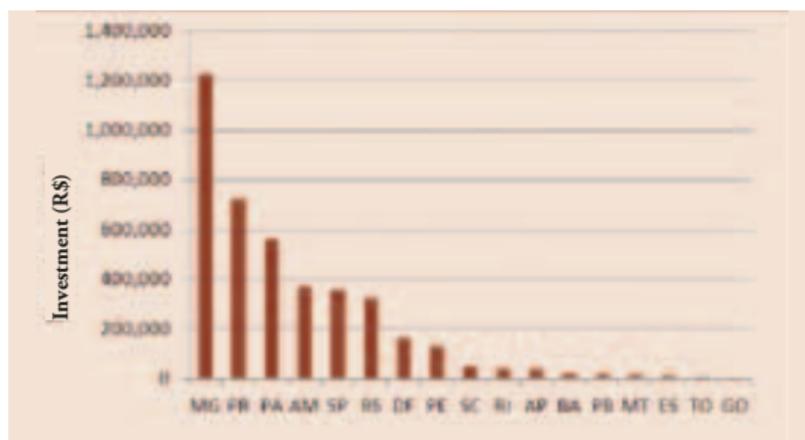
Degree	Gender	
	Female	Male
Doctor's Degree	18	24
Master's Degree	56	59
Post Doctorate	6	5
Total	80	88

Source: CNPq (2013).

Investment by CNPq by line of research (R\$)

Line of Research	2010	2011	2012
Nature Conservation	662,682	610,710	415,986
Forest Biomass Energy	73,370	165,698	170,764
Forest Management	588,822	393,471	323,314
Silviculture	527,501	320,344	307,950
Forest Techniques and Operations	51,528	26,570	--
Forest Products Technology and Use	289,834	277,532	200,182
Not Declared	1,450,926	2,335,266	2,661,088
Total	3,644,663	4,129,591	4,079,284

Source: CNPq (2013).



Investment by CNPq in forest research by State (2012) (R\$)

Source: CNPq (2013).

Main Brazilian Journals on Forest Sciences

The main scientific journals that publish articles related to forest services in Brazil are:

- *Revista Acta Amazônica* - INPA - <http://acta.inpa.gov.br/>
- *Revista Cerne* - UFPA - <http://www.dcf.ufpa.br/cerne/>
- *Revista Árvore* - UFV - <http://revistas.cpd.ufv.br/arvoreweb/index.php>
- *Scientia Forestalis* - IPEF - <http://www.ipef.br/publicacoes/scientia/>
- *Revista Floresta* - FUPEF - http://www.floresta.ufpr.br/revista_floresta/index.html
- *Floresta e Ambiente* - UFRRJ - <http://www.floram.org/>
- *Revista de Ciências Agrárias* - UFRA - <http://www.portal.ufra.edu.br/index.php/Table/Revista-de-Ciencias-Agrarias/>
- *Ciência Florestal* - UFSM - <http://cascavel.ufsm.br/revistas/ojs-2.2.2/index.php/cienciaflorestal/index>
- *Revista Brasil Florestal* - <http://www.ibama.gov.br/ojs/index.php/braflor>
- *Pesquisa Florestal Brasileira* - Embrapa Florestas - <http://www.cnpf.embrapa.br/pfb/index.php/pfb>



International Forest Data Comparison



Global comparative of forest area (2010)*

Country	Forest area (1,000 ha)
1 Russia	809,090
2 Brazil	519,522
3 Canada	310,134
4 United States	304,022
5 China	206,861
6 Congo	154,135
7 Australia	149,300
8 Indonesia	94,432
9 Sudan	69,949
10 India	68,434
11 Peru	67,992

Note: *The estimate of the total area of forests in Brazil in November 2010 was 516,586,045 hectares. Source: FAO (2010).

Global comparative of carbon stock in living forest biomass (2010)

Country	Carbon stock (million ton.)
1 Brazil	62,607
2 Russia	32,500
3 Democratic Republic of Congo	19,639
4 United States	19,308
5 Canada	13,908
6 Indonesia	13,017
7 Peru	8,560
8 Columbia	6,805
9 China	6,203
10 Bolivia	4,442
11 Angola	4,385

Source: FAO (2010).

Global comparative of planted forests areas (2010)

Country	Forest area (1,000 ha)
1 China	77,157
2 United States	25,363
3 Russia	16,991
4 Japan	10,326
5 India	10,211
6 Canada	8,963
7 Poland	8,889
8 Brazil	6,973
9 Sudan	6,068
10 Finland	5,904
11 Germany	5,283
12 Ukraine	4,846

Source: FAO (2010).

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