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Report

Brazil

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FAO has been monitoring the world's forests at 5 to 10 year intervals since 1946. The Global Forest Resources Assessments (FRA) are now produced every five years in an attempt to provide a consistent approach to describing the world's forests and how they are changing. The FRA is a country-driven process and the assessments are based on reports prepared by officially nominated National Correspondents. If a report is not available, the FRA Secretariat prepares a desk study using earlier reports, existing information and/or remote sensing based analysis.

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Introduction

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Introductory text

Brazil holds the world’s second largest forest area and the importance of its natural forests has recognized importance at the national and global levels, both due to its extension and its associated values, such as biodiversity conservation.

Brazil has participated regularly in the global forest resources assessments coordinated by FAO and since 2005 it is working for improving the quality of forest information at country level, basically through the creation of the National Forest Information System (NFIS) in 2006 and the implementation of the National Forest Inventory - NFI, with field data collection started in 2011.

The Brazilian Forest Service (BFS) is the institution responsible for coordinating the National Forest Information System – NFIS and the National Forest Inventory – NFI. The NFIS aims at producing, organizing, storing and processing data, information and knowledge on forest resources and the forestry sector to support conservation and the sustainable use of forests. Since the BFS creation (2006), the availability of forest information is continuously increasing, as well as the capability of the country to report at national and international levels.

The National Forest Inventory is still in progress with the collection of data having been completed in 18 of the 27 states. Despite the effort to cover the country, there are still some challenges ahead to complete data collection in parts of Amazon region, parts of the semi-arid dry forests of the Caatinga biome and Pantanal biome.

The efforts for improving the information quality for FRA2020 include the reformulation and updating of the forest cover database (mapping) and the use of NFI field data to produce estimates of growing stocks of volume, biomass and carbon.

The work strategy used to prepare the FRA2020 involved the participation of the team from the Brazilian Forest Service, as it was done for the last edition of the FAO assessment.

1 Forest extent, characteristics and changes

1a Extent of forest and other wooded land

National Data

Data sources + type of data source eg NFI, etc

#	References to sources of information	Variable(s)
1	Brazilian Geography and Statistics Office / Instituto Brasileiro de Geografia e Estatísticas – IBGE. Mapa de vegetação do Brasil, 2009 (Brazilian vegetation map). Available at: http://geofp.ibge.gov.br/informacoes_ambientais/vegetacao/vetores/	Vegetation base map. Establishes the vegetation typologies existed in Brazil.
2	National Institute for Space Research / Instituto Nacional de Pesquisas Espaciais – INPE. Projeto PRODES. Available at: http://www.obt.inpe.br/OBT/assuntos/programas/amazonia/prodes	Monitoring of deforestation in Amazon biome: 1997-2017 (annual).
3	National Institute for Space Research / Instituto Nacional de Pesquisas Espaciais – INPE. Projeto PRODES Cerrado. Available at: http://www.dpi.inpe.br/fipcerrado/#	Monitoring of deforestation in Cerrado biome: 2000, 2002, 2004, 2006, 2008, 2010, 2012-2017.
4	Ministry of Environment (MMA) / Brazilian Environmental and Renewable Natural Resources Institute (IBAMA): Center of Remote Sensing (IBAMA). <i>Projeto de Monitoramento do Desmatamento dos Biomas Brasileiros por Satélite – PMDBBS</i> and <i>Levantamento e mapeamento dos remanescentes da cobertura vegetal dos biomas em 2002 – PROBIO</i> . Available at: http://siscom.ibama.gov.br/monitora_biomass/	Monitoring of deforestation in Caatinga biome: 2002, 2008, 2009, 2010, 2011. Monitoring of deforestation in Atlantic Forest biome: 2002, 2008, 2009. Monitoring of deforestation in Pampa biome: 2002, 2008, 2009. Monitoring of deforestation in Pantanal biome: 2002, 2008, 2009.
5	National Institute for Space Research / Instituto Nacional de Pesquisas Espaciais – INPE. Projeto TerraClass. Available at: http://www.inpe.br/cra/projetos_pesquisas/dados_terraclass.php	Secondary Vegetation (regenerating forest) in Amazon biome: 2004, 2008, 2010, 2012 and 2014.
6	National Institute for Space Research / Instituto Nacional de Pesquisas Espaciais – INPE. Projeto TerraClass Cerrado. Available at: http://www.dpi.inpe.br/tccerrado/	Secondary Vegetation (regenerating forest) in Cerrado biome: 2013.
7	Brazilian Institute of Geography and Statistics / Instituto Brasileiro de Geografia e Estatísticas - IBGE. Forestry and silviculture production/Produção da Extração Vegetal e Silvicultura – PEVS 2015. Available at: https://www.ibge.gov.br/estatisticas-novoportal/economicas/agricultura-e-pecuaria/9105-producao-da-extracao-vegetal-e-da-silvicultura.html?=&t=outros-links	Planted Forest area in Brazil: 2013, 2014, 2015, 2016, 2017.
8	Brazilian Institute of Geography and Statistics / Instituto Brasileiro de Geografia e Estatísticas - IBGE	Brazilian biomes boundaries.
9	Brazilian Institute of Geography and Statistics / Instituto Brasileiro de Geografia e Estatísticas – IBGE. Political boundaries. Available at: http://geofp.ibge.gov.br/cartas_e_mapas/bases_cartograficas_continuas/bc250/versao2017/	Brazilian political boundaries. Continuous base 1:250.000.
10	Brazilian Institute of Geography and Statistics / Instituto Brasileiro de Geografia e Estatísticas – IBGE. Manual Técnico da Vegetação Brasileira.	Technical Manual on Brazilian Vegetation
11	FAO. 2008. National Forest Monitoring and Assessment – Manual for integrated field data collection. National Forest Monitoring and Assessment Working Paper NFMA 37/E. Rome. Available at: http://www.fao.org/forestry/14727-072b68bcfa49334202f1586889517ce24.pdf	Land Use/Cover Classes (LUCC).

National classification and definitions

In Brazil, a lot of mapping process are made by biomes, an environmental division of the territory. There are six biomes in Brazil.

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

Other Wooded Land	Land not classified as Forest, spanning more than 0.5 hectares; with trees higher than 5 meters and a canopy cover of 5-10 percent, or trees able to reach these thresholds in situ; or with a combined cover of shrubs, bushes and trees above 10 percent. It does not include land that is predominantly under agricultural or urban land use.
Other Land	All land that is not classified as Forest or Other wooded land.
Amazonia – natural vegetation	The Amazon biome represents about 5% of the world’s area, with an area of 420 million hectares. Considered as the largest biodiversity reserve of the world, this biome has a big amount of growing stock and carbon, and also a wide diversity of non wood forest products.
Caatinga – natural vegetation	The Caatinga biome covers an area 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.
Cerrado – natural vegetation	Cerrado is the second largest biome in South America and covers an area of about 24% of the Brazilian territory. Regarding biological diversity, this biome is recognized as the richest savannah in the world.
Atlantic Forest - natural vegetation	The Atlantic Forest biome encompassse an area of 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.
Pampa – natural vegetation	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.
Pantanal – natural vegetation	The Pantanal biome is considered one of the largest continuous wetland of the planet. It represents 1.8% of the total area of Brazil. Pantanal is under direct influence of three major biomes: Amazon, Cerrado and Atlantic Forest.
Planted Forest	Forest predominantly composed of trees established through planting and/or deliberate seeding. It is distributed all over the country.
Secondary vegetation	Forest areas where there was human intervention for land use. Therefore, when these areas are abandoned, the secondary vegetation emerges reflecting the ecological parameters of the environment (natural regeneration).

FRA categories	Land use/cover classification in NFMA	Vegetation typology	National Class		
			Code	Tipo de vegetação - geral	Tipo de vegetação – específica (Sub typology)
Forest	FEP – Primary ever green forest	D - Dense Humid Forest	D	Floresta Ombrófila Densa	Floresta Ombrófila Densa
			Da	Floresta Ombrófila Densa	Floresta Ombrófila Densa Aluvial
			Dau	Floresta Ombrófila Densa	Floresta Ombrófila Densa Aluvial com dossel uniforme
			Dae	Floresta Ombrófila Densa	Floresta Ombrófila Densa Aluvial com dossel emergente
			Db	Floresta Ombrófila Densa	Floresta Ombrófila Densa Terras Baixas
			Dbu	Floresta Ombrófila Densa	Floresta Ombrófila Densa Terras Baixas com dossel uniforme
			Dbe	Floresta Ombrófila Densa	Floresta Ombrófila Densa Terras Baixas com dossel emergente
			Ds	Floresta Ombrófila Densa	Floresta Ombrófila Densa Submontana
			Dsu	Floresta Ombrófila Densa	Floresta Ombrófila Densa Submontana com dossel uniforme
			Dse	Floresta Ombrófila Densa	Floresta Ombrófila Densa Submontana com dossel emergente
			Dm	Floresta Ombrófila Densa	Floresta Ombrófila Densa Montana
			Dmu	Floresta Ombrófila Densa	Floresta Ombrófila Densa Montana com dossel uniforme
			Dme	Floresta Ombrófila Densa	Floresta Ombrófila Densa Montana com dossel emergente
			DI	Floresta Ombrófila Densa	Floresta Ombrófila Densa Alto-Montana
			Dlu	Floresta Ombrófila Densa	Floresta Ombrófila Densa Alto-Montana com dossel uniforme
	FEP – Primary ever green forest	A - Open Humid Forest	A	Floresta Ombrófila Aberta	Floresta Ombrófila Aberta

			Aa	Floresta Ombrófila Aberta	Floresta Ombrófila Aberta Aluvial		
			Aap	Floresta Ombrófila Aberta	Floresta Ombrófila Aberta Aluvial com palmeiras		
			Aac	Floresta Ombrófila Aberta	Floresta Ombrófila Aberta Aluvial com cipós		
			Aab	Floresta Ombrófila Aberta	Floresta Ombrófila Aberta Aluvial com bambus		
			Ab	Floresta Ombrófila Aberta	Floresta Ombrófila Aberta Terras Baixas		
			Abp	Floresta Ombrófila Aberta	Floresta Ombrófila Aberta Terras Baixas com palmeiras		
			Abc	Floresta Ombrófila Aberta	Floresta Ombrófila Aberta Terras Baixas com cipós		
			Abb	Floresta Ombrófila Aberta	Floresta Ombrófila Aberta Terras Baixas com bambus		
			As	Floresta Ombrófila Aberta	Floresta Ombrófila Aberta Submontana		
			Asp	Floresta Ombrófila Aberta	Floresta Ombrófila Aberta Submontana com palmeiras		
			Asc	Floresta Ombrófila Aberta	Floresta Ombrófila Aberta Submontana com cipós		
			Asb	Floresta Ombrófila Aberta	Floresta Ombrófila Aberta Submontanacom bambus		
			Ass	Floresta Ombrófila Aberta	Floresta Ombrófila Aberta Submontana com sororoca		
			Am	Floresta Ombrófila Aberta	Floresta Ombrófila Aberta Montana		
			Amp	Floresta Ombrófila Aberta	Floresta Ombrófila Aberta Montana com palmeiras		
			Amc	Floresta Ombrófila Aberta	Floresta Ombrófila Aberta Montana com cipós		
			FEP – Primary ever green forest	M - MixedHumid Forest	M	Floresta Ombrófila Mista	Floresta Ombrófila Mista
					Ma	Floresta Ombrófila Mista	Floresta Ombrófila Mista Aluvial
					Ms	Floresta Ombrófila Mista	Floresta Ombrófila Mista Submontana
	Mm	Floresta Ombrófila Mista			Floresta Ombrófila Mista Montana		
	MI	Floresta Ombrófila Mista			Floresta Ombrófila Mista Alto-Montana		
	FSP – Primary semi-deciduous forest	F - Semi deciduous Seasonal Forest	F	Floresta Estacional Semidecidual	Floresta Estacional Semidecidual		
			Fa	Floresta Estacional Semidecidual	Floresta Estacional Semidecidual Aluvial		
			Fau	Floresta Estacional Semidecidual	Floresta Estacional Semidecidual Aluvial com dossel uniforme		
			Fae	Floresta Estacional Semidecidual	Floresta Estacional Semidecidual Aluvial com dossel emergente		
			Fb	Floresta Estacional Semidecidual	Floresta Estacional Semidecidual Terras Baixas		
			Fbu	Floresta Estacional Semidecidual	Floresta Estacional Semidecidual Terras Baixas com dossel uniforme		
			Fbe	Floresta Estacional Semidecidual	Floresta Estacional Semidecidual Terras Baixas com dossel emergente		
			Fs	Floresta Estacional Semidecidual	Floresta Estacional Semidecidual Submontana		
			Fsu	Floresta Estacional Semidecidual	Floresta Estacional Semidecidual Submontana com dossel uniforme		
			Fse	Floresta Estacional Semidecidual	Floresta Estacional Semidecidual Submontana com dossel emergente		
			Fm	Floresta Estacional Semidecidual	Floresta Estacional Semidecidual Montana		

		Fmu	Floresta Estacional Semidecidual	Floresta Estacional Semidecidual Montana com dossel uniforme
		Fme	Floresta Estacional Semidecidual	Floresta Estacional Semidecidual Montana com dossel emergente
FDP – Primary decicuos forest	C - Decidual Seasonal Forest	C	Floresta Estacional Decidual	Floresta Estacional Decidual
		Ca	Floresta Estacional Decidual	Floresta Estacional Decidual Aluvial
		Cau	Floresta Estacional Decidual	Floresta Estacional Decidual Aluvial com dossel uniforme
		Cb	Floresta Estacional Decidual	Floresta Estacional Decidual Terras Baixas
		Cbu	Floresta Estacional Decidual	Floresta Estacional Decidual Terras Baixas com dossel uniforme
		Cbe	Floresta Estacional Decidual	Floresta Estacional Decidual Terras Baixas com dossel emergente
		Cs	Floresta Estacional Decidual	Floresta Estacional Decidual Submontana
		Csu	Floresta Estacional Decidual	Floresta Estacional Decidual Submontana com dossel uniforme
		Cse	Floresta Estacional Decidual	Floresta Estacional Decidual Submontana com dossel emergente
		Cm	Floresta Estacional Decidual	Floresta Estacional Decidual Montana
		Cmu	Floresta Estacional Decidual	Floresta Estacional Decidual Montana com dossel uniforme
		Cme	Floresta Estacional Decidual	Floresta Estacional Decidual Montana com dossel emergente
FEP – Primary ever green forest	L - Campinarana	L	Campinarana	Campinarana
		Ld	Campinarana Florestada	Campinarana Florestada
		Lds	Campinarana Florestada	Campinarana Florestada sem palmeiras
		Ldp	Campinarana Florestada	Campinarana Florestada com palmeiras
		La	Campinarana Arborizada	Campinarana Arborizada
		Las	Campinarana Arborizada	Campinarana Arborizada sem palmeiras
		Lap	Campinarana Arborizada	Campinarana Arborizada com palmeiras
FSP – Primary semi-deciduous forest	S - Savannah	S	Savana	Savana
		Sd	Savana Florestada	Savana Florestada
WS - Shrubs		Sa	Savana Arborizada	Savana Arborizada
		Sas	Savana Arborizada	Savana Arborizada sem floresta de galeria
		Saf	Savana Arborizada	Savana Arborizada com floresta de galeria
FDP – Primarydeciduuousforest	T - Steppe Savannah	T	Savana-Estépica	Savana-Estépica
		Td	Savana-Estépica Florestada	Savana-Estépica Florestada
		Tds	Savana-Estépica Florestada	Savana-Estépica Florestada sem palmeiras
		Tdp	Savana-Estépica Florestada	Savana-Estépica Florestada com palmeiras
WS - Shrubs		Ta	Savana-Estépica Arborizada	Savana-Estépica Arborizada
		Tas	Savana-Estépica Arborizada	Savana-Estépica Arborizada sem palmeiras e sem floresta de galeria

			Tap	Savana-Estépica Arborizada	Savana-Estépica Arborizada com palmeiras
			Taf	Savana-Estépica Arborizada	Savana-Estépica Arborizada com floresta de galeria
	WS - Shrubs	E - Steppe	E	Estepe	Estepe
			Ea	Estepe Arborizada	Estepe Arborizada
			Eas	Estepe Arborizada	Estepe Arborizada sem floresta de galeria
			Eaf	Estepe Arborizada	Estepe Arborizada com floresta de galeria
	FEP – Primary ever green forest	P - Pioneer Formations	P	Restinga	Áreas das Formações Pioneiras
			Pm	Restinga Arbórea	Vegetação com influência marinha
			Pma	Restinga Arbórea	Vegetação com influência marinha Arbórea
			Pf	Manguezal	Vegetação com influência fluviomarinha
			Pfm	Manguezal	Vegetação com influência fluviomarinha Arbórea
			Pa	Palmeiral	Vegetação com influência fluvial e/ou lacustre
			Pap	Palmeiral	Vegetação com influência fluvial e/ou lacustre Palmeiral
	Transitional Zones		SO	Contatos	Contato Savana / Floresta Ombrófila
			SOT	Contatos	Contato Savana / Floresta Ombrófila (ecótono)
			SOc	Contatos	Contato Savana / Floresta Ombrófila (encrave)
			ON	Contatos	Contato Floresta Ombrófila / Floresta Estacional
			ONt	Contatos	Contato Floresta Ombrófila / Floresta Estacional (ecótono)
			ONc	Contatos	Contato Floresta Ombrófila / Floresta Estacional (encrave)
			LO	Contatos	Contato Campinarana / Floresta Ombrófila
			LOt	Contatos	Contato Campinarana / Floresta Ombrófila (ecótono)
			LOc	Contatos	Contato Campinarana / Floresta Ombrófila (encrave)
			OM	Contatos	Contato Floresta Ombrófila Densa / Floresta Ombrófila Mista
			OMc	Contatos	Contato Floresta Ombrófila Densa / Floresta Ombrófila Mista (encrave)
			SM	Contatos	Cantato Savana / Floresta Ombrófila Mista
			SMc	Contatos	Cantato Savana / Floresta Ombrófila Mista (encrave)
			NM	Contatos	Contato Floresta Estacional / Floresta Ombrófila Mista
			NMc	Contatos	Contato Floresta Estacional / Floresta Ombrófila Mista (encrave)
			SN	Contatos	Contato Savana / Floresta Estacional
			SNt	Contatos	Contato Savana / Floresta Estacional (ecótono)
			SNc	Contatos	Contato Savana / Floresta Estacional (encrave)
			OP	Contatos	Contato Floresta Ombrófila / Formações Pioneiras com Influência Marinha

OPt	Contatos	Contato Floresta Ombrófila / Formações Pioneiras com Influência Marinha (ecótono)
OPc	Contatos	Contato Floresta Ombrófila / Formações Pioneiras com Influência Marinha (encrave)
NP	Contatos	Contato Floresta Estacional / Formações Pioneiras cm Influência Marinha
NPt	Contatos	Contato Floresta Estacional / Formações Pioneiras cm Influência Marinha (ecótono)
SP	Contatos	Contato Savana / Formações Pioneiras com Influência Marinha
SPt	Contatos	Contato Savana / Formações Pioneiras com Influência Marinha (ecótono)
TP	Contatos	Contato Savana-Estépica / Formações Pioneiras com Influência Marinha
TPt	Contatos	Contato Savana-Estépica / Formações Pioneiras com Influência Marinha (ecótono)
TO	Contatos	Contato Savana-Estépica / Floresta Ombrófila
TOt	Contatos	Contato Savana-Estépica / Floresta Ombrófila (ecótono)
TOc	Contatos	Contato Savana-Estépica / Floresta Ombrófila (encrave)
TN	Contatos	Contato Savana-Estépica / Floresta Estacional
TNt	Contatos	Contato Savana-Estépica / Floresta Estacional (ecótono)
TNc	Contatos	Contato Savana-Estépica / Floresta Estacional (encrave)
SE	Contatos	Contato Savana / Estepe
SEt	Contatos	Contato Savana / Estepe (ecótono)
SEc	Contatos	Contato Savana / Estepe (encrave)
EO	Contatos	Contato Estepe / Floresta Ombrófila
EOt	Contatos	Contato Estepe / Floresta Ombrófila (ecótono)
EOc	Contatos	Contato Estepe / Floresta Ombrófila (encrave)
EN	Contatos	Contato Estepe / Floresta Estacional
ENT	Contatos	Contato Estepe / Floresta Estacional (ecótono)
ENc	Contatos	Contato Estepe / Floresta Estacional (encrave)
ST	Contatos	Contato Savana / Savana-Estépica
STt	Contatos	Contato Savana / Savana-Estépica (ecótono)
STc	Contatos	Contato Savana / Savana-Estépica (encrave)
STN	Contatos	Contato Savana / Savana-Estépica / Floresta estacional
STNt	Contatos	Contato Savana / Savana-Estépica / Floresta estacional (ecótono)
EM	Contatos	Contato Estepe / Floresta Ombrófila
EMc	Contatos	Contato Estepe / Floresta Ombrófila (encrave)
SL	Contatos	Contato Savana / Campinarana
SLt	Contatos	Contato Savana / Campinarana (ecótono)

			SLc	Contatos	Contato Savana / Campinarana (encrave)
			EP	Contatos	Contato Estepe / Formações Pioneiras
			EPT	Contatos	Contato Estepe / Formações Pioneiras (ecótono)
			EPc	Contatos	Contato Estepe / Formações Pioneiras (encrave)
		Secondary Vegetation	Vs	Vegetação Secundária	Vegetação Secundária
			Vss	Vegetação Secundária	Vegetação Secundária sem palmeiras
			Vsp	Vegetação Secundária	Vegetação Secundária com palmeiras
			Vsb	Vegetação Secundária	Vegetação Secundária só com palmeiras
		Planted Forest	R	Floresta Plantada	Floresta Plantada
			Re	Floresta Plantada	Floresta Plantada Eucaliptos
			Rp	Floresta Plantada	Floresta Plantada Pinus
			Ra	Floresta Plantada	Floresta Plantada Acácia
			Rg	Floresta Plantada	Floresta Plantada Algaroba
			Rs	Floresta Plantada	Floresta Plantada Seringueira
			Rf	Floresta Plantada	Floresta Plantada Frutíferas
Other Wooded Land	WW – Wooded wetland	L - Campinarana	Lb	Campinarana Arbustiva	Campinarana Arbustiva
			Lbs	Campinarana Arbustiva	Campinarana Arbustiva sem palmeiras
			Lbp	Campinarana Arbustiva	Campinarana Arbustiva com palmeiras
	WG – Wooded grassland	S - Savannah	Sp	Savana Parque	Savana Parque
			Sps	Savana Parque	Savana Parque sem floresta de galerias
			Spf	Savana Parque	Savana Parque com floresta de galerias
	WG – Wooded grassland	T - Steppe Savannah	Tp	Savana-Estépica Parque	Savana-Estépica Parque
			Tps	Savana-Estépica Parque	Savana-Estépica Parque sem palmeiras e sem floresta de galeria
			Tpp	Savana-Estépica Parque	Savana-Estépica Parque com palmeiras
			Tpf	Savana-Estépica Parque	Savana-Estépica Parque com floresta de galeria
	WG – Wooded grassland	E - Steppe	Ep	Estepe Parque	Estepe Parque
			Eps	Estepe Parque	Estepe Parque sem floresta de galeria
			Epf	Estepe Parque	Estepe Parque com floresta de galeria
	WG – Wooded grassland	P - Pioneer Formations	Pmb	Restinga Arbustiva	Vegetação com influência marinha Arbustiva
			Paa	Vegetação com influência fluvial e/ou lacustre Arbustiva	Vegetação com influência fluvial e/ou lacustre Arbustiva
			Paas	Vegetação com influência fluvial e/ou lacustre Arbustiva	Vegetação com influência fluvial e/ou lacustre Arbustiva sem palmeiras
			Paap	Vegetação com influência fluvial e/ou lacustre Arbustiva	Vegetação com influência fluvial e/ou lacustre Arbustiva com palmeiras

	WS – Shrubs		r	Refúgios Vegetacionais Arbustivos	Refúgios Vegetacionais
			rs	Refúgios Vegetacionais Arbustivos	Refúgios Vegetacionais Submontanos
			rsb	Refúgios Vegetacionais Arbustivos	Refúgios Vegetacionais Submontanos Arbustivo
			rm	Refúgios Vegetacionais Arbustivos	Refúgios Vegetacionais Montanos
			rmb	Refúgios Vegetacionais Arbustivos	Refúgios Vegetacionais Montanos Arbustivo
			rl	Refúgios Vegetacionais Arbustivos	Refúgios Vegetacionais Alto-Montanos
			rlb	Refúgios Vegetacionais Arbustivos	Refúgios Vegetacionais Alto-Montanoss Arbustivo
Other Land	OG – Natural grassland	L - Campinarana	Lg	Campinarana Gramíneo-Lenhosa	Campinarana Gramíneo-Lenhosa
			Lgs	Campinarana Gramíneo-Lenhosa	Campinarana Gramíneo-Lenhosa sem palmeira
			Lgp	Campinarana Gramíneo-Lenhosa	Campinarana Gramíneo-Lenhosa com palmeira
		S - Savannah	Sg	Savana Gramíneo-Lenhosa	Savana Gramíneo-Lenhosa
			Sgs	Savana Gramíneo-Lenhosa	Savana Gramíneo-Lenhosa sem floresta de galeria
			Sgf	Savana Gramíneo-Lenhosa	Savana Gramíneo-Lenhosa com floresta de galeria
		T - Steppe Savannah	Tg	Savana-Estépica Gramíneo-Lenhosa	Savana-Estépica Gramíneo-Lenhosa
			Tgs	Savana-Estépica Gramíneo-Lenhosa	Savana-Estépica Gramíneo-Lenhosa sem palmeiras e sem floresta de galeria
			Tgp	Savana-Estépica Gramíneo-Lenhosa	Savana-Estépica Gramíneo-Lenhosa com palmeiras
			Tgf	Savana-Estépica Gramíneo-Lenhosa	Savana-Estépica Gramíneo-Lenhosa com floresta de galeria
		E - Steppe	Eg	Estepe Gramíneo-Lenhosa	Estepe Gramíneo-Lenhosa
			Egs	Estepe Gramíneo-Lenhosa	Estepe Gramíneo-Lenhosa sem floresta de galeria
			Egf	Estepe Gramíneo-Lenhosa	Estepe Gramíneo-Lenhosa com floresta de galeria
		P - Pioneer Formations	Pmh	Restinga Herbácea	Vegetação com influência marinha Herbácea
			Pfh	Vegetação com influência fluviomarinha Herbácea	Vegetação com influência fluviomarinha Herbácea
			Pah	Vegetação com influência fluvial e/ou lacustre Herbácea	Vegetação com influência fluvial e/ou lacustre Herbácea
			Pahs	Vegetação com influência fluvial e/ou lacustre Herbácea	Vegetação com influência fluvial e/ou lacustre Herbácea sem palmeira
			Pahp	Vegetação com influência fluvial e/ou lacustre Herbácea	Vegetação com influência fluvial e/ou lacustre Herbácea com palmeira
			rsh	Refúgios Vegetacionais Herbáceos	Refúgios Vegetacionais Submontanos Herbáceo
			rmh	Refúgios Vegetacionais Herbáceos	Refúgios Vegetacionais Montanos Herbáceo
			rlh	Refúgios Vegetacionais Herbáceos	Refúgios Vegetacionais Alto-Montanos Herbáceo
		Rocks	Ar	Afloramentos Rochosos	Afloramentos Rochosos
		Dunes	Dn	Dunas	Dunas
Inland water bodies		Rivers, lagoons, lakes, and reservoirs	Massa_agua	Água	Água
Anthropic Areas		Agriculture and livestock	Ag	Agropecuária	Agropecuária

			Ac	Agricultura	Agricultura
			Acp	Agricultura	Agricultura culturas permanentes
			Acc	Agricultura	Agricultura culturas cíclicas
			Ap	Pecuária	Pecuária
		Urban area	Iu	Influência Urbana	Influência Urbana
		Not known	Ai	Áreas Indiscriminadas	Áreas Indiscriminadas

Original data

1990

	Area (ha)		
	Forest	OtherWoodedLand	Total
Amazonia	363713297	9845520	373558817
Caatinga	44528387	5672513	50200900
Cerrado	123995790	25899141	149894931
Atlantic Forest	26476632	442040	26918672
Pampa	3554311	646700	4201011
Pantanal	6414073	4395724	10809797
Secondary Vegetation	16657425		16657425
Planted Forest	3558094		3558094
Total	588898009	46901638	635799647

2000

	Area (ha)		
	Forest	OtherWoodedLand	Total
Amazonia	345981221	9791992	355773213
Caatinga	41141499	5509802	46651301
Cerrado	105714332	23349372	129063704
Atlantic Forest	23918089	367188	24285277
Pampa	3232898	617180	3850078
Pantanal	6146187	4176633	10322820
Secondary Vegetation	21302195		21302195
Planted Forest	3652217		3652217
Total	551088638	43812167	594900805

2010

	Area (ha)		
	Forest	OtherWoodedLand	Total
Amazonia	325299899	9663416	334963315
Caatinga	37169066	5292511	42461577
Cerrado	82393979	20814917	103208896
Atlantic Forest	21264533	285681	21550214
Pampa	2908992	587229	3496221
Pantanal	5805225	3933684	9738909
Secondary Vegetation	29410727		29410727
Planted Forest	7328296		7328296
Total	511580717	40577438	552158155

2015

	Area (ha)		
	Forest	OtherWoodedLand	Total
Amazonia	322617821	9655517	332273338
Caatinga	36626260	5268487	41894747
Cerrado	77886058	19955408	97841466
Atlantic Forest	19985625	248465	20234090
Pampa	2747991	572253	3320244
Pantanal	5638981	3811605	9450586
Secondary Vegetation	28444092		28444092
Planted Forest	9937947		9937947
Total	503884775	39511735	543396510

2016

	Area (ha)		
	Forest	OtherWoodedLand	Total
Amazonia	321892455	9653125	331545580
Caatinga	36507081	5263153	41770234
Cerrado	77340181	19836893	97177074
Atlantic Forest	19741482	241498	19982980

Pampa	2715879	569258	3285137
Pantanal	5606676	3787189	9393865
Secondary Vegetation	28255231		28255231
Planted Forest	10023076		10023076
Total	502082061	39351116	541433177

2017

	Area (ha)		
	Forest	OtherWoodedLand	Total
Amazonia	321218941	9651177	330870118
Caatinga	36387925	5257818	41645743
Cerrado	76735871	19718120	96453991
Atlantic Forest	19499592	234544	19734136
Pampa	2683852	566263	3250115
Pantanal	5574484	3762773	9337257
Secondary Vegetation	28151199		28151199
Planted Forest	9839686		9839686
Total	500091550	39190695	539282245

2018

	Area (ha)		
	Forest	OtherWoodedLand	Total
Amazonia	320510860	9648932	330159792
Caatinga	36268803	5252484	41521287
Cerrado	76170531	19599622	95770153
Atlantic Forest	19260873	227798	19488671
Pampa	2651967	563268	3215235
Pantanal	5542334	3738358	9280692
Secondary Vegetation	28142657		28142657
Planted Forest	10503326		10503326
Total	499051351	39030462	538081813

2019

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	Area (ha)		
	Forest	OtherWoodedLand	Total
Amazonia	319811422	9646762	329458184
Caatinga	36149688	5247149	41396837
Cerrado	75595708	19481542	95077250
Atlantic Forest	19025193	221851	19247044
Pampa	2620375	560274	3180649
Pantanal	5510212	3713942	9224154
Secondary Vegetation	28222417		28222417
Planted Forest	10863520		10863520
Total	497798535	38871520	536670055

2020

	Area (ha)		
	Forest	OtherWoodedLand	Total
Amazonia	319111987	9644592	328756579
Caatinga	36030577	5241814	41272391
Cerrado	75021503	19363483	94384986
Atlantic Forest	18791881	216581	19008462
Pampa	2589340	557282	3146622
Pantanal	5479109	3689526	9168635
Secondary Vegetation	28371614		28371614
Planted Forest	11223609		11223609
Total	496619620	38713278	535332898

Analysis and processing of national data

Estimation and forecasting

Methodology:

Natural Vegetation (Forest and Other Wooded Land):

The data used to produce information on forest extension was the vegetation mapping produced by IBGE [1], which gives the information about the original vegetation all over the country according to the national categories of vegetation classification. To desagregate country information, it was added political and biomes boundaries, which facilitates the calculation of the extenstion at each of FRA year based on the lost of forest due deforestation as it is presented in the following table. For each biome, it is presented the years of forest loss monitoring available.

Deforestation mapping in Brazil is provided by biomes and monitoring years varies according to biome:

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Biome	Year of monitoring available (deforestation)
Amazon	1997-2017 (annual) [2]
Caatinga	2002, 2008, 2009, 2010, 2011 [4]
Cerrado	2000, 2002, 2004, 2006, 2008, 2010, 2012-2017 [3]
Atlantic Forest	2002, 2008, 2009 [4]
Pampa	2002, 2008, 2009 [4]
Pantanal	2002, 2008, 2009 [4]

Having the original vegetation area measured (IBGE vegetation map), estimates on the extent of native forests and OWL were made using the information (monitoring data) about deforestation available for each biome. A linear inter or extrapolation was used to estimate data for the years that Brazil did not have information. This estimation considered a list of criteria established before the extrapolation.

Secondary Vegetation:

Besides deforestation, data about natural regeneration were also considered. Spatial data are available only for years 2004, 2008, 2010, 2012 and 2014, for Amazon biome [5], and 2013 for Cerrado [6]. Estimation for others years was made using linear inter or extrapolation

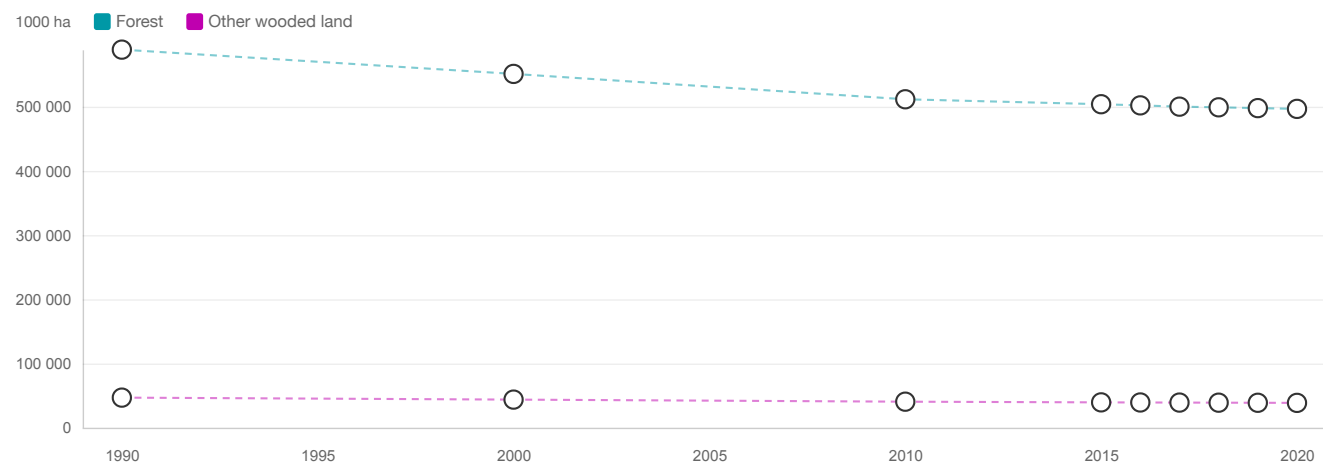
Planted Forest:

The Brazilian institute IBGE produced a report of the planted area of Brazil, by municipality, with data available for years 2013 to 2017 [6]. Total area of planted forest in Brazil were estimated for the remaining years using a linear extrapolation (from 1990 to 2020).

Reclassification into FRA 2020 categories

We adopted FAO Forest definition to produce estimates of forest extension using the same procedure of previous country reports. In order to calculate the figures for FRA classes, we established an equivalence between each national vegetation type and FRA categories and definitions.

The classification of vegetation types into the categories of “Forest” and “Other wooded land” used by FAO was defined by experts of IBGE, who were involved in the preparation of the FRA 2005. The definitions of each typology are described in the IBGE Vegetation Manual [9]. The table above presents the list of the vegetation typologies included in each FRA classes, as well as the equivalent of cover classification according to NFMA (National Forest Monitoring and Assessment) - Manual for integrated field data collection (FAO, 2008) [10], for other purposes. The forest area per forest type is the basic input for calculating forest area, volume, biomass and carbon.



FRA categories	Area (1000 ha)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Forest (a)	588 898.00	551 088.60	511 580.70	503 884.80	502 082.10	500 091.60	499 051.40	497 798.50	496 619.60
Other wooded land (a)	46 901.60	43 812.20	40 577.40	39 511.70	39 351.10	39 190.70	39 030.50	38 871.50	38 713.30
Other land (c-a-b)	200 014.40	240 913.20	283 655.90	292 417.50	294 380.80	296 531.70	297 732.10	299 144.00	300 481.10
Total land area (c)	835 814.00	835 814.00	835 814.00	835 814.00	835 814.00	835 814.00	835 814.00	835 814.00	835 814.00

The FAOSTAT land area figure for the year 2015 is used for all reference years

Climatic domain	% of forest area 2015	Override value
Boreal	0.00	
Temperate	0.00	
Sub-tropical	3.00	
Tropical	97.00	

Comments

There is a small difference between forest area from FRA 2020 and FRA 2015 (8% for 1990 or less). This is due to the change in the main base data used to estimate the area of each vegetation type, from PROBIO (2015) to IBGE vegetation map (2020).

1b Forest characteristics

National Data

Data sources + type of data source eg NFI, etc

Same data sources used in 1a.

National classification and definitions

National Classes	Brazilian classification
Planted Forest	Forest predominantly composed of trees established through planting and/or deliberate seeding. It is distributed all over the country.
Naturally regenerating forest	All forest area that is not considered planted forest (natural vegetation and secondary vegetation).
Introduced planted species	Eucalyptus and Pinus.

Original data

1990

	Forest area (ha)
Amazonia	363713297
Caatinga	44528387
Cerrado	123995790
Atlantic Forest	26476632
Pampa	3554311
Pantanal	6414073
Secondary Vegetation	16657425
Naturally regenerating Forest	585339915
Eucalyptus plantation	2785145
Pinus Plantation	656659
Others species plantation	116290
Planted Forest	3558094
Total	588898009

2000

	Forest area (ha)
Amazonia	345981221
Caatinga	41141499
Cerrado	105714332
Atlantic Forest	23918089

Pampa	3232898
Pantanal	6146187
Secondary Vegetation	21302195
Naturally regenerating Forest	547436421
Eucalyptus plantation	2871317
Pinus Plantation	665007
Others species plantation	115893
Planted Forest	3652217
Total	551088638

2010

	Forest area (ha)
Amazonia	325299899
Caatinga	37169066
Cerrado	82393979
Atlantic Forest	21264533
Pampa	2908992
Pantanal	5805225
Secondary Vegetation	29410727
Naturally regenerating Forest	504252421
Eucalyptus plantation	5521601
Pinus Plantation	1509599
Others species plantation	297096
Planted Forest	7328296
Total	511580717

2015

	Forest area (ha)
Amazonia	322617821
Caatinga	36626260
Cerrado	77886058
Atlantic Forest	19985625
Pampa	2747991

Pantanal	5638981
Secondary Vegetation	28444092
Naturally regenerating Forest	493946828
Eucalyptus plantation	7444625
Pinus Plantation	2065560
Others species plantation	427762
Planted Forest	9937947
Total	503884775

2016

	Forest Area (ha)
Amazonia	321892455
Caatinga	36507081
Cerrado	77340181
Atlantic Forest	19741482
Pampa	2715879
Pantanal	5606676
Secondary Vegetation	28255231
Naturally regenerating Forest	492058985
Eucalyptus plantation	7543707
Pinus Plantation	2079162
Others species plantation	400207
Planted Forest	10023076
Total	502082061

2017

	Forest Area (ha)
Amazonia	321218941
Caatinga	36387925
Cerrado	76735871
Atlantic Forest	19499592
Pampa	2683852
Pantanal	5574484

Secondary Vegetation	28151199
Naturally regenerating Forest	490251864
Eucalyptus plantation	7401334
Pinus Plantation	2030419
Others species plantation	407933
Planted Forest	9839686
Total	500091550

2018

	Forest Area (ha)
Amazonia	320510860
Caatinga	36268803
Cerrado	76170531
Atlantic Forest	19260873
Pampa	2651967
Pantanal	5542334
Secondary Vegetation	28142657
Naturally regenerating Forest	488548025
Eucalyptus plantation	7895955
Pinus Plantation	2166862
Others species plantation	440508
Planted Forest	10503326
Total	499051351

2019

	Forest Area (ha)
Amazonia	319811422
Caatinga	36149688
Cerrado	75595708
Atlantic Forest	19025193
Pampa	2620375
Pantanal	5510212
Secondary Vegetation	28222417

Naturally regenerating Forest	486935015
Eucalyptus plantation	8163692
Pinus Plantation	2241807
Others species plantation	458021
Planted Forest	10863520
Total	497798535

2020

	Forest area (ha)
Amazonia	319111987
Caatinga	36030577
Cerrado	75021503
Atlantic Forest	18791881
Pampa	2589340
Pantanal	5479109
Secondary Vegetation	28371614
Naturally regenerating Forest	485396011
Eucalyptus plantation	8431433
Pinus Plantation	2316646
Others species plantation	475531
Planted Forest	11223609
Total	496619620

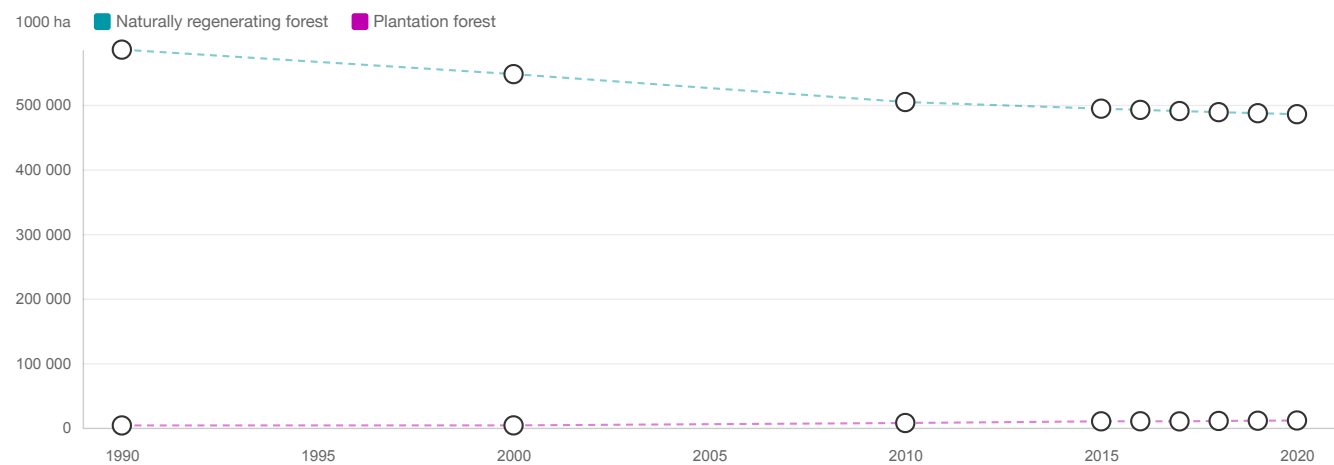
Analysis and processing of national data

Estimation and forecasting

Same methodology used in 1a.

Reclassification into FRA 2020 categories

FRA 2020 categories	National classes
Naturally regenerating forest	Natural forest in all biomes (Amazonia, Caatinga, Cerrado, Atlantic Forest, Pampa and Pantanal) + Secondary Vegetation
Plantation forest	Eucalyptus + Pinus + Other species
Plantation forest ...of which introduced species	Eucalyptus + Pinus



FRA categories	Forest area (1000 ha)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Naturally regenerating forest (a)	585 339.90	547 436.40	504 252.40	493 946.80	492 058.90	490 251.90	488 548.00	486 935.00	485 396.00
Planted forest (b)	3 558.10	3 652.20	7 328.30	9 937.90	10 023.10	9 839.70	10 503.30	10 863.50	11 223.60
Plantation forest	3 558.10	3 652.20	7 328.30	9 937.90	10 023.10	9 839.70	10 503.30	10 863.50	11 223.60
...of which introduced species	3 441.80	3 536.30	7 031.20	9 510.20	9 622.90	9 431.80	10 062.80	10 405.50	10 748.10
Other planted forest									
Total (a+b)	588 898.00	551 088.60	511 580.70	503 884.70	502 082.00	500 091.60	499 051.30	497 798.50	496 619.60
Total forest area	588 898.00	551 088.60	511 580.70	503 884.80	502 082.10	500 091.60	499 051.40	497 798.50	496 619.60

Comments

There is no information available for "Other planted forest". This data is probably embedded on class "Naturally regenerating forest".

1c Primary forest and special forest categories

National Data

Data sources + type of data source eg NFI, etc

Same sources used to calculate the area of forest.

National classification and definitions

Area of typologies considered as Bamboos and Mangroves:

FRA category	Vegetation Typology	
Bamboo	Aab	Open Humid Forest with bamboo
	Abb	Open Humid Forest with bamboo
	Asb	Open Humid Forest with bamboo
Mangrove	Pf	Pionner Formation with fluvial and marine influence
	Pfm	Pionner Formation with fluvial and marine influence

Original data

FRA category	Vegetation Typology	1990	2000	2010	2015	2020
Bamboo	Aab	5.876,26	5.427,02	5.138,32	5.128,22	5.114,31
	Abb	5.765.679,25	5.668.729,69	5.495.292,99	5.439.953,27	5.366.021,23
	Asb	1.956,85	1.956,85	1.730,33	1.325,62	1.266,81
	Total	5.773.512,36	5.676.113,56	5.502.161,64	5.446.407,12	5.372.402,35
Mangrove	Pf	32.875,51	31.287,45	29.922,78	29.892,95	29.863,13
	Pfm	1.393.761,02	1.383.409,31	1.294.313,63	1.289.692,01	1.285.364,09
	Total	1.426.636,54	1.414.696,76	1.324.236,41	1.319.584,97	1.315.227,22

Analysis and processing of national data

Estimation and forecasting

For bambus the forest type considered from IBGE vegetation map was: Floresta Ombrófila Aberta Aluvial com bambus, Floresta Ombrófila Aberta Terras Baixas com bambus, Floresta Ombrófila Aberta Submontana com bambus.

For Mangrove the forest type considered from IBGE vegetation map was: Vegetação com influência fluviomarinha, Vegetação com influência fluviomarinha Arbórea.

The primary forest areas were estimated by geographical data from years 2000, 2010 and 2015. For the years 1990 and 2020 there were forecasting based on linear projection based on the data obtained for the years 2000, 2010 and 2015.

Reclassification into FRA 2020 categories

The estimations of primary forest were based on criteria to consider only forests with a high probability of meeting primary forest concept criteria.

Basically, it was excluded forest areas (buffers) that could be under human interference by using the following criteria for:

1. Deforested areas: a buffer of 5km;
2. Main roads (from Brazilian Map on scale 1:250.000): a buffer of 10km;
3. Big rivers (polygonal rivers of Brazilian Map on scale 1:1.000.000): a buffer of 10km;
4. Urban areas (from Brazilian Map on scale 1:250.000): a buffer of 30km

After these processes, all the remnant polygons with area less than 50.000 ha were eliminated.

We excluded these areas from forest maps of the years 2000, 2010, 2015, and the forest remaining were computed as primary forests.

FRA categories	Area (1000 ha)				
	1990	2000	2010	2015	2020
Primary forest	253 129.00	239 024.00	218 200.00	217 193.00	216 187.00
Temporarily unstocked and/or recently regenerated					
Bamboos	5 773.51	5 676.11	5 502.16	5 446.41	5 372.40
Mangroves	1 423.89	1 413.92	1 323.58	1 318.93	1 314.58
Rubber wood					

Comments

1d Annual forest expansion, deforestation and net change

National Data

Data sources + type of data source eg NFI, etc

There is no information on afforestation or natural expansion of forest, based on monitoring and at country level.

Data on deforestation come from national forest monitoring systems, as described in Table 1a. The years with available data are presented in the following table:

Deforestation mapping in Brazil is provided by biomes and monitoring years varies according to biome:

Biome	Year of monitoring available (deforestation)
Amazon	1997-2017 (annual) [2]
Caatinga	2002, 2008, 2009, 2010, 2011 [4]
Cerrado	2000, 2002, 2004, 2006, 2008, 2010, 2012-2017 [3]
Atlantic Forest	2002, 2008, 2009 [4]
Pampa	2002, 2008, 2009 [4]
Pantanal	2002, 2008, 2009 [4]

National classification and definitions

Same classification used in 1a and 1b.

Original data

The original data used in 1a and 1b.

Analysis and processing of national data

Estimation and forecasting

Linear projections were used to years 1990 and 2020.

Reclassification into FRA 2020 categories

Reclassification is presented on 1a.

FRA categories	Area (1000 ha/year)			
	1990-2000	2000-2010	2010-2015	2015-2020
Forest expansion (a)	473.86	1 178.51	328.62	242.66
...of which afforestation				
...of which natural expansion				
Deforestation (b)	4 254.80	5 129.30	1 867.80	1 695.70
Forest area net change (a-b)	-3 780.94	-3 950.79	-1 539.18	-1 453.04

Comments

There is no information on afforestation or natural expansion of forest, based on monitoring and at country level.

1e Annual reforestation

National Data

Data sources + type of data source eg NFI, etc

#	References to sources of information	Variable(s)
1	Brazilian Institute of Geography and Statistics / Instituto Brasileiro de Geografia e Estatísticas - IBGE. Forestry and silviculture production/Produção da Extração Vegetal e Silvicultura – PEVS 2015. Available at: https://www.ibge.gov.br/estatisticas-novoportal/economicas/agricultura-e-pecuaria/9105-producao-da-extracao-vegetal-e-da-silvicultura.html?=&t=outros-links	Planted Forest area in Brazil: 2013, 2014, 2015, 2016, 2017.

National classification and definitions

Plantation Forest is estimated by surveys (2013-2017).

Original data

Year	Eucaliptus (ha)	Pinus (ha)	Other Species (ha)
2013	6.315.444,00	1.611.338,00	370.753,00
2014	6.952.509,00	2.049.234,00	364.998,00
2015	7.444.625,00	2.065.560,00	427.762,00
2016	7.543.707,00	2.079.162,00	400.207,00
2017	7.411.276,00	2.030.419,00	410.025,00

Analysis and processing of national data

Estimation and forecasting

For the years before 2013, linear projection using data from 2013-2015. For the years after 2017, linear projection using data from 2015-2017.

Reclassification into FRA 2020 categories

Brazilian classification of Species of genders Eucaliptus and Pinus as well as other Species (e.i. Acacia, Araucaria, ...) were considered as FRA category of Reforestation.

FRA categories	Area (1000 ha/year)			
	1990-2000	2000-2010	2010-2015	2015-2020
Reforestation	9.41	367.61	521.93	257.13

Comments

1f Other land with tree cover

National Data

Data sources + type of data source eg NFI, etc

-

National classification and definitions

-

Original data

-

Analysis and processing of national data

Estimation and forecasting

-

Reclassification into FRA 2020 categories

-

FRA categories	Area (1000 ha)				
	1990	2000	2010	2015	2020
Palms (a)					
Tree orchards (b)					
Agroforestry (c)					
Trees in urban settings (d)					
Other (specify in comments) (e)					
Total (a+b+c+d+e)	–	–	–	–	–
Other land area	200 014.40	240 913.20	283 655.90	292 417.50	300 481.10

Comments

2 Forest growing stock, biomass and carbon

2a Growing stock

National Data

Data sources + type of data source eg NFI, etc

The data used for estimating volume stocks were obtained from the NFI of Brazil collected until and available by December 2018. The NFI is based on a systematic sampling design, with clusters of four sub unities of 20m x 50m each, distributed in a national grid of 20 km x 20 km. Data of all living trees over 10 cm DBH were processed for calculating average stocks of volume (m3/ha) for each biome and for each forest type within each biome, using available and published volume equation fitted for forest types. For the vegetation types with low number of clusters in the considered biome, we used instead the total samples (clusters) for all biomes of that specific forest type. To retrieve field data for forest type we used the same vegetation map used for Table 1 (forest extension)and for achieve the total growing stock we multiplied each forest type stock (m3/ha) by its correspondent area given by the vegetation map. The same procedure for Forest and OWL categories.

National classification and definitions

FRA Category	Brazilian classification
Planted Forest	Forest predominantly composed of trees established through planting and/or deliberate seeding. It is distributed all over the country.
Naturally regenerating forest	All forest area that is not considered planted forest (natural vegetation). Encompasses forest in all six Brazilian biomes.

Original data

To report growing stock, two main data are used:

- the area of each vegetation type by biome, in each year;
- the factor (m³/ha) that indicates an average value of growing stock in each typology, in each biome.

Factors (Data from National Forest Inventory December 2018, only for Pantanal Biome the data used was from FRA 2015):

Amazonia:

Typology (Forest Type)	n (Clusters)	Error (%)	Growing stock factor (m³/ha)	SD	Observation
Floresta Ombrófila Densa (Da, Db, Dl, Dm, Ds)	707,00	4,24	355,92	16,92	Based Amazonia biome
Floresta Ombrófila Aberta (Aa, Ab, Am, As)	440,00	6,53	342,98	21,84	Based Amazonia biome
Floresta Ombrófila Mista (Ma, MI, Mm, Ms)	-	-	-	-	no data
Floresta Estacional Decidual (Ca, Cb, Cm, Cs)	191,00	11,31	49,41	7,14	Based Cerrado biome
Floresta Estacional Semidecidual (Fa, Fb, FI, Fm, Fs)	66,00	11,07	315,94	39,99	Based Amazonia biome
Campinara Florestada (Ld)	32,00	16,82	265,15	57,77	Based Amazonia biome
Campinarana Arborizada (La)	32,00	16,82	265,15	57,77	Based Amazonia biome
Campinarana Arbustiva (Lb)	111,00	20,49	37,14	8,87	Avarage value for all typologies of OWL on Amazonian Biome
Campinarana Gramíneo-Lenhosa (Lg)	-	-		-	Values from FRA 2015

			6,35		
Savana Florestada (Sd)	55,00	22,88	82,75	24,09	Based Amazonia biome
Savana-Estépica Florestada (Td)	680,00	9,11	16,66	2,17	Value from Caatinga Biome
Savana-Estépica Arborizada (Ta)	680,00	9,11	16,66	2,17	Value from Caatinga Biome
Savana Arborizada (Sa)	55,00	22,88	82,75	24,09	Based Amazonia biome
Savana Parque (Sp, Spf, Sps)	111,00	20,49	37,14	8,87	Avarage value for all typologies of OWL on Amazonian Biome
Savana-Estépica Parque (Tp, TPf, Tps, Tb, Tbs)	111,00	20,49	37,14	8,87	Avarage value for all typologies of OWL on Amazonian Biome
Savana Gramíneo-Lenhosa (Sg, Sgf, Sgs)	-	-	4,19	-	Values from FRA 2015
Savana-Estépica Gramíneo-Lenhosa (Tg, Tgf, Tgs)	-	-	1,49	-	Values from FRA 2015
Estepe Arborizada (Ea)	-	-	-	-	no data
Estepe Parque (Ep)	111,00	20,49		8,87	no data
Estepe Gramíneo Lenhosa (Eg)	-	-	-	-	no data
Formações Pioneiras (Pm, Pma, Pf, Pfm)	111,00	18,24	60,24	14,77	Based on avarage values for all biomes
Formações Pioneiras (P, Pa, Pap)	111,00	18,24	60,24	14,77	Based on avarage values for all biomes
Formações Pioneiras Arbustivas (Pmb, Paa)	111,00	20,49	37,14	8,87	Avarage value for all typologies of OWL on Amazonian Biome
Formações Pioneiras Herbáceas (Pmh, Pfh, Pah)	-	-	-	-	no data
Ecótonos (OMc, ONt, ONc, NMc, LOt, LOc, SOT, SOc, SMc, SNt, SNc, OPt, OPc, NPt, TOT, TOc, TNT, TNc, EOt, EOc, ENT, ENc, STNt, EMc, SLt, SLc,TPt, SEt, SEc, STt, STc, EPt, Epc, SPt)	269,00	15,22	65,15	16,83	Based on avarage values for all biomes
Refúgios Vegetacionais Arbustivos (rsb,rmb, rlb)	111,00	20,49	37,14	8,87	Avarage value for all typologies of OWL on Amazonian Biome
Refúgios Vegetacionais Herbáceos (rsh, rmh, rlh)	111,00	20,49	37,14	8,87	Avarage value for all typologies of OWL on Amazonian Biome
Vegetação Secundária (Vs)	-	-	175,60	-	Values from FRA 2015

Caatinga:

Typology (Forest Type)	n	Error	Growing stock factor (m³/ha)	SD	Observation
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	(Clusters)	(%)			
Floresta Ombrófila Densa (Da, Db, Dl, Dm, Ds)	185,00	9,84	68,23	9,53	Value from Atlantic Forest Biome
Floresta Ombrófila Aberta (Aa, Ab, Am, As)	20,00	38,82	81,04	35,58	Value from Caatinga Biome
Floresta Ombrófila Mista (Ma, MI, Mm, Ms)	-	-	-	-	no data
Floresta Estacional Decidual (Ca, Cb, Cm, Cs)	191,00	11,31	49,41	7,14	Value from Cerrado Biome
Floresta Estacional Semidecidual (Fa, Fb, FI, Fm, Fs)	125,00	10,92	97,19	15,03	Value from Cerrado Biome
Campinara Florestada (Ld)	-	-	-	-	no data
Campinarana Arborizada (La)	-	-	-	-	no data
Campinarana Arbustiva (Lb)	-	-	-	-	no data
Campinarana Gramíneo-Lenhosa (Lg)	-	-	-	-	no data
Savana Florestada (Sd)	1.783,00	3,54	53,57	2,43	Value from Cerrado Biome
Savana-Estépica Florestada (Td)	680,00	9,11	16,66	2,17	Value from Caatinga Biome
Savana-Estépica Arborizada (Ta)	680,00	9,11	16,66	2,17	Value from Caatinga Biome
Savana Arborizada (Sa)	1.783,00	3,54	53,57	2,43	Value from Cerrado Biome
Savana Parque (Sp, Spf, Sps)	98,00	22,12	7,94	1,89	Avarage value for all typologies of OWL on Caatinga Biome
Savana-Estépica Parque (Tp, TPf, Tps, Tb, Tbs)	98,00	22,12	7,94	1,89	Avarage value for all typologies of OWL on Caatinga Biome
Savana Gramíneo-Lenhosa (Sg, Sgf, Sgs)	-	-	8,67	-	Values from FRA 2015
Savana-Estépica Gramíneo-Lenhosa (Tg, Tgf, Tgs)	-	-	28,99	-	Values from FRA 2015
Estepe Arborizada (Ea)	-	-	-	-	no data
Estepe Parque (Ep)	-	-	-	-	no data
Estepe Gramíneo Lenhosa (Eg)	-	-	-	-	no data
Formações Pioneiras (Pm, Pma, Pf, Pfm)	111,00	18,24	60,24	14,77	Value from all Biomes
Formações Pioneiras (P, Pa, Pap)	111,00	18,24	60,24	14,77	Value from all Biomes
Formações Pioneiras Arbustivas (Pmb, Paa)					Avarage value for all typologies of OWL on

	98,00	22,12	7,94	1,89	Caatinga Biome
Formações Pioneiras Herbáceas (Pmh, Pfh, Pah)	-	-	-	-	no data
Ecótonos (OMc, ONt, ONc, NMc, LOt, LOc, SOt, SOc, SMc, SNt, SNc, OPt, OPc, NPt, TOt, TOc, TNt, TNc, EOt, EOc, ENT, ENc, STNt, EMc, SLt, SLc,TPt, SEt, SEc, STt, STc, EPt, Epc, SPt)	269,00	15,22	65,15	16,83	Value from all Biomes
Refúgios Vegetacionais Arbustivos (rsb, rmb, rlb)	98,00	22,12	7,94	1,89	Avarage value for all typologies of OWL on Caatinga Biome
Refúgios Vegetacionais Herbáceos (rsh, rmh, rlh)	-	-	-	-	no data
Vegetação Secundária (Vs)	-	-	-	-	no data

Cerrado:

Typology (Forest Type)	n (Clusters)	Error (%)	Growing stock factor (m³/ha)	SD	Observation
Floresta Ombrófila Densa (Da, Db, Dl, Dm, Ds)	185	9,84	68,23	9,53	Value from Atlantic Forest Biome
Floresta Ombrófila Aberta (Aa, Ab, Am, As)	6	36,40	41,70	21,80	Value from Cerrado Biome
Floresta Ombrófila Mista (Ma, MI, Mm, Ms)	190	8,28	211,15	19,44	Value from Atlantic Forest Biome
Floresta Estacional Decidual (Ca, Cb, Cm, Cs)	191	11,31	49,41	7,14	Value from Cerrado Biome
Floresta Estacional Semidecidual (Fa, Fb, Fl, Fm, Fs)	125	10,92	97,19	15,03	Value from Cerrado Biome
Campinara Florestada (Ld)	-	-	-	-	no data
Campinarana Arborizada (La)	-	-	-	-	no data
Campinarana Arbustiva (Lb)	-	-	-	-	no data
Campinarana Gramíneo-Lenhosa (Lg)	-	-	-	-	no data
Savana Florestada (Sd)	1.783	3,54	53,57	2,43	Value from Cerrado Biome
Savana-Estépica Florestada (Td)	680	9,11	16,66	2,17	Value from Caatinga Forest Biome
Savana-Estépica Arborizada (Ta)	680	9,11	16,66	2,17	Value from Caatinga Forest Biome
Savana Arborizada (Sa)	1.783	3,54	53,57	2,43	Value from Cerrado Biome
Savana Parque (Sp, Spf, Sps)	398	9,94	23,86	2,73	Avarage value for all typologies of OWL on Cerrado Biome
Savana-Estépica Parque (Tp, TPf, Tps, Tb, Tbs)	398	9,94	23,86	2,73	Avarage value for all typologies of OWL on Cerrado Biome

Savana Gramíneo-Lenhosa (Sg, Sgf, Sgs)	-	-	7,88	-	Values from FRA 2015
Savana-Estépica Gramíneo-Lenhosa (Tg, Tgf, Tgs)	-	-	28,99	-	Values from FRA 2015
Estepe Arborizada (Ea)	117	17,99	60,24	29,14	Value from Pampa Forest Biome
Estepe Parque (Ep)	-	-	-	-	no data
Estepe Gramíneo Lenhosa (Eg)	-	-	-	-	no data
Formações Pioneiras (Pm, Pma, Pf, Pfm)	111	18,24	60,24	14,77	Based on avarage values for all biomes
Formações Pioneiras (P, Pa, Pap)	111	18,24	60,24	14,77	Based on avarage values for all biomes
Formações Pioneiras Arbustivas (Pmb, Paa)	398,00	9,94	23,86	2,73	Avarage value for all typologies of OWL on Cerrado Biome
Formações Pioneiras Herbáceas (Pmh, Pfh, Pah)	-	-	-	-	no data
Ecótonos (OMc, ONt, ONc, NMc, LOt, LOc, SOt, SOc, SMc, Snt, SNc, OPt, OPc, NPt, Tot, TOc, Tnt, Tnc, EOt, EOc, Ent, ENc, STnt, EMc, SLt, SLc,TPt, SEt, SEc, STt, STc, EPt, Epc, SPt)	269,00	15,22	65,15	16,83	Based on avarage values for all biomes
Refúgios Vegetacionais Arbustivos (rsb,rmb, rlb)	398,00	9,94	23,86	2,73	Avarage value for all typologies of OWL on Cerrado Biome
Refúgios Vegetacionais Herbáceos (rsh, rmh, rlh)	398,00	9,94	23,86	2,73	Avarage value for all typologies of OWL on Cerrado Biome
Vegetação Secundária (Vs)	-	-	44,09	-	Values from FRA 2015

Atlantic forest:

Typology (Forest Type)	n (Clusters)	Error (%)	Growing stock factor (m³/ha)	SD	Observation
Floresta Ombrófila Densa (Da, Db, Dl, Dm, Ds)	185	9,84	68,23	9,53	Value from Atlantic Forest Biome
Floresta Ombrófila Aberta (Aa, Ab, Am, As)	11	38,36	134,83	59,11	Value from Atlantic Forest Biome
Floresta Ombrófila Mista (Ma, MI, Mm, Ms)	190	8,28	211,15	19,44	Value from Atlantic Forest Biome
Floresta Estacional Decidual (Ca, Cb, Cm, Cs)	36	50,14	45,56	23,59	Value from Atlantic Forest Biome
Floresta Estacional Semidecidual (Fa, Fb, FI, Fm, Fs)	192	13,41	32,96	11,16	Value from Atlantic Forest Biome
Campinara Florestada (Ld)	32	16,82	265,15	57,77	Value from Amazonia Biome

Campinarana Arborizada (La)	32	16,82	265,15	57,77	Value from Amazonia Biome
Campinarana Arbustiva (Lb)	-	-	-	-	no data
Campinarana Gramíneo-Lenhosa (Lg)	-	-	20,18	-	Values from FRA 2015
Savana Florestada (Sd)	1.783	3,54	53,57	2,43	Value from Cerrado Biome
Savana-Estépica Florestada (Td)	680	9,11	16,66	2,17	Value from Caatinga Biome
Savana-Estépica Arborizada (Ta)	680	9,11	16,66	2,17	Value from Caatinga Biome
Savana Arborizada (Sa)	1.783	3,54	53,57	2,43	Value from Cerrado Biome
Savana Parque (Sp, Spf, Sps)	36	50,19	29,83	19,87	Avarage value for all typologies of OWL on Atlantic Forest Biome
Savana-Estépica Parque (Tp, TPf, Tps, Tb, Tbs)	36	50,19	29,83	19,87	Avarage value for all typologies of OWL on Atlantic Forest Biome
Savana Gramíneo-Lenhosa (Sg, Sgf, Sgs)	-	-	20,18	-	Values from FRA 2015
Savana-Estépica Gramíneo-Lenhosa (Tg, Tgf, Tgs)	-	-	-	-	no data
Estepe Arborizada (Ea)	117	17,99	105,73	29,14	Value from Pampa Forest Biome
Estepe Parque (Ep)	-	-	-	-	no data
Estepe Gramíneo Lenhosa (Eg)	-	-	20,18	-	Values from FRA 2015
Formações Pioneiras (Pm, Pma, Pf, Pfm)	111	18,24	60,24	14,77	Based on avarage values for all biomes
Formações Pioneiras (P, Pa, Pap)	111	18,24	60,24	14,77	Based on avarage values for all biomes
Formações Pioneiras Arbustivas (Pmb, Paa)	36	50,19	29,83	19,87	Avarage value for all typologies of OWL on Atlantic Forest Biome
Formações Pioneiras Herbáceas (Pmh, Pfh, Pah)	-	-	-	-	no data
Ecótonos (OMc, ONt, ONc, NMc, LOt, LOc, SOt, SOc, SMc, SNt, SNc, OPt, OPc, NPt, Tot, TOc, TNt, TNc, EOt, EOc, ENt, ENc, STNt, EMc, SLt, SLc, TPt, SEt, SEc, STt, STc, EPt, Epc, SPt)	269	15,22	65,15	16,83	Based on avarage values for all biomes
Refúgios Vegetacionais Arbustivos (rsb,rmb, rlb)	36	50,19	29,83	19,87	Avarage value for all typologies of OWL on Atlantic Forest Biome
Refúgios Vegetacionais Herbáceos (rsh, rmh, rlh)	36	50,19	29,83	19,87	Avarage value for all typologies of OWL on Atlantic Forest Biome
Vegetação Secundária (Vs)					Values from FRA 2015

Pampa:

Typology (Forest Type)	n (Clusters)	Error (%)	Growing stock factor (m³/ha)	SD	Observation
Floresta Ombrófila Densa (Da, Db, Dl, Dm, Ds)	185	9,84	68,23	9,53	Value from Atlantic Forest Biome
Floresta Ombrófila Aberta (Aa, Ab, Am, As)	-	-	-	-	no data
Floresta Ombrófila Mista (Ma, MI, Mm, Ms)	-	-	211,15	-	Value from Atlantic Forest Biome
Floresta Estacional Decidual (Ca, Cb, Cm, Cs)	11	53,27	194,70	113,66	Value from Pampa Biome
Floresta Estacional Semidecidual (Fa, Fb, Fl, Fm, Fs)	30	33,73	84,09	38,01	Value from Pampa Biome
Campinara Florestada (Ld)	-	-	-	-	no data
Campinarana Arborizada (La)	-	-	-	-	no data
Campinarana Arbustiva (Lb)	3	21,48		8,35	no data
Campinarana Gramíneo-Lenhosa (Lg)	-	-	-	-	no data
Savana Florestada (Sd)	-	-	-	-	no data
Savana-Estépica Florestada (Td)	-	-	16,66	-	Value from Caatinga Forest Biome
Savana-Estépica Arborizada (Ta)	680	9,11		2,17	no data
Savana Arborizada (Sa)	-	-	-	-	no data
Savana Parque (Sp, Spf, Sps)	3	21,48		8,35	no data
Savana-Estépica Parque (Tp, TPf, Tps, Tb, Tbs)	3	21,48	13,79	8,35	Avarage value for all typologies of OWL on Pampa Biome
Savana Gramíneo-Lenhosa (Sg, Sgf, Sgs)	-	-	-	-	no data
Savana-Estépica Gramíneo-Lenhosa (Tg, Tgf, Tgs)	-	-	-	-	no data
Estepe Arborizada (Ea)	117	17,99	105,73	29,14	Value from Pampa Biome
Estepe Parque (Ep)	3	21,48	13,79	8,35	Avarage value for all typologies of OWL on Pampa Biome
Estepe Gramíneo Lenhosa (Eg)	-	-	-	-	no data
Formações Pioneiras (Pm, Pma, Pf, Pfm)	111	18,24		14,77	no data
Formações Pioneiras (P, Pa, Pap)					Based on avarage values for all biomes

	111	18,24	60,24	14,77	
Formações Pioneiras Arbustivas (Pmb, Paa)	3	21,48	13,79	8,35	Avarage value for all typologies of OWL on Pampa Biome
Formações Pioneiras Herbáceas (Pmh, Pfh, Pah)	-	-	28,99	-	Values from FRA 2015
Ecótonos (OMc, ONt, ONc, NMc, LOt, LOc, SOT, SOc, SMc, SNt, SNc, OPt, OPc, NPt, TOT, TOc, TNT, TNc, EOt, EOc, ENT, ENc, STNt, EMc, SLt, SLc,TPt, SEt, SEc, STt, STc, EPt, Epc, SPt)	269	15,22	65,15	16,83	Based on avarage values for all biomes
Refúgios Vegetacionais Arbustivos (rsb,rmb, rlb)	-	-	-	-	no data
Refúgios Vegetacionais Herbáceos (rsh, rmh, rlh)	-	-	-	-	no data
Vegetação Secundária (Vs)	-	-	-	-	no data

Pantanal:

Typology	Growing stock factor (m³/ha)
Floresta Ombrófila Densa (Da, Db, Dl, Dm, Ds)	
Floresta Ombrófila Aberta (Aa, Ab, Am, As)	
Floresta Ombrófila Mista (Ma, MI, Mm, Ms)	
Floresta Estacional Decidual (Ca, Cb, Cm, Cs)	92,78
Floresta Estacional Semidecidual (Fa, Fb, Fl, Fm, Fs)	273,17
Campinara Florestada (Ld)	
Campinarana Arborizada (La)	
Campinarana Arbustiva (Lb)	
Campinarana Gramíneo-Lenhosa (Lg)	
Savana Florestada (Sd)	114,40
Savana-Estépica Florestada (Td)	91,60
Savana-Estépica Arborizada (Ta)	43,01
Savana Arborizada (Sa)	20,12
Savana Parque (Sp, Spf, Sps)	
Savana-Estépica Parque (Tp, Tpf, Tps, Tb, Tbs)	7,88
Savana Gramíneo-Lenhosa (Sg, Sgf, Sgs)	8,67
Savana-Estépica Gramíneo-Lenhosa (Tg, Tgf, Tgs)	28,99
Estepe Arborizada (Ea)	
Estepe Parque (Ep)	
Estepe Gramíneo Lenhosa (Eg)	
Formações Pioneiras (Pm, Pma, Pf, Pfm)	

Formações Pioneiras (P, Pa, Pap)	15,79
Formações Pioneiras Arbustivas (Pmb, Paa)	
Formações Pioneiras Herbáceas (Pmh, Pfh, Pah)	
Ecótonos (OMc, ONt, ONc, NMc, LOT, LOc, SOT, SOc, SMc, SNt, SNc, OPt, OPc, NPt, TOT, TOc, TNT, TNc, EOT, EOC, ENT, ENC, STNt, EMc, SLt, SLc,TPt, SEt, SEc, STt, STc, EPt, Epc, SPt)	93,27
Refúgios Vegetacionais Arbustivos (rsb, rmb, rlb)	
Refúgios Vegetacionais Herbáceos (rsh, rmh, rlh)	73,06
Vegetação Secundária (Vs)	45,58

Analysis and processing of national data

Estimation and forecasting

Growing stock is calculated based on the area of vegetation typology, by biome and by year.

There is a factor established for each typology, in each biome, that represents the stock in this type of vegetation (m³/ha). Considering the area of this typology in each year, it is possible to estimate the total growing stock of Brazil.

Total growing stock:

Forest

Million m³	Amazônia	Caatinga	Cerrado	Atlantic Forest	Pampa	Pantanal	Naturally regenerating forest	Plantation Forest	Forest
1990	122.998,15	1.370,33	7.324,89	2.144,07	351,57	631,42	134.820,43	968,99	138.009,00
2000	117.765,21	1.259,81	6.429,46	1.925,25	334,90	612,72	128.327,35	994,62	131.008,38
2010	111.469,64	1.128,29	5.312,64	1.700,20	302,54	589,32	120.502,62	1.995,74	123.298,27
2015	110.237,32	1.109,05	5.100,31	1.590,90	286,42	578,03	118.902,04	2.706,44	122.683,83
2016	109.936,28	1.104,87	5.075,23	1.569,94	283,20	575,87	118.545,39	2.729,62	122.394,56
2017	109.665,53	1.100,69	5.046,46	1.549,14	279,98	573,73	118.215,54	2.679,68	122.044,98
2018	109.401,29	1.096,50	5.020,15	1.528,62	276,78	571,59	117.894,94	2.860,41	121.917,92
2019	109.155,15	1.092,32	4.993,23	1.508,29	273,60	569,45	117.592,04	2.958,50	121.710,60
2020	108.921,21	1.088,14	4.966,36	1.488,12	270,47	567,41	117.301,71	3.056,57	121.503,65

Other Wooded Land

Million m³	Amazônia	Caatinga	Cerrado	Atlantic Forest	Pampa	Pantanal	Total
1990	365,62	45,05	617,95	13,19	8,92	3,83	1.054,54
2000	363,63	43,76	557,11	10,95	8,51	3,76	987,72
2010	358,85	42,03	496,64	8,52	8,10	3,61	917,75
2015	358,56	41,84	476,13	7,41	7,89	3,53	895,36
2016	358,47	41,80	473,30	7,20	7,85	3,52	892,15
2017	358,40	41,76	470,47	7,00	7,81	3,50	888,93

2018	358,32	41,71	467,64	6,80	7,77	3,49	885,72
2019	358,23	41,67	464,83	6,62	7,72	3,47	882,54
2020	358,15	41,63	462,01	6,46	7,68	3,46	879,39

Reclassification into FRA 2020 categories

Reclassification is presented on 1a.

FRA categories	Growing stock m³/ha (over bark)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Naturally regenerating forest	230.33	234.42	238.97	240.72	240.92	241.13	241.32	241.49	241.66
Planted forest	272.33	272.33	272.33	272.34	272.33	272.33	272.33	272.33	272.33
...of which plantation forest	272.33	272.33	272.33	272.34	272.33	272.33	272.33	272.33	272.33
...of which other planted forest									
Forest	230.58	234.67	239.45	241.34	241.54	241.75	241.97	242.17	242.35
Other wooded land	22.48	22.54	22.62	22.66	22.67	22.68	22.69	22.70	22.72

FRA categories	Total growing stock (million m³ over bark)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Naturally regenerating forest	134 820.43	128 327.35	120 502.62	118 902.04	118 545.39	118 215.54	117 894.94	117 592.04	117 301.71
Planted forest	968.98	994.60	1 995.72	2 706.49	2 729.59	2 679.65	2 860.36	2 958.46	3 056.52
...of which plantation forest	968.98	994.60	1 995.72	2 706.49	2 729.59	2 679.65	2 860.36	2 958.46	3 056.52
...of which other planted forest									
Forest	135 789.41	129 321.95	122 498.34	121 608.52	121 274.98	120 895.18	120 755.30	120 550.50	120 358.23
Other wooded land	1 054.54	987.72	917.75	895.36	892.15	888.93	885.72	882.54	879.39

Comments

2b Growing stock composition

National Data

Data sources + type of data source eg NFI, etc

We did not have data for producing estimates as the botanical identification of tree species were not completed for the majority of the dataset. The tree species identification is made by a network of (>20) Brazilian herbaria based on bothanical samples collected by NFI field crews.

National classification and definitions

-

Original data

-

Analysis and processing of national data

Estimation and forecasting

-

Reclassification into FRA 2020 categories

-

FRA categories	Scientific name	Common name	Growing stock in forest (million m³ over bark)				
			1990	2000	2010	2015	2020
Native tree species							
#1 Ranked in terms of volume							
#2 Ranked in terms of volume							
#3 Ranked in terms of volume							
#4 Ranked in terms of volume							
#5 Ranked in terms of volume							
#6 Ranked in terms of volume							
#7 Ranked in terms of volume							
#8 Ranked in terms of volume							
#9 Ranked in terms of volume							
#10 Ranked in terms of volume							
Remaining native tree species							
Total volume of native tree species			–	–	–	–	–
Introduced tree species							
#1 Ranked in terms of volume							
#2 Ranked in terms of volume							
#3 Ranked in terms of volume							
#4 Ranked in terms of volume							
#5 Ranked in terms of volume							
Remaining introduced tree species							
Total volume of introduced tree species			–	–	–	–	–
Total growing stock			–	–	–	–	–

Comments

2c Biomass stock

National Data

Data sources + type of data source eg NFI, etc

The data used for calculation of biomass and carbon stocks were obtained from the NFI of Brazil collected until and available by December 2018. The NFI is based on a systematic sampling design, with clusters of four sub unities of 20m x 50m each, distributed in a national grid of 20 km x 20 km. Data of living trees over 10 cm DBH were processed for calculating average stocks (ton/ha) for each biome and for each forest type within each biome, using available and published allometric equation fitted for forest types. For the vegetation types with low number of clusters in the considered biome, we used instead the total samples for all biomes of that specific forest type. The stock of carbon was achieved using a factor of 0.49 applied to the biomass values.To retrieve field data for forest type we used the same vegetation map used for Table 1 (forest extension) and for achieving the total biomass stock we multiplied each forest type value by its correspondent area given by the map.

National classification and definitions

FRA Category	Brazilian classification
Planted Forest	Forest predominantly composed of trees established through planting and/or deliberate seeding. It is distributed all over the country.
Naturally regenerating forest	All forest area that is not considered planted forest (natural vegetation). Encompasses forest in all six Brazilian biomes.

Original data

To report biomass, two main data are used:

- the area of each vegetation type by biome, in each year;
- the factor (tonnes/ha) that indicates an average value of biomass in each typology, in each biome.

Factors (Data from National Forest Inventory December 2018, only for Pantanal Biome the data used was from FRA 2015):

Amazon biome (comma as decimal separator):

Typology (Forest Type)	n (Clusters)	Error (%)	Above-ground biomass (t/ha)	SD	Below-ground biomass (t/ha)	SD	Observation
Floresta Ombrófila Densa (Da, Db, Dl, Dm, Ds)	707	6,45	267,56	17,27	64,21	4,14	Based Amazonia biome
Floresta Ombrófila Aberta (Aa, Ab, Am, As)	440	6,53	230,06	20,30	55,21	9,95	Based Amazonia biome
Floresta Ombrófila Mista (Ma, Ml, Mm, Ms)	-	-	-	-	-	-	no data
Floresta Estacional Decidual (Ca, Cb, Cm, Cs)	191	11,31	72,14	12,11	20,20	5,93	Based Cerrado biome
Floresta Estacional Semidecidual (Fa, Fb, Fl, Fm, Fs)	66	11,07	193,25	40,15	46,38	19,67	Based Amazonia biome
Campinara Florestada (Ld)	32	16,82	168,48	37,14	33,70	18,20	Based Amazonia biome
Campinarana Arborizada (La)	32	16,82	168,48	37,14	33,70	18,20	Based Amazonia biome
Campinarana Arbustiva (Lb)	111	20,49	13,64	4,50	7,64	2,20	Avarage value for all typologies of OWL on Amazonian Biome
Campinarana Gramíneo-Lenhosa (Lg)	-		12,06	-	6,75		Values from FRA 2015

Savana Florestada (Sd)	55	22,88	51,77	15,22	10,35	7,46	Based Amazonia biome
Savana-Estépica Florestada (Td)	680	9,11	9,01	0,70	5,05	0,34	Value from Caatinga Biome
Savana-Estépica Arborizada (Ta)	680	9,11	9,01	0,70	5,05	0,34	Value from Caatinga Biome
Savana Arborizada (Sa)	55	22,88	51,77	15,22	10,35	7,46	Based Amazonia biome
Savana Parque (Sp, Spf, Sps)	111	20,49	13,64	4,50	7,64	2,20	Avarage value for all typologies of OWL on Amazonian Biome
Savana-Estépica Parque (Tp, TPf, Tps, Tb, Tbs)	111	20,49	13,64	4,50	7,64	2,20	Avarage value for all typologies of OWL on Amazonian Biome
Savana Gramíneo-Lenhosa (Sg, Sgf, Sgs)	-	-	7,96	-	18,76	-	Values from FRA 2015
Savana-Estépica Gramíneo-Lenhosa (Tg, Tgf, Tgs)	-	-	2,84	-	5,13	-	Values from FRA 2015
Estepe Arborizada (Ea)	-	-	-	-	-	-	no data
Estepe Parque (Ep)	111	20,49		4,50		2,20	no data
Estepe Gramíneo Lenhosa (Eg)	-		-	-			no data
Formações Pioneiras (Pm, Pma, Pf, Pfm)	111	18,24	41,08	9,86	8,22	4,83	Based on avarage values for all biomes
Formações Pioneiras (P, Pa, Pap)	111	18,24	41,08	9,86	8,22	4,83	Based on avarage values for all biomes
Formações Pioneiras Arbustivas (Pmb, Paa)	111	20,49	13,64	4,50	7,64	2,20	Avarage value for all typologies of OWL on Amazonian Biome
Formações Pioneiras Herbáceas (Pmh, Pfh, Pah)	-	-	-	-	-	-	no data
Ecótonos (OMc, ONt, ONc, NMc, LOt, LOc, SOt, SOc, SMc, SNt, SNC, OPt, OPc, NPt, TOT, TOc, TNT, TNC, EOt, EOC, ENT, ENC, STNt, EMc, SLt, SLc, TPt, SEt, SEc, STt, STc, EPt, Epc, SPT)	269	13,49	48,61	10,82	9,72	2,16	Based on avarage values for all biomes
Refúgios Vegetacionais Arbustivos (rsb,rmb, rlb)	111	20,49	13,64	4,50	7,64	2,20	Avarage value for all typologies of OWL on Amazonian Biome
Refúgios Vegetacionais Herbáceos (rsh, rmh, rlh)	111	20,49	13,64	4,50	7,64	2,20	Avarage value for all typologies of OWL on Amazonian Biome
Vegetação Secundária (Vs)	-	-	60,03	-	12,01	-	Values from FRA 2015

Caatinga (comma as decimal separator):

Typology (Forest Type)	n (Clusters)	Error (%)	Above-ground biomass (t/ha)	SD	Below-ground biomass (t/ha)	SD	Observation
Floresta Ombrófila Densa (Da, Db, Dl, Dm, Ds)	185	9,84	68,50	8,21	13,70	4,03	Value from Atlantic Forest Biome
Floresta Ombrófila Aberta (Aa, Ab, Am, As)	20	46,99	28,24	13,27	7,91	3,72	Value from Caatinga Biome
Floresta Ombrófila Mista (Ma, MI, Mm, Ms)	-		-	-		-	no data
Floresta Estacional Decidual (Ca, Cb, Cm, Cs)	191	11,31	72,14	12,11	20,20	5,93	Value from Cerrado Biome
Floresta Estacional Semidecidual (Fa, Fb, Fl, Fm, Fs)	125	10,92	53,04	8,38	14,85	4,11	Value from Cerrado Biome
Campinara Florestada (Ld)	-		-	-		-	no data
Campinarana Arborizada (La)	-		-	-		-	no data
Campinarana Arbustiva (Lb)	-		-	-		-	no data
Campinarana Gramíneo-Lenhosa (Lg)	-		-	-		-	no data
Savana Florestada (Sd)	1783	3,54	33,31	1,53	9,33	0,75	Value from Cerrado Biome
Savana-Estépica Florestada (Td)	680	9,11	9,01	0,70	5,05	0,34	Value from Caatinga Biome
Savana-Estépica Arborizada (Ta)	680	9,11	9,01	0,70	5,05	0,34	Value from Caatinga Biome
Savana Arborizada (Sa)	1783	3,54	33,31	1,53	9,33	0,75	Value from Cerrado Biome
Savana Parque (Sp, Spf, Sps)	98	22,12	5,38	1,05	3,01	0,51	Avarage value for all typologies of OWL on Caatinga Biome
Savana-Estépica Parque (Tp, TPf, Tps, Tb, Tbs)	98	22,12	5,38	1,05	3,01	0,51	Avarage value for all typologies of OWL on Caatinga Biome
Savana Gramíneo-Lenhosa (Sg, Sgf, Sgs)	-		5,20	-	20,91		Values from FRA 2015
Savana-Estépica Gramíneo-Lenhosa (Tg, Tgf, Tgs)	-		28,99	-	5,88		Values from FRA 2015
Estepe Arborizada (Ea)	-		-	-		-	no data
Estepe Parque (Ep)	-		-	-		-	no data
Estepe Gramíneo Lenhosa (Eg)	-		-	-		-	no data
	111						Value from all Biomes

Formações Pioneiras (Pm, Pma, Pf, Pfm)		18,24	41,08	9,86	8,22	4,83	
Formações Pioneiras (P, Pa, Pap)	111	18,24	41,08	9,86	8,22	4,83	Value from all Biomes
Formações Pioneiras Arbustivas (Pmb, Paa)	98	22,12	5,38	1,05	3,01	0,51	Avarage value for all typologies of OWL on Caatinga Biome
Formações Pioneiras Herbáceas (Pmh, Pfh, Pah)	-		-	-		-	no data
Ecótonos (OMc, ONt, ONc, NMc, LOt, LOc, SOT, SOc, SMc, Snt, SNc, OPT, OPc, NPt, TOT, TOc, TNT, TNc, EOT, EOc, ENT, ENc, STnt, EMc, SLt, SLc,TPt, SEt, SEc, STt, STc, EPt, Epc, SPt)	269	22,26	48,61	10,82	9,72	2,16	Value from all Biomes
Refúgios Vegetacionais Arbustivos (rsb,rmb, rlb)	98	22,12	5,38	1,05	3,01	0,51	Avarage value for all typologies of OWL on Caatinga Biome
Refúgios Vegetacionais Herbáceos (rsh, rmh, rlh)	-	-	-	-	-	0,51	no data
Vegetação Secundária (Vs)	-	-	-	-	-	-	no data

Cerrado (comma as decimal separator):

Typology (Forest Type)	n (Clusters)	Error (%)	Above-ground biomass (t/ha)	SD	Below-ground biomass (t/ha)	SD	Observation
Floresta Ombrófila Densa (Da, Db, DI, Dm, Ds)	185	9,84	68,50	8,21	13,70	4,03	Value from Atlantic Forest Biome
Floresta Ombrófila Aberta (Aa, Ab, Am, As)	6	36,40	19,02	9,90	10,65	4,85	Value from Cerrado Biome
Floresta Ombrófila Mista (Ma, MI, Mm, Ms)	190	8,28	111,86	9,60	22,37	4,70	Value from Atlantic Forest Biome
Floresta Estacional Decidual (Ca, Cb, Cm, Cs)	191	11,31	72,14	12,11	20,20	5,93	Value from Cerrado Biome
Floresta Estacional Semidecidual (Fa, Fb, FI, Fm, Fs)	125	10,92	53,04	8,38	14,85	4,11	Value from Cerrado Biome
Campinara Florestada (Ld)	-	-	-	-	-	-	no data
Campinarana Arborizada (La)	-	-	-	-	-	-	no data
Campinarana Arbustiva (Lb)	-	-	-	-	-	0,98	no data
Campinarana Gramíneo-Lenhosa (Lg)	-	-	-	-	-	-	no data
Savana Florestada (Sd)	1.783	3,54	33,31	1,53	9,33	0,75	Value from Cerrado Biome
Savana-Estépica Florestada (Td)	680	9,11	9,01	0,70	5,05	0,34	Value from Caatinga Forest Biome
Savana-Estépica Arborizada (Ta)	680	9,11					Value from Caatinga

			9,01	0,70	5,05	0,34	Forest Biome
Savana Arborizada (Sa)	1.783	3,54	33,31	1,53	9,33	0,75	Value from Cerrado Biome
Savana Parque (Sp, Spf, Sps)	398	9,94	16,83	2,00	9,43	0,98	Avarage value for all typologies of OWL on Cerrado Biome
Savana-Estépica Parque (Tp, TPf, Tps, Tb, Tbs)	398	9,94	16,83	2,00	9,43	0,98	Avarage value for all typologies of OWL on Cerrado Biome
Savana Gramíneo-Lenhosa (Sg, Sgf, Sgs)	-	-	5,20	-	20,91	-	Values from FRA 2015
Savana-Estépica Gramíneo-Lenhosa (Tg, Tgf, Tgs)	-	-	28,99	-	5,88	-	Values from FRA 2015
Estepe Arborizada (Ea)	117	17,99	41,08	12,38	8,22	6,07	Value from Pampa Forest Biome
Estepe Parque (Ep)	-	-	-	2,00	-	0,98	no data
Estepe Gramíneo Lenhosa (Eg)	-	-	-	-	-	-	no data
Formações Pioneiras (Pm, Pma, Pf, Pfm)	111	18,24	41,08	9,86	8,22	4,83	Based on avarage values for all biomes
Formações Pioneiras (P, Pa, Pap)	111	18,24	41,08	9,86	8,22	4,83	Based on avarage values for all biomes
Formações Pioneiras Arbustivas (Pmb, Paa)	398,00	9,94	16,83	2,00	9,43	0,98	Avarage value for all typologies of OWL on Cerrado Biome
Formações Pioneiras Herbáceas (Pmh, Pfh, Pah)	-	-	-	-	-	-	no data
Ecótonos (OMc, ONt, ONc, NMc, LOt, LOc, SOt, SOc, SMc, SNt, SNC, OPt, OPc, NPt, TOt, TOc, TNT, TNc, EOt, EOC, ENT, ENc, STNt, EMc, SLt, SLc,TPt, SEt, SEc, STt, STc, EPt, Epc, SPT)	269,00	22,26	48,61	10,82	9,72	2,16	Based on avarage values for all biomes
Refúgios Vegetacionais Arbustivos (rsb,rmb, rlb)	398,00	9,94	16,83	2,00	9,43	0,98	Avarage value for all typologies of OWL on Cerrado Biome
Refúgios Vegetacionais Herbáceos (rsh, rmh, rlh)	398,00	9,94	16,83	2,00	9,43	0,98	Avarage value for all typologies of OWL on Cerrado Biome
Vegetação Secundária (Vs)	-	-	29,10	-	5,82	-	Values from FRA 2015

Atlantic forest (comma as decimal separator):

Typology (Forest Type)	n (Clusters)	Error (%)	Above-ground biomass (t/ha)	SD	Below-ground biomass (t/ha)	SD	Observation

Floresta Ombrófila Densa (Da, Db, Dl, Dm, Ds)	185	9,84	68,50	8,21	13,70	4,03	Value from Atlantic Forest Biome
Floresta Ombrófila Aberta (Aa, Ab, Am, As)	11	38,36	107,83	49,04	21,57	24,03	Value from Atlantic Forest Biome
Floresta Ombrófila Mista (Ma, Ml, Mm, Ms)	190	8,28	111,86	9,60	22,37	4,70	Value from Atlantic Forest Biome
Floresta Estacional Decidual (Ca, Cb, Cm, Cs)	36	50,14	35,02	19,32	7,00	9,47	Value from Atlantic Forest Biome
Floresta Estacional Semidecidual (Fa, Fb, Fl, Fm, Fs)	192	13,41	59,81	9,63	11,96	4,72	Value from Atlantic Forest Biome
Campinara Florestada (Ld)	32	16,82	168,48	37,14	33,70	18,20	Value from Amazonia Biome
Campinarana Arborizada (La)	32	16,82	168,48	37,14	33,70	18,20	Value from Amazonia Biome
Campinarana Arbustiva (Lb)	-	-	-	-	-	8,50	no data
Campinarana Gramíneo-Lenhosa (Lg)	-	-	28,14	-	15,76	-	Values from FRA 2015
Savana Florestada (Sd)	1.783	3,54	33,31	1,53	9,33	0,75	Value from Cerrado Biome
Savana-Estépica Florestada (Td)	680	9,11	9,01	0,70	5,05	0,34	Value from Caatinga Biome
Savana-Estépica Arborizada (Ta)	680	9,11	9,01	0,70	5,05	0,34	Value from Caatinga Biome
Savana Arborizada (Sa)	1.783	3,54	33,31	1,53	9,33	0,75	Value from Cerrado Biome
Savana Parque (Sp, Spf, Sps)	36	50,19	28,14	17,34	15,76	8,50	Avarage value for all typologies of OWL on Atlantic Forest Biome
Savana-Estépica Parque (Tp, TPf, Tps, Tb, Tbs)	36	50,19	28,14	17,34	15,76	8,50	Avarage value for all typologies of OWL on Atlantic Forest Biome
Savana Gramíneo-Lenhosa (Sg, Sgf, Sgs)	-	-	28,14	-	15,76	-	Values from FRA 2015
Savana-Estépica Gramíneo-Lenhosa (Tg, Tgf, Tgs)	-	-	-	-	-	-	no data
Estepe Arborizada (Ea)	117	17,99	57,70	12,38	11,54	6,07	Value from Pampa Forest Biome
Estepe Parque (Ep)	-	-	-	-	-	8,50	no data
Estepe Gramíneo Lenhosa (Eg)	-	-		-		-	Values from FRA 2015

			28,14		15,76		
Formações Pioneiras (Pm, Pma, Pf, Pfm)	111	18,24	41,08	9,86	8,22	4,83	Based on avarage values for all biomes
Formações Pioneiras (P, Pa, Pap)	111	18,24	41,08	9,86	8,22	4,83	Based on avarage values for all biomes
Formações Pioneiras Arbustivas (Pmb, Paa)	36	50,19	28,14	17,34	15,76	8,50	Avarage value for all typologies of OWL on Atlantic Forest Biome
Formações Pioneiras Herbáceas (Pmh, Pfh, Pah)	-	-	-	-	-	-	no data
Ecótonos (OMc, ONt, ONc, NMc, LOt, LOc, SOt, SOc, SMc, SNt, SNC, OPt, OPc, NPt, TOt, TOc, TNT, TNC, EOt, EOc, ENT, ENC, STNt, EMc, SLt, SLc,TPt, SET, SEc, STt, STc, EPt, Epc, SPt)	269	22,26	48,61	10,82	9,72	2,16	Based on avarage values for all biomes
Refúgios Vegetacionais Arbustivos (rsb,rmb, rlb)	36	50,19	28,14	17,34	15,76	8,50	Avarage value for all typologies of OWL on Atlantic Forest Biome
Refúgios Vegetacionais Herbáceos (rsh, rmh, rlh)	36	50,19	28,14	17,34	15,76	8,50	Avarage value for all typologies of OWL on Atlantic Forest Biome
Vegetação Secundária (Vs)	-	-	-	-	-	-	Values from FRA 2015

Pampa (comma as decimal separator):

Typology (Forest Type)	n (Clusters)	Error (%)	Above-ground biomass (t/ha)	SD	Below-ground biomass (t/ha)	SD	Observation
Floresta Ombrófila Densa (Da, Db, Dl, Dm, Ds)	185	9,84	68,50	8,21	13,70	4,03	Value from Atlantic Forest Biome
Floresta Ombrófila Aberta (Aa, Ab, Am, As)	-	-	-	-	-	-	no data
Floresta Ombrófila Mista (Ma, MI, Mm, Ms)	-	-	111,86	-	22,37	-	Value from Atlantic Forest Biome
Floresta Estacional Decidual (Ca, Cb, Cm, Cs)	11	53,27	114,93	63,73	22,99	31,23	Value from Pampa Biome
Floresta Estacional Semidecidual (Fa, Fb, Fl, Fm, Fs)	30	33,73	46,07	17,44	9,21	8,55	Value from Pampa Biome
Campinara Florestada (Ld)	-	-	-	-	-	-	no data
Campinarana Arborizada (La)	-	-	-	-	-	-	no data
Campinarana Arbustiva (Lb)	-	-	-	-	-	1,68	no data
Campinarana Gramíneo-Lenhosa (Lg)	-	-	-	-	-	-	no data
Savana Florestada (Sd)	-	-	-	-	-	-	no data
Savana-Estépica Florestada (Td)	-	9,11	9,01	-	5,05	-	Value from Caatinga Forest Biome

Savana-Estépica Arborizada (Ta)	680	-	-	0,70	-	0,34	no data
Savana Arborizada (Sa)	-	-	-	-	-	-	no data
Savana Parque (Sp, Spf, Sps)	3	-	-	3,42	-	1,68	no data
Savana-Estépica Parque (Tp, TPf, Tps, Tb, Tbs)	3	21,48	12,95	3,42	2,59	1,68	Avarage value for all typologies of OWL on Pampa Biome
Savana Gramíneo-Lenhosa (Sg, Sgf, Sgs)	-	-	-	-	-	-	no data
Savana-Estépica Gramíneo-Lenhosa (Tg, Tgf, Tgs)	-	-	-	-	-	-	no data
Estepe Arborizada (Ea)	117	17,99	57,70	12,38	11,54	6,07	Value from Pampa Biome
Estepe Parque (Ep)	3	21,48	12,95	3,42	2,59	1,68	Avarage value for all typologies of OWL on Pampa Biome
Estepe Gramíneo Lenhosa (Eg)	-	-	-	-	-	-	no data
Formações Pioneiras (Pm, Pma, Pf, Pfm)	-	-	-	-	-	4,83	no data
Formações Pioneiras (P, Pa, Pap)	111	18,24	41,08	9,86	8,22	4,83	Based on avarage values for all biomes
Formações Pioneiras Arbustivas (Pmb, Paa)	3	21,48	12,95	3,42	2,59	1,68	Avarage value for all typologies of OWL on Pampa Biome
Formações Pioneiras Herbáceas (Pmh, Pfh, Pah)	-	-	28,99	-	5,88	-	Values from FRA 2015
Ecótonos (OMc, ONt, ONc, NMc, LOt, LOc, SOT, SOc, SMC, Snt, Snc, OPT, OPc, NPt, TOT, TOc, Tnt, Tnc, EOt, EOc, ENT, ENc, STNt, EMc, SLt, SLc,TPt, SEt, SEc, STt, STc, EPt, Epc, SPt)	269	22,26	48,61	10,82	9,72	2,16	Based on avarage values for all biomes
Refúgios Vegetacionais Arbustivos (rsb, rmb, rlb)	-	-	-	-	-	1,68	no data
Refúgios Vegetacionais Herbáceos (rsh, rmh, rlh)	-	-	-	-	-	1,68	no data
Vegetação Secundária (Vs)	-	-	-	-	-	-	no data

Pantanal:

	Above-ground biomass (t/ha)	Below-ground biomass (t/ha)	Dead Wood (t/ha)
Floresta Ombrófila Densa (Da, Db, DI, Dm, Ds)			
Floresta Ombrófila Aberta (Aa, Ab, Am, As)			

Floresta Ombrófila Mista (Ma, MI, Mm, Ms)			
Floresta Estacional Decidual (Ca, Cb, Cm, Cs)	132,95	31,91	4,55
Floresta Estacional Semidecidual (Fa, Fb, FI, Fm, Fs)	163,90	39,34	
Campinara Florestada (Ld)			
Campinarana Arborizada (La)			
Campinarana Arbustiva (Lb)			
Campinarana Gramíneo-Lenhosa (Lg)			
Savana Florestada (Sd)	75,50	21,14	
Savana-Estépica Florestada (Td)	60,46	13,53	2,90
Savana-Estépica Arborizada (Ta)	34,41	8,85	2,90
Savana Arborizada (Sa)	21,70	38,39	0,92
Savana Parque (Sp, Spf, Sps)			
Savana-Estépica Parque (Tp, TPf, Tps, Tb, Tbs)	5,20	20,91	
Savana Gramíneo-Lenhosa (Sg, Sgf, Sgs)	5,20	20,91	
Savana-Estépica Gramíneo-Lenhosa (Tg, Tgf, Tgs)	28,99	5,88	2,90
Estepe Arborizada (Ea)			
Estepe Parque (Ep)			
Estepe Gramíneo Lenhosa (Eg)			
Formações Pioneiras (Pm, Pma, Pf, Pfm)			
Formações Pioneiras (P, Pa, Pap)	30,00	6,00	3,30
Formações Pioneiras Arbustivas (Pmb, Paa)			
Formações Pioneiras Herbáceas (Pmh, Pfh, Pah)			
Ecótonos (OMc, ONt, ONc, NMc, LOt, LOc, SOT, SOc, SMC, SNt, SNC, OPT, OPc, NPt, TOT, TOc, TNt, TNC, EOT, EOC, ENT, ENC, STNt, EMc, SLt, SLc,TPt, SEt, SEc, STt, STc, EPt, Epc, SPt)	61,56	12,31	
Refúgios Vegetacionais Arbustivos (rsb,rm b, rlb)			
Refúgios Vegetacionais Herbáceos (rsh, rmh, rlh)	30,00	6,00	
Vegetação Secundária (Vs)	17,40	3,48	

Analysis and processing of national data

Estimation and forecasting

Biomass is calculated based on the area of vegetation typology, by biome and by year.

There is a factor established for each typology, in each biome, that represents the biomass in this type of vegetation (tonees/ha). Considering the area of this typology in each year, it is possible to estimate biomass in Brazil.

To estimate values in tonnes/ha, the total biomass was divided by the forest area in the year.

Above-ground biomass (comma separeted and dot thousand separator)

Forest

Million tonnes	Amazônia	Caatinga	Cerrado	Atlantic Forest	Pampa	Pantanal	Naturally regenerating forest	Plantation Forest	Forest
1990	87.306,60	900,77	4.980,98	1.788,43	201,42	441,23	95.619,42	726,74	96.346,17
2000	83.482,30	826,05	4.359,43	1.611,64	193,49	426,68	90.899,59	745,97	91.645,56
2010	78.878,83	737,65	3.557,28	1.429,92	174,86	408,71	85.187,24	1.496,81	86.684,05
2015	78.129,72	725,01	3.412,43	1.341,69	165,58	400,00	84.174,43	2.029,83	86.204,26
2016	77.937,06	722,27	3.395,67	1.324,72	163,73	398,33	83.941,78	2.047,22	85.988,99
2017	77.760,98	719,53	3.376,59	1.307,90	161,88	396,66	83.723,55	2.009,76	85.733,31
2018	77.582,98	716,79	3.359,06	1.291,30	160,04	395,00	83.505,17	2.145,31	85.650,48
2019	77.412,20	714,05	3.341,15	1.274,86	158,22	393,34	83.293,81	2.218,88	85.512,69
2020	77.245,59	711,31	3.323,26	1.258,57	156,43	391,75	83.086,89	2.292,43	85.379,32

Below-ground biomass (comma separeted and dot thousand separator)

Forest

Million tonnes	Amazônia	Caatinga	Cerrado	Mata Atlântica	Pampa	Pantanal	Naturally regenerating forest	Plantation Forest	Forest
1990	20.792,45	309,48	1.359,05	360,84	40,35	193,36	22.862,17	145,35	23.007,52
2000	19.874,60	284,67	1.183,42	325,16	38,75	185,63	21.706,59	149,19	21.855,78
2010	18.764,81	255,36	953,25	288,48	35,01	175,81	20.296,92	299,36	20.596,28
2015	18.589,70	251,24	911,36	270,68	33,15	170,98	20.056,13	405,97	20.462,10
2016	18.544,25	250,34	906,46	267,25	32,78	170,03	20.001,08	409,44	20.410,52
2017	18.502,60	249,44	900,88	263,86	32,41	169,09	19.949,19	401,95	20.351,14
2018	18.460,24	248,54	895,75	260,51	32,04	168,15	19.897,08	429,06	20.326,14
2019	18.419,41	247,65	890,51	257,19	31,67	167,20	19.846,43	443,78	20.290,21
2020	18.379,41	246,75	885,27	253,91	31,31	166,29	19.796,65	458,49	20.255,14

Dead wood (comma separeted and dot thousand separator)

Forest

Million tonnes	Amazônia	Caatinga	Cerrado	Atlantic Forest	Pampa	Pantanal	Naturally regenerating forest	Plantation Forest	Forest
1990	4.610,12	226,29	1.010,23	258,76	24,87	5,75	6.136,02	-	6.136,02
2000	4.414,70	209,08	888,91	233,76	24,39	5,48	5.776,31	-	5.776,31
2010	4.197,44	188,89	746,34	207,82	21,94	5,15	5.367,58	-	5.367,58

2015	4.141,58	186,13	717,97	195,32	20,73	4,99	5.266,73	-	5.266,73
2016	4.128,88	185,53	714,62	192,94	20,49	4,96	5.247,41	-	5.247,41
2017	4.117,69	184,92	710,91	190,57	20,24	4,93	5.229,27	-	5.229,27
2018	4.107,36	184,32	707,44	188,24	20,00	4,89	5.212,25	-	5.212,25
2019	4.098,20	183,71	703,91	185,94	19,77	4,86	5.196,38	-	5.196,38
2020	4.089,88	183,11	700,38	183,66	19,53	4,83	5.181,39	-	5.181,39

Reclassification into FRA 2020 categories

Reclassification is presented on 1a.

FRA categories	Forest biomass (tonnes/ha)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Above-ground biomass	163.60	166.30	169.44	171.08	171.26	171.44	171.63	171.78	171.92
Below-ground biomass	39.07	39.66	40.26	40.61	40.65	40.69	40.73	40.76	40.79
Dead wood	10.42	10.48	10.49	10.45	10.45	10.46	10.44	10.44	10.43

Comments

2d Carbon stock

National Data

Data sources + type of data source eg NFI, etc

The data was obtained from NFI of Brazil, database retrieved on December 2018. The information for each plot was classified base on Brazilian Vegetation Map to obtain the main classes of vegetation types. For each vegetation type on each biome were statistically estimated biomass and then coverted to the equivalet carbon quantity (0.49). For the vegetation types with low number of samples and consequently sample insufficiency was used instead the total samples for all biomes of this specific type. For the estimation the data used was only trees with DBH higher than 10cm.

National classification and definitions

FRA Category	Brazilian classification
Planted Forest	Forest predominantly composed of trees established through planting and/or deliberate seeding. It is distributed all over the country.
Naturally regenerating forest	All forest area that is not considered planted forest (natural vegetation). Encompasses forest in all six Brazilian biomes.

Original data

To report carbon, two main data are used:

- the area of each vegetation type by biome, in each year;
- the factor (tonnes/ha) that indicates an average value of carbon in each typology, in each biome.

Factors (Data from National Forest Inventory December 2018, only for Pantanal Biome the data used was from FRA 2015):

Amazon biome (decimal comma separated and thousand dot separated):

Typology (Forest Type)	n (Clusters)	Error (%)	C in above ground biomass (t/ha)	SD	C in below ground biomass (t/ha)	SD	C in litter (t/ha)	Soil C (t/ha)	Observation
Floresta Ombrófila Densa (Da, Db, Dl, Dm, Ds)	707,00	6,45	131,10	9,67	31,46	4,74	2,10	48,30	Based Amazonia biome
Floresta Ombrófila Aberta (Aa, Ab, Am, As)	440,00	6,53	112,73	4,87	27,05	2,39	2,10	46,30	Based Amazonia biome
Floresta Ombrófila Mista (Ma, Ml, Mm, Ms)	-	-	-	-	-	-	-	-	no data
Floresta Estacional Decidual (Ca, Cb, Cm, Cs)	191,00	11,31	35,35	3,39	9,90	1,66	2,10	34,90	Based Cerrado biome
Floresta Estacional Semidecidual (Fa, Fb, Fl, Fm, Fs)	66,00	11,07	94,69	9,64	22,73	4,72	2,10	41,30	Based Amazonia biome
Campinara Florestada (Ld)	32,00	16,82	82,55	7,43	16,51	3,64	2,10	60,20	Based Amazonia biome
Campinarana Arborizada (La)	32,00	16,82	82,55	7,43	16,51	3,64	2,10	60,50	Based Amazonia biome
Campinarana Arbustiva (Lb)									Avarage

	111,00	20,49	6,68	2,52	3,74	1,23	2,10	60,70	value for all typologies of OWL on Amazonian Biome
Campinarana Gramíneo-Lenhosa (Lg)	-	-	5,67	-	3,17		2,10	59,80	Values from FRA 2015
Savana Florestada (Sd)	55,00	22,88	25,37	3,04	5,07	1,49	2,10	34,20	Based Amazonia biome
Savana-Estépica Florestada (Td)	680,00	9,11	4,42	0,39	2,47	0,19	2,10	31,40	Value from Caatinga Biome
Savana-Estépica Arborizada (Ta)	680,00	9,11	4,42	0,39	2,47	0,19	2,10	38,10	Value from Caatinga Biome
Savana Arborizada (Sa)	55,00	22,88	25,37	3,04	5,07	1,49	2,10	34,60	Based Amazonia biome
Savana Parque (Sp, Spf, Sps)	111,00	20,49	6,68	2,52	3,74	1,23	2,10	34,00	Avarage value for all typologies of OWL on Amazonian Biome
Savana-Estépica Parque (Tp, TPf, Tps, Tb, Tbs)	111,00	20,49	6,68	2,52	3,74	1,23	2,10	34,90	Avarage value for all typologies of OWL on Amazonian Biome
Savana Gramíneo-Lenhosa (Sg, Sgf, Sgs)	-	-	3,74	-	8,82	-	2,10	32,80	Values from FRA 2015
Savana-Estépica Gramíneo-Lenhosa (Tg, Tgf, Tgs)	-	-	1,33	-	2,41	-	2,10	38,10	Values from FRA 2015
Estepe Arborizada (Ea)	-	-	-	-	-	-	-	-	no data
Estepe Parque (Ep)	111,00	20,49	-	2,52		1,23	-	-	no data
Estepe Gramíneo Lenhosa (Eg)	-	-	-	-	-	-	-	-	no data
Formações Pioneiras (Pm, Pma, Pf, Pfm)	111,00	18,24	20,13	1,97	4,03	0,97	2,10	50,30	Based on avarage values for all biomes
									Based on

Formações Pioneiras (P, Pa, Pap)	111,00	18,24	20,13	1,97	4,03	0,97	2,10	50,30	avarage values for all biomes
Formações Pioneiras Arbustivas (Pmb, Paa)	111,00	20,49	6,68	2,52	3,74	1,23	2,10	34,90	Avarage value for all typologies of OWL on Amazonian Biome
Formações Pioneiras Herbáceas (Pmh, Pfh, Pah)	-	-	-	-	-	-	-	-	no data
Ecótonos (OMc, ONt, ONc, NMc, LOt, LOc, SOt, SOc, SMc, SNt, SNC, OPt, OPc, NPt, TOT, TOc, TNt, TNc, EOt, EOc, ENt, ENc, STNt, EMc, SLt, SLc,TPt, SEt, SEc, STt, STc, EPt, Epc, SPt)	269,00	13,49	23,82	2,60	4,76	1,06	2,10	35,00	Based on avarage values for all biomes
Refúgios Vegetacionais Arbustivos (rsb,rmb, rlb)	111,00	20,49	6,68	2,52	3,74	1,23	2,10	55,70	Avarage value for all typologies of OWL on Amazonian Biome
Refúgios Vegetacionais Herbáceos (rsh, rmh, rlh)	111,00	20,49	6,68	2,52	3,74	1,23	-	-	Avarage value for all typologies of OWL on Amazonian Biome
Vegetação Secundária (Vs)	-	-	50,31	-	5,64	-	2,10	29,08	Values from FRA 2015

Caatinga (decimal comma separated and thousand dot separated):

Typology (Forest Type)	n (Clusters)	Error (%)	C in above ground biomass (t/ha)	SD	C in below ground biomass (t/ha)	SD	C in litter (t/ha)	Soil C (t/ha)	Observation
Floresta Ombrófila Densa (Da, Db, DI, Dm, Ds)	185,00	9,84	33,56	1,64	6,71	0,81	0,30	3,46	Value from Atlantic Forest Biome
Floresta Ombrófila Aberta (Aa, Ab, Am, As)	20,00	46,99	13,84	7,43	3,87	1,82	0,53	7,20	Value from Caatinga Biome
Floresta Ombrófila Mista (Ma, MI, Mm, Ms)	-		-	-		-	-	-	no data
Floresta Estacional Decidual (Ca, Cb, Cm, Cs)	191,00	11,31	35,35	3,39	9,90	1,66	2,32	38,38	Value from Cerrado Biome
Floresta Estacional Semidecidual (Fa, Fb, FI, Fm, Fs)									Value from

	125,00	10,92	25,99	2,35	7,28	1,15	3,21	60,61	Cerrado Biome
Campinara Florestada (Ld)	-		-	-		-	-	-	no data
Campinarana Arborizada (La)	-		-	-		-	-	-	no data
Campinarana Arbustiva (Lb)	-		-	-		-	-	-	no data
Campinarana Gramíneo-Lenhosa (Lg)	-		-	-		-	-	-	no data
Savana Florestada (Sd)	1.783,00	3,54	16,32	0,43	4,57	0,21	0,08	1,35	Value from Cerrado Biome
Savana-Estépica Florestada (Td)	680,00	9,11	4,42	0,39	2,47	0,19	8,01	79,00	Value from Caatinga Biome
Savana-Estépica Arborizada (Ta)	680,00	9,11	4,42	0,39	2,47	0,19	47,45	516,99	Value from Caatinga Biome
Savana Arborizada (Sa)	1.783,00	3,54	16,32	0,43	4,57	0,21	5,28	93,01	Value from Cerrado Biome
Savana Parque (Sp, Spf, Sps)	98,00	22,12	2,64	0,59	1,48	0,29	1,17	17,06	Avarage value for all typologies of OWL on Caatinga Biome
Savana-Estépica Parque (Tp, TPf, Tps, Tb, Tbs)	98,00	22,12	2,64	0,59	1,48	0,29	8,68	94,65	Avarage value for all typologies of OWL on Caatinga Biome
Savana Gramíneo-Lenhosa (Sg, Sgf, Sgs)	-		2,44	-	9,83		0,19	3,09	Values from FRA 2015
Savana-Estépica Gramíneo-Lenhosa (Tg, Tgf, Tgs)	-		13,63	-	2,76		0,35	4,21	Values from FRA 2015
Estepe Arborizada (Ea)	-		-	-		-	-	-	no data
Estepe Parque (Ep)	-		-	-		-	-	-	no data
Estepe Gramíneo Lenhosa (Eg)	-		-	-		-	-	-	no data
Formações Pioneiras (Pm, Pma, Pf, Pfm)	111,00	18,24	20,13	1,97	4,03	0,97	0,08	4,37	Value from all Biomes
Formações Pioneiras (P, Pa, Pap)	111,00	18,24	20,13	1,97	4,03	0,97	0,15	4,16	Value from all Biomes

Formações Pioneiras Arbustivas (Pmb, Paa)	98,00	22,12	2,64	0,59	1,48	0,29	0,19	4,22	Avarage value for all typologies of OWL on Caatinga Biome
Formações Pioneiras Herbáceas (Pmh, Pfh, Pah)	-		-	-		-	-	-	no data
Ecótonos (OMc, ONt, ONc, NMc, LOt, LOc, SOt, SOc, SMc, SNt, SNC, OPt, OPc, NPt, TOT, TOc, TNT, TNc, EOt, EOc, ENT, ENC, STNt, EMc, SLt, SLc,TPt, SEt, SEc, STt, STc, EPt, Epc, SPt)	269,00	22,26	23,82	2,60	4,76	1,06	9,30	164,73	Value from all Biomes
Refúgios Vegetacionais Arbustivos (rsb,rmb, rlb)	98,00	22,12	2,64	0,59	1,48	0,29	0,97	16,23	Avarage value for all typologies of OWL on Caatinga Biome
Refúgios Vegetacionais Herbáceos (rsh, rmh, rlh)	-	-	-	-	-	0,29	-	-	no data
Vegetação Secundária (Vs)	-	-	-	-	-	-	-	-	no data

Cerrado (decimal comma separated and thousand dot separated):

Typology (Forest Type)	n (Clusters)	Error (%)	C in above ground biomass (t/ha)	SD	C in below ground biomass (t/ha)	SD	C in litter (t/ha)	Soil C (t/ha)	Observation
Floresta Ombrófila Densa (Da, Db, DI, Dm, Ds)	185	9,84	33,56	1,64	6,71	0,81	0,29	4,20	Value from Atlantic Forest Biome
Floresta Ombrófila Aberta (Aa, Ab, Am, As)	6	36,40	9,32	5,55	5,22	2,72	0,62	8,55	Value from Cerrado Biome
Floresta Ombrófila Mista (Ma, MI, Mm, Ms)	190	8,28	54,81	1,92	10,96	0,94	0,05	1,88	Value from Atlantic Forest Biome
Floresta Estacional Decidual (Ca, Cb, Cm, Cs)	191	11,31	35,35	3,39	9,90	1,66	12,07	200,20	Value from Cerrado Biome
Floresta Estacional Semidecidual (Fa, Fb, FI, Fm, Fs)	125	10,92	25,99	2,35	7,28	1,15	16,09	303,23	Value from Cerrado Biome
Campinara Florestada (Ld)	-	-	-	-	-	-	-	-	no data
Campinarana Arborizada (La)	-	-	-	-	-	-	-	-	no data
Campinarana Arbustiva (Lb)	-	-	-	-	-		-	-	no data

						0,55			
Campinarana Gramíneo-Lenhosa (Lg)	-	-	-	-	-	-	-	-	no data
Savana Florestada (Sd)	1.783	3,54	16,32	0,43	4,57	0,21	16,56	291,95	Value from Cerrado Biome
Savana-Estépica Florestada (Td)	680	9,11	4,42	0,39	2,47	0,19	0,58	6,03	Value from Caatinga Forest Biome
Savana-Estépica Arborizada (Ta)	680	9,11	4,42	0,39	2,47	0,19	1,62	17,65	Value from Caatinga Forest Biome
Savana Arborizada (Sa)	1.783	3,54	16,32	0,43	4,57	0,21	102,00	1.798,12	Value from Cerrado Biome
Savana Parque (Sp, Spf, Sps)	398	9,94	8,25	1,12	4,62	0,55	39,57	697,60	Avarage value for all typologies of OWL on Cerrado Biome
Savana-Estépica Parque (Tp, TPf, Tps, Tb, Tbs)	398	9,94	8,25	1,12	4,62	0,55	0,53	5,32	Avarage value for all typologies of OWL on Cerrado Biome
Savana Gramíneo-Lenhosa (Sg, Sgf, Sgs)	-	-	2,44	-	9,83	-	10,00	156,71	Values from FRA 2015
Savana-Estépica Gramíneo-Lenhosa (Tg, Tgf, Tgs)	-	-	13,63	-	10,90	-	-	0,76	Values from FRA 2015
Estepe Arborizada (Ea)	117	17,99	20,13	2,48	4,03	1,21	-	-	Value from Pampa Forest Biome
Estepe Parque (Ep)	-	-	-	1,12		0,55	-	-	no data
Estepe Gramíneo Lenhosa (Eg)	-	-	-	-	-	-	-	-	no data
Formações Pioneiras (Pm, Pma, Pf, Pfm)	111	18,24	20,13	1,97	4,03	0,97	0,20	4,77	Based on avarage values for all biomes
	111	18,24							Based on

Formações Pioneiras (P, Pa, Pap)			20,13	1,97	4,03	0,97	0,13	3,23	avarage values for all biomes
Formações Pioneiras Arbustivas (Pmb, Paa)	398,00	9,94	8,25	1,12	4,62	0,55	-	-	Avarage value for all typologies of OWL on Cerrado Biome
Formações Pioneiras Herbáceas (Pmh, Pfh, Pah)	-	-	-	-	-	-	-	-	no data
Ecótonos (OMc, ONt, ONc, NMc, LOt, LOc, SOf, SOc, SMc, SNt, SNc, OPt, OPc, NPt, TOt, TOc, TNt, TNc, EOt, EOc, ENT, ENc, STNt, EMc, SLt, SLc,TPt, SEt, SEc, STt, STc, EPt, Epc, SPt)	269,00	22,26	23,82	2,60	4,76	1,06	-	-	Based on avarage values for all biomes
Refúgios Vegetacionais Arbustivos (rsb,rmb, rlb)	398,00	9,94	8,25	1,12	4,62	0,55	-	-	Avarage value for all typologies of OWL on Cerrado Biome
Refúgios Vegetacionais Herbáceos (rsh, rmh, rlh)	398,00	9,94	8,25	1,12	4,62	0,55	-	-	Avarage value for all typologies of OWL on Cerrado Biome
Vegetação Secundária (Vs)	-	-	13,68	-	2,74	-	-	-	Values from FRA 2015

Atlantic forest (decimal comma separated and thousand dot separated):

Typology (Forest Type)	n (Clusters)	Error (%)	C in above ground biomass (t/ha)	SD	C in below ground biomass (t/ha)	SD	C in litter (t/ha)	Soil C (t/ha)	Observation
Floresta Ombrófila Densa (Da, Db, DI, Dm, Ds)	185	9,84	33,56	1,64	6,71	0,81	3,59	48,70	Value from Atlantic Forest Biome
Floresta Ombrófila Aberta (Aa, Ab, Am, As)	11	38,36	52,84	9,81	10,57	4,81	3,59	48,41	Value from Atlantic Forest Biome
Floresta Ombrófila Mista (Ma, MI, Mm, Ms)	190	8,28	54,81	1,92	10,96	0,94	2,10	85,90	Value from Atlantic Forest Biome
Floresta Estacional Decidual (Ca, Cb, Cm, Cs)									Value from

	36	50,14	17,16	3,86	3,43	1,89	2,10	35,36	Atlantic Forest Biome
Floresta Estacional Semidecidual (Fa, Fb, Fl, Fm, Fs)	192	13,41	29,31	1,93	5,86	0,94	2,10	38,50	Value from Atlantic Forest Biome
Campinarara Florestada (Ld)	32	16,82	82,55	7,43	16,51	3,64	-	-	Value from Amazonia Biome
Campinarana Arborizada (La)	32	16,82	82,55	7,43	16,51	3,64	-	-	Value from Amazonia Biome
Campinarana Arbustiva (Lb)	-	-	-	-	-	4,76	-	-	no data
Campinarana Gramíneo-Lenhosa (Lg)	-	-	-	-	7,72	-	-	-	Values from FRA 2015
Savana Florestada (Sd)	1.783	3,54	16,32	0,43	4,57	0,21	2,10	31,10	Value from Cerrado Biome
Savana-Estépica Florestada (Td)	680	9,11	4,42	0,39	2,47	0,19	2,32	24,30	Value from Caatinga Biome
Savana-Estépica Arborizada (Ta)	680	9,11	4,42	0,39	2,47	0,19	2,10	21,80	Value from Caatinga Biome
Savana Arborizada (Sa)	1.783	3,54	16,32	0,43	4,57	0,21	2,10	37,80	Value from Cerrado Biome
Savana Parque (Sp, Spf, Sps)	36	50,19	13,79	9,71	7,72	4,76	2,10	36,70	Avarage value for all typologies of OWL on Atlantic Forest Biome
Savana-Estépica Parque (Tp, TPf, Tps, Tb, Tbs)	36	50,19	13,79	9,71	7,72	4,76	2,10	36,70	Avarage value for all typologies of OWL on Atlantic Forest Biome
Savana Gramíneo-Lenhosa (Sg, Sgf, Sgs)	-	-	13,79	-	7,72	-	2,10	37,80	Values from FRA 2015

Savana-Estépica Gramíneo-Lenhosa (Tg, Tgf, Tgs)	-	-	-	-	-	-	-	-	no data
Estepe Arborizada (Ea)	117	17,99	28,27	2,48	5,65	1,21	2,10	57,90	Value from Pampa Forest Biome
Estepe Parque (Ep)	-	-	-	-	-	4,76	-	-	no data
Estepe Gramíneo Lenhosa (Eg)	-	-	13,79	-	7,72	-	2,10	59,00	Values from FRA 2015
Formações Pioneiras (Pm, Pma, Pf, Pfm)	111	18,24	20,13	1,97	4,03	0,97	2,10	49,00	Based on average values for all biomes
Formações Pioneiras (P, Pa, Pap)	111	18,24	20,13	1,97	4,03	0,97	2,10	49,00	Based on average values for all biomes
Formações Pioneiras Arbustivas (Pmb, Paa)	36	50,19	13,79	9,71	7,72	4,76	2,10	49,00	Average value for all typologies of OWL on Atlantic Forest Biome
Formações Pioneiras Herbáceas (Pmh, Pfh, Pah)	-	-	-	-	-	-	-	-	no data
Ecótonos (OMc, ONt, ONc, NMc, LOt, LOc, SOt, SOc, SMc, SNt, SNc, OPt, OPc, NPt, TOT, TOc, TNT, TNc, EOt, EOc, ENT, ENC, STNt, EMc, SLt, SLc,TPt, SEt, SEc, STt, STc, EPt, Epc, SPt)	269	22,26	23,82	2,60	4,76	1,06	2,10	47,00	Based on average values for all biomes
Refúgios Vegetacionais Arbustivos (rsb,rmb, rlb)	36	50,19	13,79	9,71	7,72	4,76	2,10	42,90	Average value for all typologies of OWL on Atlantic Forest Biome
Refúgios Vegetacionais Herbáceos (rsh, rmh, rlh)	36	50,19	13,79	9,71	7,72	4,76	2,10	47,00	Average value for all typologies of OWL on Atlantic Forest Biome
Vegetação Secundária (Vs)	-	-	-	-	-	-	-	-	Values from FRA 2015

Pampa (decimal comma separated and thousand dot separated):

Typology (Forest Type)	n (Clusters)	Error (%)	C in above ground biomass (t/ha)	SD	C in below ground biomass (t/ha)	SD	C in litter (t/ha)	Soil C (t/ha)	Observation
Floresta Ombrófila Densa (Da, Db, Dl, Dm, Ds)	185	9,84	33,56	1,64	6,71	0,81	3,59	60,80	Value from Atlantic Forest Biome
Floresta Ombrófila Aberta (Aa, Ab, Am, As)	-	-	-	-	-	-	-	-	no data
Floresta Ombrófila Mista (Ma, Ml, Mm, Ms)	-	-	54,81	-	10,96	-	-	-	Value from Atlantic Forest Biome
Floresta Estacional Decidual (Ca, Cb, Cm, Cs)	11	53,27	56,32	12,75	11,26	6,25	2,10	36,14	Value from Pampa Biome
Floresta Estacional Semidecidual (Fa, Fb, Fl, Fm, Fs)	30	33,73	22,57	3,49	4,51	1,71	2,10	35,09	Value from Pampa Biome
Campinara Florestada (Ld)	-	-	-	-	-	-	-	-	no data
Campinarana Arborizada (La)	-	-	-	-	-	-	-	-	no data
Campinarana Arbustiva (Lb)	-	-	-	-	-	0,34	-	-	no data
Campinarana Gramíneo-Lenhosa (Lg)	-	-	-	-	-	-	-	-	no data
Savana Florestada (Sd)	-	-	-	-	-	-	-	-	no data
Savana-Estépica Florestada (Td)		9,11	4,42	-	2,47	-	-	-	Value from Caatinga Forest Biome
Savana-Estépica Arborizada (Ta)	680	-	-	0,39	-	0,19	2,10	59,03	no data
Savana Arborizada (Sa)	-	-	-	-	-		-	-	no data
Savana Parque (Sp, Spf, Sps)	-	-	-	-	-	0,34	-	-	no data
Savana-Estépica Parque (Tp, TPf, Tps, Tb, Tbs)	3	21,48	6,34	0,68	1,27	0,34	-	-	Avarage value for all typologies of OWL on Pampa Biome
Savana Gramíneo-Lenhosa (Sg, Sgf, Sgs)	-	-	-	-	-	-	-	-	no data

Savana-Estépica Gramíneo-Lenhosa (Tg, Tgf, Tgs)	-	-	-	-	-	-	-	-	no data
Estepe Arborizada (Ea)	117	17,99	28,27	2,48	5,65	1,21	2,10	59,03	Value from Pampa Biome
Estepe Parque (Ep)	3	21,48	6,34	0,68	1,27	0,34			Avarage value for all typologies of OWL on Pampa Biome
Estepe Gramíneo Lenhosa (Eg)	-	-	-	-	-	-	-	-	no data
Formações Pioneiras (Pm, Pma, Pf, Pfm)	-	-	-	-	-	0,97	-	-	no data
Formações Pioneiras (P, Pa, Pap)	111	18,24	20,13	1,97	4,03	0,97	2,10	50,48	Based on avarage values for all biomes
Formações Pioneiras Arbustivas (Pmb, Paa)	3	21,48	6,34	0,68	1,27	0,34	-	-	Avarage value for all typologies of OWL on Pampa Biome
Formações Pioneiras Herbáceas (Pmh, Pfh, Pah)	-	-	13,63	-	10,90	-	-	-	Values from FRA 2015
Ecótonos (OMc, ONt, ONc, NMc, LOt, LOc, SOf, SOc, SMc, SNt, SNc, OPt, OPc, NPt, TOt, TOc, TNt, TNc, EOf, EOc, ENT, ENC, STNt, EMc, SLt, SLc,TPt, SET, SEc, STt, STc, EPt, Epc, SPt)	269	22,26	23,82	2,60	4,76	1,06	-	-	Based on avarage values for all biomes
Refúgios Vegetacionais Arbustivos (rsb,rmb, rlb)	-	-	-	-	-	0,34	-	-	no data
Refúgios Vegetacionais Herbáceos (rsh, rmh, rlh)	-	-	-	-	-	0,34	-	-	no data
Vegetação Secundária (Vs)	-	-	-	-	-	-	-	-	no data

Pantanal (decimal comma separated and thousand dot separated):

Rótulos de Linha	C in above ground biomass (t/ha)	C in below ground biomass (t/ha)	C in dead wood (t/ha)	C in litter (t/ha)	Soil C (t/ha)
Floresta Ombrófila Densa (Da, Db, DI, Dm, Ds)					
Floresta Ombrófila Aberta (Aa, Ab, Am, As)					
Floresta Ombrófila Mista (Ma, MI, Mm, Ms)					

Floresta Estacional Decidual (Ca, Cb, Cm, Cs)	63,50	62,49	2,14	3,59	38,79
Floresta Estacional Semidecidual (Fa, Fb, FI, Fm, Fs)	77,03	18,49		2,10	41,45
Campinara Florestada (Ld)					
Campinarana Arborizada (La)					
Campinarana Arbustiva (Lb)					
Campinarana Gramíneo-Lenhosa (Lg)					
Savana Florestada (Sd)	35,49	9,94		2,10	37,02
Savana-Estépica Florestada (Td)	28,41	6,36	1,36	2,32	37,20
Savana-Estépica Arborizada (Ta)	16,17	4,16	1,36	2,10	52,85
Savana Arborizada (Sa)	10,20	18,04	0,43	2,10	37,02
Savana Parque (Sp, Spf, Sps)					
Savana-Estépica Parque (Tp, TPf, Tps, Tb, Tbs)	2,44	9,83		2,10	37,20
Savana Gramíneo-Lenhosa (Sg, Sgf, Sgs)	2,44	9,83		2,10	37,02
Savana-Estépica Gramíneo-Lenhosa (Tg, Tgf, Tgs)	13,63	2,76	1,36	2,10	49,36
Estepe Arborizada (Ea)					
Estepe Parque (Ep)					
Estepe Gramíneo Lenhosa (Eg)					
Formações Pioneiras (Pm, Pma, Pf, Pfm)					
Formações Pioneiras (P, Pa, Pap)	14,10	2,82	1,55	2,10	38,00
Formações Pioneiras Arbustivas (Pmb, Paa)					
Formações Pioneiras Herbáceas (Pmh, Pfh, Pah)					
Ecótonos (OMc, ONt, ONc, NMc, LOt, LOc, SOt, SOc, SMc, SNt, SNc, OPt, OPc, NPt, TOT, TOc, TNt, Tnc, EOt, EOc, ENT, ENc, STNt, EMc, SLt, SLc,TPt, SEt, SEc, STt, STc, EPt, Epc, SPt)	28,93	5,79		2,10	38,00
Refúgios Vegetacionais Arbustivos (rsb, rmb, rlb)					
Refúgios Vegetacionais Herbáceos (rsh, rmh, rlh)	14,10	2,82		2,10	38,00
Vegetação Secundária (Vs)	8,18	1,64		2,10	38,00

Analysis and processing of national data

Estimation and forecasting

Carbon is calculated based on the area of vegetation typology, by biome and by year.

There is a factor established for each typology, in each biome, that represents the carbon in this type of vegetation (tonees/ha). Considering the area of this typology in each year, it is possible to estimate carbon in Brazil.

To estimate values in tonnes/ha, the total carbon was divided by the forest area in the year.

Carbon in above-ground biomass (decimal comma separated and thousand dot separated)

Forest

Million tonnes	Amazônia	Caatinga	Cerrado	Atlantic Forest	Pampa	Pantanal	Naturally regenerating forest	Plantation Forest	Forest
1990	43.027,81	441,38	2.437,91	876,33	98,69	207,65	47.089,77	341,57	47.431,34
2000	41.191,77	404,76	2.131,71	789,70	94,81	200,80	44.813,56	350,60	45.164,16
2010	38.998,38	361,45	1.735,66	700,66	85,68	192,33	42.074,16	703,50	42.777,66
2015	38.592,28	355,25	1.664,16	657,43	81,14	188,23	41.538,49	954,02	42.492,51
2016	38.491,41	353,91	1.655,88	649,11	80,23	187,45	41.417,99	962,19	42.380,18
2017	38.400,16	352,57	1.646,46	640,87	79,32	186,66	41.306,04	944,59	42.250,63
2018	38.310,15	351,23	1.637,79	632,74	78,42	185,88	41.196,21	1.008,29	42.204,50
2019	38.225,48	349,88	1.628,94	624,68	77,53	185,09	41.091,61	1.042,87	42.134,49
2020	38.144,31	348,54	1.620,11	616,70	76,65	184,34	40.990,65	1.077,44	42.068,09

Carbon in below-ground biomass (decimal comma separated and thousand dot separated)

Forest

Million tonnes	Amazônia	Caatinga	Cerrado	Atlantic Forest	Pampa	Pantanal	Naturally regenerating forest	Plantation Forest	Forest
1990	10.185,46	151,65	665,38	176,81	19,77	103,81	11.199,07	68,31	11.267,38
2000	9.735,27	139,49	578,99	159,33	18,99	99,36	10.632,07	70,12	10.702,19
2010	9.190,76	125,13	465,61	141,36	17,15	93,92	9.940,01	140,70	10.080,71
2015	9.105,41	123,11	444,98	132,63	16,24	91,25	9.822,37	190,80	10.013,17
2016	9.083,21	122,67	442,57	130,95	16,06	90,72	9.795,46	192,44	9.987,90
2017	9.062,86	122,23	439,82	129,29	15,88	90,20	9.770,07	188,92	9.958,99
2018	9.042,13	121,79	437,29	127,65	15,70	89,68	9.744,56	201,66	9.946,22
2019	9.022,14	121,35	434,71	126,02	15,52	89,15	9.719,73	208,57	9.928,30
2020	9.002,53	120,91	432,13	124,41	15,34	88,64	9.695,32	215,49	9.910,81

Carbon in dead wood biomass (decimal comma separated and thousand dot separated)

Forest

Million tonnes	Amazônia	Caatinga	Cerrado	Atlantic Forest	Pampa	Pantanal	Naturally regenerating forest	Plantation Forest	Forest
1990	2.247,65	110,88	495,01	126,79	12,18	2,69	2.995,21	-	2.995,21
2000	2.151,93	102,45	435,56	114,54	11,95	2,57	2.819,00	-	2.819,00
2010	2.045,51	92,56	365,71	101,83	10,75	2,41	2.618,77	-	2.618,77
2015	2.018,14	91,20	351,81	95,71	10,16	2,34	2.569,36	-	2.569,36

2016	2.011,92	90,91	350,16	94,54	10,04	2,32	2.559,89	-	2.559,89
2017	2.006,44	90,61	348,35	93,38	9,92	2,31	2.551,01	-	2.551,01
2018	2.001,38	90,31	346,64	92,24	9,80	2,29	2.542,67	-	2.542,67
2019	1.996,89	90,02	344,92	91,11	9,69	2,28	2.534,90	-	2.534,90
2020	1.992,82	89,72	343,19	89,99	9,57	2,26	2.527,55	-	2.527,55

Carbon in litter (decimal comma separated and thousand dot separated)

Forest

Million tonnes	Amazônia	Caatinga	Cerrado	Atlantic Forest	Pampa	Pantanal	Naturally regenerating forest	Plantation Forest	Forest
1990	763,80	94,74	246,02	68,88	6,37	13,95	1.193,77	78,28	1.272,04
2000	726,56	87,56	210,38	62,54	5,78	13,36	1.106,18	80,35	1.186,53
2010	683,13	79,11	165,05	55,96	5,18	12,62	1.001,05	161,22	1.162,27
2015	677,50	77,96	156,01	52,78	4,88	12,25	981,38	218,63	1.200,01
2016	675,97	77,71	154,91	52,17	4,82	12,18	977,76	220,51	1.198,27
2017	674,56	77,45	153,68	51,57	4,76	12,11	974,13	216,47	1.190,60
2018	673,07	77,20	152,54	50,97	4,70	12,04	970,52	231,07	1.201,59
2019	671,60	76,95	151,37	50,38	4,64	11,97	966,92	239,00	1.205,91
2020	670,14	76,69	150,21	49,80	4,59	11,90	963,32	246,92	1.210,24

Soli carbon (decimal comma separated and thousand dot separated)

Forest

Million tonnes	Amazônia	Caatinga	Cerrado	Atlantic Forest	Pampa	Pantanal	Naturally regenerating forest	Plantation Forest	Forest
1990	17.182,07	1.208,06	4.316,49	1.345,44	164,35	249,90	24.466,31	162,50	24.628,81
2000	16.377,91	1.114,97	3.690,50	1.213,10	148,62	239,60	22.784,70	166,80	22.951,50
2010	15.428,31	1.005,22	2.900,50	1.076,38	132,78	226,50	20.769,67	334,68	21.104,35
2015	15.303,99	989,96	2.741,72	1.010,25	124,91	220,10	20.390,92	453,87	20.844,79
2016	15.270,23	986,62	2.722,42	997,57	123,33	218,86	20.319,02	457,75	20.776,78
2017	15.238,86	983,28	2.700,78	985,00	121,76	217,62	20.247,30	449,38	20.696,68
2018	15.205,90	979,94	2.680,70	972,58	120,19	216,38	20.175,70	479,69	20.655,39
2019	15.173,33	976,60	2.660,25	960,30	118,63	215,14	20.104,26	496,14	20.600,39
2020	15.140,77	973,26	2.639,81	948,14	117,09	213,94	20.033,01	512,58	20.545,60

Reclassification into FRA 2020 categories

Reclassification is presented on 1a.

FRA categories	Forest carbon (tonnes/ha)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Carbon in above-ground biomass	80.54	81.95	83.62	84.33	84.41	84.49	84.57	84.64	84.71
Carbon in below-ground biomass	19.13	19.42	19.71	19.87	19.89	19.91	19.93	19.94	19.96
Carbon in dead wood	5.09	5.12	5.12	5.10	5.10	5.10	5.10	5.09	5.09
Carbon in litter	2.16	2.15	2.27	2.38	2.39	2.38	2.41	2.42	2.44
Soil carbon	41.82	41.65	41.25	41.38	41.38	41.38	41.39	41.38	41.37

Soil depth (cm) used for soil carbon estimates	
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Comments

Values for Above-ground Carbon and Below-ground Carbon for all Biome except Pantanal was obtained by NFI data the other Values are going to be updated with data from National Forest Inventory, for these factores used from FRA 2015.

3 Forest designation and management

3a Designated management objective

National Data

Data sources + type of data source eg NFI, etc

#	References to sources of information	Variable(s)
1	Brazilian Foresta Service – SFB / Ministry of Environment – MMA, National Registry of Public Forest 2015 (<i>Cadastro Nacional de Florestas Públicas – CNFP</i>). Available at: http://www.florestal.gov.br/cadastro-nacional-de-florestas-publicas	Forests in Public Lands
2	Brazilian Foresta Service – SFB / Ministry of Environment – MMA, Rural Environmental Registry (<i>Cadastro Ambiental Rural</i>). Available at: http://www.florestal.gov.br/numeros-do-car (Boletim informativo, edição especial 4 anos)	Permanent Preservation Area

National classification and definitions

FRA Category	Brazilian classification
Production	Comprises National and State Forests and Planted Forest
Protection of soil and water	Corresponds to Permanent Preservation Areas with vegetation
Conservation of biodiversity	Includes forest designated to conservation in CNFP (conservation units)
Social Service	Includes forest designated to community use: indigenous land, settlements and reserves (RDS and RESEX)
Multiple use	
Other	Military area
Unknown	Includes non designated forest of CNFP

Original data

FRA 2020 categories	1990	2000	2010	2015	2020
Production (flonas, flotas e outras do CNFP)	33.383.415,83	33.161.459,54	36.422.121,32	38.963.136,82	40.041.090,21
Protection of soil and water (APP não geográfico)	9.805.218,00	9.805.218,00	9.805.218,00	9.805.218,00	9.805.218,00
Conservation of biodiversity (proteção integral do CNFP)	40.659.190,57	40.207.297,71	39.545.467,73	39.508.464,71	39.177.549,72
Social Services (uso comunitário do CNFP)	143.941.013,58	142.517.373,34	140.633.122,75	140.335.851,95	139.393.726,66
Multiple use (privada = toda floresta que não esta no CNFP)	288.020.471,44	254.379.329,83	216.498.505,91	207.387.347,78	201.488.118,83
Other (área militar)	2.788.633,22	2.710.072,37	2.593.749,45	2.588.454,89	2.530.293,43
None/unknown (não destinadas)	70.300.066,37	68.307.887,21	66.082.531,83	65.296.300,85	64.183.623,16
Total forest area	588.898.009,00	551.088.638,00	511.580.717,00	503.884.775,00	496.619.620,00

Analysis and processing of national data

Estimation and forecasting

The association of CNFP shapes with forest area provided the information required.

Non designated areas are considered as category none/unknow. So, the difference between areas that the designation is known and the total forest area is considered as multiple use.

Years 1990 and 2020 were linearly extrapolated from observed data from 2000, 2010 and 2015.

Reclassification into FRA 2020 categories

FRA Categories	National Categories
Production (flonas, flotas e outras do CNFP)	National and State Forests and other state or municipality Conservation units with main purpose of production in sustainable basis and Planted Forest
Protection of soil and water	Areas of Permanent Protection (APP), protection of river and soil (implementated by Law)
Conservation of biodiversity	Conservation Units with restricted use (correlated with IUCN Types I to IV)
Social Services	Comunitary Use including Indians Territories, Public Settlements, and Conservation Units of sustainable use that admit Community
Multiple use	All other areas that are not considered as public land
Other	Military Areas
None/unknown	Undesignated Public Land

Primary designated management objective

FRA 2020 categories	Forest area (1000 ha)				
	1990	2000	2010	2015	2020
Production (a)	33 383.42	33 161.46	36 422.12	38 963.14	40 041.09
Protection of soil and water (b)	9 805.22	9 805.22	9 805.22	9 805.22	9 805.22
Conservation of biodiversity (c)	40 659.19	40 207.30	39 545.47	39 508.46	39 177.55
Social Services (d)	143 941.01	142 517.37	140 633.12	140 335.85	139 393.73
Multiple use (e)	288 020.47	254 379.33	216 498.51	207 387.35	201 488.12
Other (specify in comments) (f)	2 788.63	2 710.07	2 593.75	2 588.45	2 530.29
None/unknown (g)	70 300.06	68 307.85	66 082.51	65 296.33	64 183.60
Total forest area	588 898.00	551 088.60	511 580.70	503 884.80	496 619.60

Total area with designated management objective

FRA 2020 categories	Forest area (1000 ha)				
	1990	2000	2010	2015	2020
Production					
Protection of soil and water					
Conservation of biodiversity					
Social Services					
Other (specify in comments)					

Comments

Other is Military forest areas.

3b Forest area within protected areas and forest area with long-term management plans

National Data

Data sources + type of data source eg NFI, etc

The data used was the forest extent estimated by forest map (item 1a) and the information of conservation units and indians territories.

National Register od Conservation Units, Minister of Environment - <http://www.mma.gov.br/areas-protegidas/cadastro-nacional-de-ucs>

Indians Territories, Indian National Fundation - <http://www.funai.gov.br/index.php/servicos/geoprocessamento>

National classification and definitions

Strictly Protected Conservation Uniots: National Park, Biological Reserve, Ecological Reserve, Wildlife Reserve, Natural Monument

Original data

Conservation Unit Name	Forest Area (ha) 1990	Forest Area (ha) 2000	Forest Area (ha) 2010	Forest Area (ha) 2015	Forest Area (ha) 2020	Manegement Plan Date
ESTAÇÃO ECOLÓGICA DA TERRA DO MEIO	3.356.876,61	3.356.593,32	3.312.746,05	3.311.671,19	3.306.662,32	2015
ESTAÇÃO ECOLÓGICA DE MARACÁ	97.294,45	97.294,45	95.630,46	95.630,46	95.630,46	2015
ESTAÇÃO ECOLÓGICA DE NIQUIÁ	213.038,45	213.038,45	213.012,52	213.012,52	213.012,52	2018
ESTAÇÃO ECOLÓGICA JUAMI-JAPURÁ	829.628,64	829.628,64	829.628,64	829.583,60	829.583,60	2000
ESTAÇÃO ECOLÓGICA RASO DA CATARINA	51.406,79	51.323,87	51.047,44	51.047,44	51.047,44	2008
ESTACAO ECOLOGICA SERRA GERAL DO TOCANTINS	136.720,28	136.714,31	136.681,93	136.624,71	136.612,68	2001
FLORESTA NACIONAL ALTAMIRA	725.402,91	725.373,05	720.594,91	708.961,25	706.749,09	2012
FLORESTA NACIONAL DE AMAPÁ	458.176,66	458.176,66	457.989,52	457.981,18	457.981,18	2014
FLORESTA NACIONAL DE CARAJÁS	378.389,78	375.919,72	374.687,16	374.068,10	373.769,94	2004
FLORESTA NACIONAL DE CAXIUANÃ	314.704,14	314.704,14	313.741,44	313.602,51	313.451,17	2013
FLORESTA NACIONAL DE HUMAITÁ	452.735,82	452.656,48	452.593,02	452.556,26	452.556,26	2018
FLORESTA NACIONAL DE ITAITUBA I	212.832,46	212.592,21	212.487,86	212.418,20	212.200,20	2014
FLORESTA NACIONAL DE ITAITUBA II	394.954,90	394.291,04	390.148,04	387.836,54	384.563,76	2014
FLORESTA NACIONAL DE JACUNDÁ	219.767,65	219.753,08	216.205,69	216.166,04	216.120,93	2011
FLORESTA NACIONAL DE MACAUÃ	176.325,20	176.261,42	176.129,89	176.084,00	176.054,26	2016
FLORESTA NACIONAL DE MAPIÁ-INAUINÍ	368.716,85	368.536,80	368.406,70	368.389,18	368.373,40	2009
FLORESTA NACIONAL DE PAU-ROSA	977.471,63	975.838,31	975.462,95	975.398,67	975.369,51	2018
FLORESTA NACIONAL DE PURUS	254.927,59	254.499,26	253.619,62	253.453,92	253.333,21	2009
FLORESTA NACIONAL DE SÃO FRANCISCO	21.094,47	21.094,47	21.029,74	21.029,74	21.012,26	2016
FLORESTA NACIONAL DE SARACÁ-TAQUERA	430.332,10	427.018,91	420.596,77	418.569,68	416.827,41	2002
FLORESTA NACIONAL DE TAPAJÓS	515.714,06	506.799,38	503.369,91	503.227,68	503.169,42	2005
FLORESTA NACIONAL DE TAPIRAPÉ-AQUIRI	196.389,82	195.882,63	194.650,50	194.130,94	193.365,59	2006

FLORESTA NACIONAL DE TEFÉ	856.634,45	854.084,33	849.876,42	848.968,14	847.569,24	2016
FLORESTA NACIONAL DO AMANÁ	680.334,23	680.158,67	678.929,01	677.861,70	675.189,25	2010
FLORESTA NACIONAL DO CREPORI	739.108,14	738.715,44	737.418,60	737.287,21	736.261,31	2006
FLORESTA NACIONAL DO JAMANXIM	1.288.139,31	1.278.005,60	1.166.360,40	1.141.085,50	1.115.275,31	2006
FLORESTA NACIONAL DO JAMARI	214.736,06	213.704,21	212.692,25	212.685,57	212.646,98	2005
FLORESTA NACIONAL DO TRAIRÃO	257.420,16	257.417,16	254.350,16	254.223,58	254.011,03	2011
PARQUE NACIONAL CAVERNAS DO PERUAÇU	55.317,09	54.335,19	52.823,77	52.363,22	52.191,51	2005
PARQUE NACIONAL DA AMAZÔNIA	1.066.204,38	1.065.327,84	1.061.956,49	1.061.494,25	1.060.990,55	1988
PARQUE NACIONAL DA CHAPADA DIAMANTINA	14.407,80	14.338,35	14.263,14	14.232,84	14.197,87	2007
PARQUE NACIONAL DA CHAPADA DOS VEADEIROS	72.931,23	72.722,18	71.398,10	71.308,47	71.185,53	1998
PARQUE NACIONAL DA SERRA DA BOCAINA	98.729,57	97.152,21	94.493,45	93.164,06	91.834,66	2002
PARQUE NACIONAL DA SERRA DA BODOQUENA	74.194,74	72.998,30	72.088,08	71.944,98	71.938,39	2013
PARQUE NACIONAL DA SERRA DA CANASTRA	494,89	416,21	325,34	325,34	325,34	1981
PARQUE NACIONAL DA SERRA DA CUTIA	258.699,71	258.699,71	258.690,74	258.591,05	258.591,05	2008
PARQUE NACIONAL DA SERRA DO DIVISOR	822.441,47	816.663,93	811.840,36	810.828,38	810.405,46	1989
PARQUE NACIONAL DA SERRA DO PARDO	395.315,76	395.103,59	369.504,31	369.436,98	369.392,10	2015
PARQUE NACIONAL DAS EMAS	22.702,60	22.702,60	22.701,66	22.701,66	22.701,66	2005
PARQUE NACIONAL DAS SEMPRE VIVAS	10.292,33	10.143,43	10.028,46	9.993,60	9.993,60	2016
PARQUE NACIONAL DE ANAVILHANAS	199.076,91	199.047,55	198.982,01	198.982,01	198.982,01	2002
PARQUE NACIONAL DE PACAÁS NOVOS	651.447,59	651.045,90	650.596,29	650.596,29	649.872,89	1984
PARQUE NACIONAL DO ARAGUAIA	193.556,06	193.522,72	191.700,18	190.384,14	190.384,14	1981
PARQUE NACIONAL DO CABO ORANGE	181.082,91	181.082,91	180.312,33	180.234,72	180.234,72	2011
PARQUE NACIONAL DO IGUAÇU	161.728,35	161.719,78	161.711,21	161.706,93	161.702,64	1981
PARQUE NACIONAL DO JAÚ	2.306.902,41	2.304.288,48	2.303.729,78	2.303.624,00	2.303.512,82	1997
PARQUE NACIONAL DO JURUENA	1.917.283,63	1.916.995,57	1.909.532,08	1.909.396,99	1.909.351,55	2011
PARQUE NACIONAL DO MONTE RORAIMA	99.556,64	99.556,64	99.406,36	99.406,36	99.406,36	2000
PARQUE NACIONAL DO PANTANAL MATOGROSSENSE	73.857,97	73.857,97	73.857,97	73.857,97	73.857,97	2004
PARQUE NACIONAL DOS CAMPOS AMAZÔNICOS	773.880,05	773.846,41	769.555,44	769.106,95	769.039,16	2011
PARQUE NACIONAL DOS LENÇÓIS MARANHENSES	29.449,66	29.005,41	27.725,11	27.483,88	27.418,73	2003
PARQUE NACIONAL GRANDE SERTÃO VEREDAS	182.103,13	181.889,85	180.416,36	180.345,94	180.312,86	2003
PARQUE NACIONAL MAPINGUARI	1.592.250,60	1.591.962,07	1.583.267,62	1.581.288,08	1.580.351,85	2018
PARQUE NACIONAL MONTANHAS DO TUMUCUMAQUE	3.823.332,38	3.823.332,38	3.819.318,80	3.819.312,14	3.819.290,57	2010

PARQUE NACIONAL NASCENTES DO LAGO JARI	807.964,13	807.885,98	806.659,14	806.648,42	806.648,42	2018
PARQUE NACIONAL SERRA DA MOCIDADE	307.923,13	307.923,13	307.914,58	307.914,58	307.914,58	2018
PARQUE NACIONAL SERRA DAS CONFUSÕES	822.619,13	822.165,13	820.835,33	820.689,73	820.588,04	2004
PARQUE NACIONAL VIRUÁ	135.557,68	135.556,96	135.540,33	135.540,33	135.540,33	2014
RESERVA BIOLÓGICA DO ABUFARI	187.744,17	187.681,40	187.599,16	187.558,98	187.531,92	2018
RESERVA BIOLÓGICA DO GUAPORÉ	479.570,44	479.200,22	478.700,26	478.689,29	478.689,29	1984
RESERVA BIOLÓGICA DO GURUPI	271.087,00	226.254,61	195.183,94	191.879,81	189.096,32	2002
RESERVA BIOLÓGICA DO JARU	345.492,89	344.604,15	335.729,12	335.678,03	335.678,03	1984
RESERVA BIOLÓGICA DO RIO TROMBETAS	377.963,86	377.845,17	377.771,64	377.735,31	377.700,36	1982
RESERVA BIOLÓGICA DO TAPIRAPÉ	98.783,53	98.651,05	98.616,33	98.614,72	98.614,72	1989
RESERVA BIOLÓGICA DO UATUMÃ	903.011,33	903.011,33	902.956,18	902.955,35	902.955,35	2002
RESERVA BIOLÓGICA NASCENTES SERRA DO CACHIMBO	295.047,28	290.579,80	269.980,21	267.135,11	263.313,24	2009
RESERVA EXTRATIVISTA ARAPIXI	129.476,60	129.132,71	128.301,95	128.162,00	127.737,37	2006
RESERVA EXTRATIVISTA BAIXO JURUÁ	173.927,53	172.720,81	172.079,10	171.955,68	171.886,75	2009
RESERVA EXTRATIVISTA BARREIRO DAS ANTAS	101.827,49	101.827,49	101.816,20	101.816,20	101.816,20	2015
RESERVA EXTRATIVISTA CHICO MENDES	925.446,48	907.966,06	888.464,00	879.431,04	865.676,38	2008
RESERVA EXTRATIVISTA DO CAZUMBÁ-IRACEMA	754.933,52	751.883,54	747.991,27	746.945,37	745.771,86	2008
RESERVA EXTRATIVISTA DO LAGO DO CAPANÃ GRANDE	284.415,33	283.841,43	284.467,59	284.421,45	284.404,44	2013
RESERVA EXTRATIVISTA DO RIO JUTAÍ	266.952,32	266.385,35	265.610,67	265.458,48	265.367,60	2002
RESERVA EXTRATIVISTA DO RIO UNINI	824.163,16	823.336,07	822.998,59	822.867,83	822.841,17	2014
RESERVA EXTRATIVISTA MÉDIO JURUÁ	283.359,05	280.689,28	280.035,29	279.962,49	279.829,77	1997
RESERVA EXTRATIVISTA RIO IRIRI	369.632,77	369.528,62	366.649,68	366.611,83	366.611,83	2011
RESERVA EXTRATIVISTA RIO OURO PRETO	198.572,63	190.565,28	183.541,18	182.330,20	181.676,56	2013
RESERVA EXTRATIVISTA RIO XINGU	270.114,54	270.049,95	266.871,29	266.819,39	266.784,81	2008
RESERVA EXTRATIVISTA RIOZINHO DO ANFRÍSIO	735.877,17	735.793,49	733.729,31	732.998,48	732.290,22	2011

Analysis and processing of national data

Estimation and forecasting

The information was obtained by geoprocessing overlaying Conservation Unit with forest map, and selecting the Conservation Units that have Management Plans on the the year specified bellow, for the years 2018, 2019 and 2020 linear projection using the years 2015 to 2017.

Reclassification into FRA 2020 categories

Criteria	IUCN Code	IUCN Category	National Classification
Included	Ia	Strict Nature Reserve	Reserva Biológica

Included	Ib	Wilderness Area	Estação Ecológica
Included	II	National Park	Parques Nacionais
Included	III	Natural Monument or Feature	Monumento Natural
Included	IV	Habitat/Species Management Area	Refugio da Vida Silvestre
Excluded	V	Protected Landscape/Seascape/Area	APA
Excluded	VI	Protected Area with sustainable use of natural resources	RPPNFloresta Nacional, Reserva Extrativista, Reserva de Desenvolvimento Sustentável, Reserva de Fauna, Área de Relevante Interesse Ecológico and Reserva Particular do Patrimônio Natural

FRA categories	Area (1000 ha)								
	1990	2000	2010	2015	2016	2017	2018	2019	2020
Forest area within protected areas	83 651.37	107 148.13	140 002.64	143 329.05	145 619.35	145 679.65	147 226.61	148 401.91	149 577.21
Forest area with long-term forest management plan	4 447.18	9 246.19	23 684.96	31 643.59	36 630.52	36 630.52	41 283.99	42 835.14	45 161.88
...of which in protected areas	4 447.18	9 246.19	23 684.96	31 643.59	36 630.52	36 630.52	41 283.99	42 835.14	45 161.88

Comments

4 Forest ownership and management rights

4a Forest ownership

National Data

Data sources + type of data source eg NFI, etc

#	References to sources of information	Variable(s)
1	Brazilian Floresta Service – SFB / Ministry of Environment – MMA, National Registry of Public Forest 2015 (<i>Cadastro Nacional de Florestas Públicas – CNFP</i>). Available at: http://www.florestal.gov.br/cadastro-nacional-de-florestas-publicas	Forests in Public Lands
2	National Institute of Colonization and Agrarian Reform. Available at: http://acervofundiario.incra.gov.br/acervo/acv.php > Download Dados	Private land owned by local, tribal and indigenous communities (Quilombolas)

National classification and definitions

FRA Category	Brazilian classification
Public ownership	Includes all public forest registered in National Registry of Public Forest
Private ownership	Includes all forest that is not considered public
Owned by local, tribal and indigenous land	Private land owned by quilombola families.

Original data

	2000	2010	2015
Forest registered in CNFP	288172370.70	282357893.57	281102387.87
Quilombola land	1972841.59	1588092.07	1579447.92

Analysis and processing of national data

Estimation and forecasting

The association of CNFP shapes and quilombola shape with forest area provided the information required.

The area of forest in public and private land were linear projected using the data of the years 2000, 2010 and 2015.

Reclassification into FRA 2020 categories

Indians Territories are considered as Public Land in Brazil.

The Private land was considered as all the land no assigned as public land.

For tribal or indigenous on private land there is a category of Quilombos. Quilombo is the name given in Brazil to the places of refuge of the escaped slaves during the colonial and imperial period. In these places, slaves began to live in freedom, creating new social relations. After recognition of these traditional communities, the government gives the collective domain of the land to them.

FRA categories	Forest area (1000 ha)			
	1990	2000	2010	2015
Private ownership (a)	278 441.04	262 916.27	229 222.82	222 782.39
...of which owned by individuals				
...of which owned by private business entities and institutions				
...of which owned by local, tribal and indigenous communities		1 972.84	1 588.09	1 579.45
Public ownership (b)	290 765.02	288 172.33	282 357.88	281 102.41
Unknown/other (specify in comments) (c)	19 691.94	0.00	0.00	0.00
Total forest area	588 898.00	551 088.60	511 580.70	503 884.80

Comments

In Brazil, all indigenous land are considered as public land.

4b Holder of management rights of public forests

National Data

Data sources + type of data source eg NFI, etc

#	References to sources of information	Variable(s)
1	Brazilian Foresta Service – SFB / Ministry of Environment – MMA, National Registry of Public Forest 2015 (<i>Cadastro Nacional de Florestas Públicas – CNFP</i>). Available at: http://www.florestal.gov.br/cadastro-nacional-de-florestas-publicas	Forests in Public Lands
2	National Institute of Colonization and Agrarian Reform. Available at: http://acervofundiario.incra.gov.br/acervo/acv.php > Download Dados	Private land owned by local, tribal and indigenous communities (Quilombolas)

National classification and definitions

-

Original data

-

Analysis and processing of national data

Estimation and forecasting

-

Reclassification into FRA 2020 categories

-

FRA categories	Forest area (1000 ha)			
	1990	2000	2010	2015
Public Administration (a)	290 765.02	288 172.33	282 357.88	281 102.41
Individuals (b)	0.00	0.00	0.00	0.00
Private business entities and institutions (c)	0.00	0.00	0.00	0.00
Local, tribal and indigenous communities (d)	0.00	0.00	0.00	0.00
Unknown/other (specify in comments) (e)	0.00	0.00	0.00	0.00
Total public ownership	290 765.02	288 172.33	282 357.88	281 102.41

Comments

5 Forest disturbances

5a Disturbances

National Data

Data sources + type of data source eg NFI, etc

-

National classification and definitions

-

Original data

-

Analysis and processing of national data

Estimation and forecasting

-

Reclassification into FRA 2020 categories

-

FRA categories	Area (1000 ha)																	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Insects (a)																		
Diseases (b)																		
Severe weather events (c)																		
Other (specify in comments) (d)																		
Total (a+b+c+d)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total forest area	551 088.60	-	-	-	-	-	-	-	-	-	511 580.70	-	-	-	-	503 884.80	502 082.10	500 091.60

Comments

There are not significant area of disturbance caused by (insects, diseases or severe weather events) related to the total area of Forest in Brazil.

5b Area affected by fire

National Data

Data sources + type of data source eg NFI, etc

#	References to sources of information	Variable(s)
1	National Institute for Space Research (INPE), <i>Programa Queimadas</i> . Available at http://www.inpe.br/queimadas	Area of burn scars, for month, available from 2000 to 2017.

National classification and definitions

The monitoring system uses images from low (0.3 to 1 km) and average (10 to 50 m) spatial resolution to automatically and automatically estimate the surface burned in the country, generating digital maps, time comparisons, and management support products and evaluation of the impact of fire use on vegetation.

Original data

Area of burn scars, for month, available from 2000 to 2017:

Year	2000	2001	2002	2003	2004	2005
Total burned area	5939673.83	13942580.13	51062691.10	49212668.35	51116518.01	54730945.51
Year	2006	2007	2008	2009	2010	2011
Total burned area	30993817.38	62726672.40	34586365.19	23696228.55	59262723.70	27474904.38
Year	2012	2013	2014	2015	2016	2017
Total burned area	49153427.87	25663151.82	43140622.87	73017072.22	64913192.95	71739788.34

Analysis and processing of national data

Estimation and forecasting

Shapes with burn scars are available for years 2000 to 2017, giving the total burned area in Brazil, for month. The association of this shapes with forest area provided information of foret area affected by fire.

Reclassification into FRA 2020 categories

The original data was not reclassified.

FRA categories	Area (1000 ha)																	
	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Total land area affected by fire	5 939.67	13 942.58	51 062.69	49 212.67	51 116.52	54 730.95	30 993.82	62 726.67	34 586.36	23 696.23	59 262.72	27 474.90	49 153.43	25 663.15	43 140.62	73 017.07	64 913.19	71 739.79
...of which on forest	3 929.90	7 048.07	30 541.69	31 068.75	27 999.57	31 696.23	16 667.54	36 023.44	14 959.58	8 857.41	27 417.73	11 133.62	23 859.54	10 636.04	18 089.35	32 998.07	26 605.07	29 609.36

Comments

5c Degraded forest

Does your country monitor area of degraded forest		Yes
If "yes"	What is the national definition of "Degraded forest"?	Process of changing forest structure and/or composition, resulting from anthropogenic action, which leads to the continuous reduction of its capacity to provide ecosystem goods and services.
	Describe the monitoring process and results	<p>Considering Amazon biome, there are in Brazil two system of degraded forest monitoring:</p> <p>DETER: the system verifies the change of forest cover with almost daily frequency in the Legal Amazon. The changes in forest cover that DETER maps are forest clear cutting, forest degradation preparatory to deforestation and forest fire scars. DETER maps may also include areas with logging activities. The information produced is fundamental to the effectiveness of control actions that combat deforestation in the region, guiding its planning. Its historical series began in 2004.</p> <p>DEGRAD: developed to track forest degradation in the Legal Amazon. The system, which produced data for the period between 2007 and 2013, had the objective of mapping areas in the process of deforestation where the forest cover had not yet been totally removed. In the coming years, monitoring of degradation in the Legal Amazon will focus on fire degradation, based on the information produced by the Burning and Fire Monitoring Program.</p>

Comments

The concept and monitoring of degraded forest refers only for Amazon biome. For other biomes, it is still under discussion.

6 Forest policy and legislation

6a Policies, Legislation and national platform for stakeholder participation in forest policy

National Data

Data sources + type of data source eg NFI, etc

#	References to sources of information	Variable(s)
1	Brazilian government portal. 2013. Available at: http://www.planalto.gov.br/ .	Federal Environmental Legislation
2	Institute of Environmental Protection of the Amazonas state portal. 2013. Available at: http://www.ipaam.am.gov.br/ .	Environmental Legislation of Amazonas state
3	Department of Environment of Bahia state portal. 2013. Available at: http://www.meioambiente.ba.gov.br/ .	Environmental Legislation of Bahia state
4	Department of Environment and Sustainable Development of Minas Gerais state portal. 2013. Available at: http://www.siam.mg.gov.br/ .	Environmental Legislation of Minas Gerais state
5	Department of Environmental Development of Rondônia state portal. 2013. Available at: http://www.sedam.ro.gov.br/ .	Environmental Legislation of Rondônia state
6	Secretary of Urban Habitation, Regularization and Development portal. 2013. Available at: http://www.sedhab.df.gov.br/ .	Environmental Legislation of Federal District
7	Brazilian Environmental and Renewable Natural Resources Institute. Directorate of Sustainable Use of Biodiversity and Forests - IBAMA /DBFLO. 2007. <i>Normas Florestais Federais para a Amazônia</i> .	Federal Forest Norms for Amazon
8	Mendes e Forster Júnior, 2002. <i>Manual de redação da Presidência da República</i> . Disponível em http://www4.planalto.gov.br/centrodeestudos/assuntos/manual-de-redacao-da-presidencia-da-republica/manual-de-redacao.pdf	Concept of Law, decree and ordinance
9	Acquaviva, M. C. 1999. <i>Dicionário Acadêmico de Direito</i> .	Concept of normative instruction
10	Ministry of Environment, 2013. Available at: http://www.mma.gov.br .	Federal Environmental Legislation
11	Brazilian Legislation portal, 2013. Available at: http://www.diariodasleis.com.br .	Brazilian Legislation
12	Chico Mendes Institute for Biodiversity Conservation portal, 2013. Available at: http://www.icmbio.gov.br/ .	Federal Legislation about Community Sustainable Forest Management Plan in Conservation Units
13	Brazilian Environmental and Renewable Natural Resources Institute – IBAMA. Sistema Nacional de Controle da Origem dos Produtos Florestais – Sinaflor. Available at: http://www.ibama.gov.br/flora-e-madeira/sinaflor/sobre-o-sinaflor	Traceability system for wood products
14	Brazilian Forest Service – SFB. Sistema de Cadeia de Custódia – SCC (Chain of Custody System). Available at: http://www.florestal.gov.br/monitoramento	Traceability system for wood products

National classification and definitions

The classification used follows the definition provided from “Terms and Definitions”.

FRA Category	Brazilian classification
Policies supporting SFM	Policies or strategies that explicitly encourage sustainable forest management.
Legislations and/or regulations supporting SFM	Legislation and regulations that govern and guide sustainable forest management, operations and use.
Platform that promotes or allows for stakeholder participation in forest policy development	A recognized procedure that a broad range of stakeholders can use to provide opinions, suggestions, analysis, recommendations and other input into the development of national forest policy.
Traceability system for wood products	A system that provides the ability to trace the origin, location and movement of wood products by means of recorded identifications. This involves two main aspects: (1) identification of the product by marking, and (2) the recording of data on movement and location of the product all the way along the production, processing and distribution chain.
Sustainable Forest Management (SFM)	A dynamic and evolving concept, that is intended to maintain and enhance the economic, social and environmental value of all types of forests, for the benefit of present and future generations.

National class	Definition
Law	Primary normative act of practical effects. Contains, as a rule, general and abstract rules [8].
Decree	Administrative acts within the exclusive jurisdiction of the Chief Executive, intended to provide general or individual cases, provided abstractly, express or implied in law [8].
Ordinance	Instrument by which Ministers or other authorities expedite instructions for the organization and functioning of service and practice other acts of their jurisdiction [8].
Normative Instruction	Administrative act expressed by written order expedite by the Head of Department or Minister of State to their subordinates, providing disciplinary rules that should be adopted in the operation of public service reworked or newly formed. Also considered as a rule expedited to interpret a law [9].
Resolution	
Execution Rule	

Original data

#	Legislation	Comments
	Law n. 12,651, of 25th May 2012	Institutes the Forest Code. Provides on protection on the vegetation, Permanent Preservation Areas, Legal Reserve; exploration of forests and succeeding formations, the supply of forest raw materials, control the origin of forest products and the prevention and control of forest fires, and provides economic and financial instruments for the achievement of its objectives, and makes other provisions [1].
	Complementary Law 140/2011	Establishes norms for the cooperation between the Union, the States, the Federal District and the Municipalities in the administrative actions arising from the exercise of the common competence regarding the protection of the remarkable natural landscapes, the protection of the environment, the fight against pollution in any of its forms and the preservation of forests, fauna and flora.
	Law 11.428/2006	Provides on the use and protection of the native vegetation of the Atlantic Forest Biome, and makes other provisions.
	Law n. 11,284, of 2nd March 2006	Provides for public forest management for sustainable production; creates the Brazilian Forest Service (SFB) in the structure of the Brazilian Ministry of the Environment; establishes the National Forest Development Fund (FNDF), and makes other provisions [1].
	Law 10.650/2003	Provides on public access to data and information in the institutes and entities that are members of Sisnama.
	Law n. 9,985, of 18th July 2000	Institutes the National System of Conservation Units (SNUC), establishes criteria and norms for the creation, implementation, and management of protected areas and makes other provisions [1].
	Law n. 7,797, of 10th July 1989	Institutes the National Fund for the Environment, in order to develop projects aimed at the rational and sustainable use of natural resources, including the maintenance, improvement or restoration of environmental quality in order to enhance the quality of life of the population [1].
	Law 6.938/1981	Provides on the National Environmental Policy, its purposes and mechanisms of formulation and application, and other measures. Art. 12.
	Decree 8.972/2017	Institutes the National Policy for the Recovery of Native Vegetation.
	Decree 8.375/2014	Defines the Agricultural Policy for Planted Forests and establishes the principles and objectives of the Planted Forest Policy for the production, processing and marketing of products, by-products, services and inputs for planted forests. Planted forests are considered to be forests composed predominantly of trees that result from sowing or planting, grown with economic focus and commercial purposes.
	Decree n. 6,874, of 5 th June 2009	Institutes Federal Program for Community and Family Forest Management – PMCF, established under the Ministry of Environment and Ministry of Agrarian Development, whose goal is to organize management actions and fostering sustainable management in forests that are subject to use by farmers, settlers reform land and the traditional peoples and communities [1].
	Decree n. 6,527, of 1 st August 2008	Provides for the establishment of the Amazon Fund by National Bank for Economic and Social Economic Development – BNDES [1].
	Decree n. 6,063, of 20 th March 2007	Regulates, at the federal level, provisions of Law n. 11,284, of 2 nd March 2006, which provides on public forest management for sustainable production, and makes other provisions [1].
	Decree n. 5,975, of 30 th November 2006	Regulates Articles of Law n. 4,771, of 15 th September 1965, of Law n. 6,938, of 31 st August 1981, of Law n. 10,650, of 16 th April 2003, alters and adds provisions to Decrees ns. 3,179, of 21 st September 1999, and 3,420, of 20 th April 2000, and makes other provisions. Provides on observations for the exploration, suppression and clear-cutting of forests and succeeding formations; Sustainable Forest Management Plan, Forest Replanting and License to transport forest by products [1].
	Decree n. 4,340, of	Regulates Articles of Law n. 9,985, of 18 th July 2000, which provides on the National System of Conservation Units (SNUC), and makes other provisions. Provides on the creation of Protected Areas, Management Plan, advisory,

22 th August 2002	management and authorization to explore goods and services [1].
Decree n. 3,420, of 20 th April 2000	Provides for the creation of the National Forests Program – PNF, and makes other provisions [1].
Ordinance 103/2006	Implements the Document of Forest Origin - DOF, as a new system of control of origin of forest products.
Resolution SFB 24/2014	Establishes technical guidelines for the elaboration and presentation of the Forest Protection Plan for areas under federal forest concession.
Resolution SFB 21/2013	Regulates the procedures for the use, in improvements, of woods coming from Forest Management in Public Forests of the Union under concession, and the payment of the amounts due to the Brazilian Forest Service.
Resolution SFB 6/2010	Establishes the Chain of Custody System for Forest Concessions with the objective of controlling the production and control of the exit of the exploited timber products exploited in the areas under a forest concession regime, in the Public Forests of the Union.
Resolution MMA n. 406, of 2 nd February 2009	Establishes technical parameters to be adopted in preparation, presentation, technical evaluation and implementation of Sustainable Forest Management Plan – PMFS with timber purpose, for native forests and their forms of succession in the Amazon [10].
Resolution CONAMA n. 379, of 19 th October 2006	Creates and regulates the database on forest management at the National Environmental System – SISNAMA level [1].
Resolution n. 378, of 19 th October 2006	Defines undertakings which may potentially cause national or regional environmental impacts and makes other provisions. Subjects forest exploration to an IBAMA's authorization [1].
Normative Instruction 21/2014	Establishes the National System to Control the Origin of Wood Products / Sistema Nacional de Controle da Origem dos Produtos Florestais - Sinaflor.
Normative Instruction n. 16, of 4 th August 2011	Regulates the guidelines and administrative procedures for the approval of the Community Sustainable Forest Management Plan – PMFS for exploration timber resources within Extractive Reserve, Sustainable Development Reserve and National Forest [12].
Normative Instruction 04/2009	Provides technical procedures for the use of vegetation of the Legal Reserve under a regime of sustainable forest management, and other measures.
Normative Instruction n. 1, of 25 th June 2009	Provides for technical procedures for preparation, presentation, execution and technical evaluation of Sustainable Forest Management Plans – PMFS for native forests and their forms of succession in the Caatinga, and makes other provisions [11].
Normative Instruction n. 6, of 15 th December 2006	Provides on forest replanting and forest raw-material consumption, and makes other provisions [7].
Normative Instruction n. 5, of 11 th December 2006	Provides on technical procedures for the formulation, presentation, carrying-out, and technical evaluation of Sustainable Forest Management Plans – PMFS in primitive forests and succeeding forms thereof in the legally-defined Brazilian Amazon region (Legal Amazon), and makes other provisions [7].
Normative Instruction n. 4, of 11 th December 2006	Provides on the Previous Authorization for Technical Analysis of Sustainable Forest Management Plans – APAT, and makes other provisions [7].

	Normative Instruction n. 112, of 21 th August 2006	Provides on the Document of Forest Origin – DOF and Declaration of Forest Products Supply, Forest Products Transport Authorization – ATPF [7].
	Normative Instruction n. 93, of 3 th March 2006	Establishes technical norms for the presentation of maps and geo-referenced information about the localization of Legal Reserves and areas under forest management and respective subdivisions. Sustainable Forest Management Plans and authorization requests for alternative land use in the several Brazilian biomes, to be applied for at IBAMA and submitted to technical and juridical analysis, shall be accompanied by geo-referenced maps and forms prepared in accordance with technical norms and requirements set forth by this Normative Instruction [7].
	Normative Instruction n. 7, of 22 th August 2003	Procedures related to the activities of the Sustainable Forest Management Plan which consider the exploration of mahogany (<i>Swietenia macrophylla</i> King) [7].
	Execution Rule 01/2010	Establishes, for SFM in public forest, the System of Monitoring and Tracing of Forest Products Transport Vehicles (SMR), in areas under federal forest concession, for the purposes of monitoring, controlling and managing operations of transporting forest products from a forest concession federal to the points of first processing, based on article 53, sections II and VIII of Law No. 11.284, of March 2, 2006.
	Execution Rule n. 2, of 26 th April 2007	Institutes the Simplified Manual for Analysis of the Timber Forest Management Plan in Amazon in order to subsidize the analysis of the Sustainable Forest Management Plans – PMFS [7].
	Execution Rule n. 1, of 24 th April 2007	Institutes technical guidelines for development of Sustainable Forest Management Plans – PMFS [7].
	Execution Rule n. 1, of 18 th December 2006	Institutes the methodology and its model inspection report in order to subsidize the analysis of the Sustainable Forest Management Plans – PMFS [7].
	Normative Instruction n. 5, of 26 th February 2008	Provides for technical procedures for the preparation, presentation, implementation and technical evaluation of Sustainable Forest Management Plans - PMFS in native forests and succeeding formations in the state of Amazonas, and makes other provisions [2].
	Normative Instruction n. 2, of 11 th February 2008	Provides for technical procedures for the preparation, presentation, implementation and technical evaluation of Small Scale Sustainable Forest Management Plans - PMFSPE in native forests and succeeding formations, less than 500 hectares in the state of Amazonas, and makes other provisions [2].
	Law n. 10,431, of 20 th December 2006	Provides for Environmental and Biodiversity Protection Policy of the State of Bahia, and makes other provisions [3].
	Ordinance n. 29, of 10 th May 2005	Provides for guidelines for forest exploration, the forest management plan, the removal of native vegetation for changing the land use, special procedures for projects and activities within the Forests for the Future Program, the Forest Register of Rural Property - CFIR in the state of Bahia, and makes other provisions [3].
	Law n. 14,309, of 19 th June 2002	Provides for Environmental and Biodiversity Protection Policy of the State of Minas Gerais [4].
	Decree n. 43,710, of 8 th January 2004	Regulates Law n. 14,309, of June 19 th 2002 in the state of Minas Gerais [4].
	Decree n. 12,447, of 10 th October 2006	Institutes the Forest Management in the state of Rondônia, and makes other provisions [5].
	Law n. 3,031, of 18 th July 2002	Institutes the Forest Policy in the Federal District [6].
#	Policies	Comments
	Forest Concessions - Concessões florestais	The forest concession is one of the modalities for the management of public forests provided for in Law 11.284/2006, which allows the Union, states and municipalities, through a bidding process, to grant a legal

		<p>person the right to manage public forest in a sustainable manner and through payment to obtain products and services.</p> <p>The granted forest remains standing because the contracts only allow techniques of sustainable forest management. In this way, the area is used in a rotation system, which allows the continuous and sustainable production of wood. On average, four to six trees are removed per hectare and the same area will return after 25 to 35 years, allowing the growth of the remaining trees</p>
	National Forest Development Fund - Fundo Nacional de Desenvolvimento Florestal	<p>National Forest Development Fund (FNDF) has the mission of promoting the development of sustainable forestry activities in Brazil and promoting technological innovation in the sector.</p> <p>Priority areas for resource use:</p> <ul style="list-style-type: none"> a) research and technological development in forest management; b) technical assistance and forestry extension; c) recovery of degraded areas with native species; d) rational and sustainable economic exploitation of forest resources; e) control and monitoring of forest activities and deforestation; f) training in forest management and training of multiplier agents in forestry activities; g) environmental education; and h) protection of the environment and conservation of natural resources.
#	Platform	Comments
	National Forest Commission (CONAFLO)	<p>CONAFLO is the National Forest Commission, established by Decree 3,420/2000. The Commission provides guidelines on the implementation of the National Forests procedures and allows the joint participation of various interest groups in developing public policies for the forest sector.</p> <p>CONAFLO has the main role in the process of putting in practice the National Program of Forests and by now it is dealing with the review of the National Forest Code, the National Report of Genetic Forest Resources, the National Study of Brazilian Forest Sector and the inclusion of the subject "Forests" in the multiannual Brazilian plans.</p> <p>It is composed of 39 representatives distributed equally between the government (20) and civil society (19), including some federal government agencies and entities, state environmental agencies, civil society groups, forestry sectors, NGOs and educational and research institutions.</p>
	Commission on Public Forest Management (CGFLOP)	<p>The Commission on Public Forest Management (CGFLOP) is an advisory body of the Brazilian Forest Service which aims to advise, evaluate and propose guidelines for the management of public forests in Brazil, especially regarding the Annual Plan on Forest Concession (PAOF), which deals with identification, selection and description of public federal forests or potential areas for concession. Besides that, the CGFLOP deliberates about different subjects such as Community and Family Annual Plan of Forest Management, The National Forest Inventory, The National Register of Public Forests, National Forest Development Fund, studies about the promotion of forest planting and also the research carried out by the Laboratory of Forest Products.</p> <p>The CGFLOP, established by the Law 11,284/2006 and regulated by the Decree 5,795/2006, is composed of 24 representatives appointed by the holders of the respective agencies, groups, organizations and sectors involved in the process and designated by the Minister of State for the Environment.</p> <p>The Commission meets, ordinarily, at least twice a year and extraordinarily at any time when called by its chairman or by request of at least one third of its members.</p>
#	Traceability system	Comments
	National System to Control the Origin of Wood Products - Sistema Nacional de Controle da Origem dos Produtos Florestais - Sinaflor	System that integrates the control of the origin of wood, coal and other forest products or by-products, under the coordination, supervision and regulation of Ibama.
	Chain of Custody System - Sistema de Cadeia de Custódia - SCC	Set of procedures adopted for the tracking of timber forest products exploited in areas under forest concession, ranging from logging, sectioning and transportation of the logs until their transformation into the first processing unit, controlled through a computerized system.

Indicate the existence of	Boolean (Yes/No)	
	National	Sub-national
Policies supporting SFM	Yes	Yes
Legislations and regulations supporting SFM	Yes	Yes
Platform that promotes or allows for stakeholder participation in forest policy development	Yes	Yes
Traceability system(s) for wood products	Yes	Yes

Comments

Many policies supporting sustainable forest management are regulated by Brazilian environmental laws.

There are no specific local laws and policies, but municipalities follow the politics and legislation guidelines from state and country.

6b Area of permanent forest estate

National Data

Data sources + type of data source eg NFI, etc

#	References to sources of information	Variable(s)
1	Brazilian Foresta Service – SFB / Ministry of Environment – MMA, National Registry of Public Forest 2015 (<i>Cadastro Nacional de Florestas Públicas – CNFP</i>). Available at: http://www.florestal.gov.br/cadastro-nacional-de-florestas-publicas	Forests in Public Lands (designated areas)
2	Brazilian Foresta Service – SFB / Ministry of Environment – MMA, Rural EnvironmentalRegistry (<i>Cadastro Ambiental Rural</i>). Available at: http://www.florestal.gov.br/numeros-do-car (Boletim informativo, edição especial 4 anos)	Forest in Private Lands

National classification and definitions

FRA Category	Brazilian classification
Forest in Public Lands	Public lands covered with forest designated to be protected areas. Includes areas of community use, forest production, conservation and military.
Permanent Preservation Area	An area located within a rural property or possession, with the purpose of ensuring the sustainable economic use of the natural resources of the rural property, assisting the conservation and rehabilitation of ecological processes and promoting biodiversity conservation, as well as shelter and protection of wild fauna and flora.
Legal Reserve Areas	Areas protected by law covered or not by native vegetation, with the environmental function of preserving water resources, landscape, geological stability, biodiversity, the gene flow of fauna and flora, protect the soil and to ensure the well-being of human populations.

Original data

According to the National Registry of Public Forest of 2015, there is 239.037.975 ha of designated public areas. Associating this information with forest area, it is possible to obtain the area of permanent forest state in public areas, in each year:

Area (ha)	2000	2010	2015
CNFP + Forest	219864483,49	216275361,74	215806087,02

Concernig the private areas, according to the Rural Environmental Registry:

Area (ha)	Permanent Preservation Area	Legal Reserve Areas			
Total	18538737	102024137			
With vegetation	9805218	72387287			

Area (ha)		2000	2010	2015
Public area	CNFP + Forest	219864483	216275362	215806087
Private area	Permanent Preservation Area with vegetation	9805218	9805218	9805218
	Legal Reserve Area with vegetation	72387287	72387287	72387287
Total		302056988	298467867	297998592

FRA 2020 categories	Forest area (1000 ha)					
	Applicable?	1990	2000	2010	2015	2020
Area of permanent forest estate	Yes		302 056.99	298 467.87	297 998.59	

Comments

It is important to note that the Rural Environmental Registry is a declared data and that there are some private areas not declared yet. The information available is about area with remaining vegetation, not only with forest. Although the data available refers to 2018, this same area is also considered as area of permanent forest state for previous years.

7 Employment, education and NWFP

7a Employment in forestry and logging

National Data

Data sources + type of data source eg NFI, etc

#	References to sources of information	Variable(s)
1	Labor and Employment Ministry / Ministério do Trabalho e Emprego – Programa de Disseminação das estatísticas do Trabalho. Base de dados RAIS – Relação Anual de Informações Sociais. Available at: http://pdet.mte.gov.br/aceso-online-as-bases-de-dados	Number of employment relationship in December 31 of each year, for economic activity and gender
2	Brazilian Institute of Geography and Statistics / Instituto Brasileiro de Geografia e Estatísticas - IBGE. Comissão Nacional de Classificação – CONCLA. Available at: https://concla.ibge.gov.br/classificacoes/correspondencias/atividades-economicas.html	Correspondence between national economic classification (CNAE) and ISIC ver. 4 activity A02
3	International Standard Industrial Classification of All Economic Activities - Revision 4. Available at: https://unstats.un.org/unsd/publication/SeriesM/seriesm_4rev4e.pdf	Classification ISIC

National classification and definitions

FRA Category	Brazilian classification
Full-time equivalents (FTE)	Number of employment relationship in December 31 of each year.
Employment in forestry and logging ...of which silviculture and other forestry activities	Activity 0210 from ISIC 4. Correspond to Brazilian CNAE 2.0 subclasses 0210-1/01 – 0210-1/06 (Forestry – planted forest) and 0220-9/06 (Forestry – natural forest).
Employment in forestry and logging ...of which logging	Activity 0220 from ISIC 4. Correspond to Brazilian CNAE 2.0 subclasses 0210-1/07 and 0210-1/08 (Forestry – planted forest) and 0220-9/01 and 0220-9/02 (Forestry – natural forest).
Employment in forestry and logging ...of which gathering of non-wood forest products	Activity 0230 from ISIC 4. Correspond to Brazilian CNAE 2.0 subclasses 0210-1/09 and 0210-1/99 (Forestry – planted forest) and 0220-9/03 - 0220-9/05 and 0220-9/99 (Forestry – natural forest).
Employment in forestry and logging ...of which support services to forestry	Activity 0240 from ISIC 4. Correspond to Brazilian CNAE 2.0 subclass 0230-6/00: Support service to forestry/CNAE 95 class 2135: Activities related to silviculture.

According to ISIC ver.4, the activity 02 of Forestry and logging includes the production of roundwood for the forest-based manufacturing industries (ISIC divisions 16 and 17) as well as the extraction and gathering of wild growing non-wood forest products. Besides the production of timber, forestry activities result in products that undergo little processing, such as fire wood, charcoal, wood chips and roundwood used in an unprocessed form (e.g. pit-props, pulpwood etc.). These activities can be carried out in natural or planted forests.

For this report, it wasn't considered activities from ISIC divisions 16 and 17 (differently from FRA 2015).

Classification ISIC x CNAE (Brazilian):

CNAE 2.0 (2002-2016)		CIIU/ISIC rev. 4	
Subclass	Denomination	Code	Denomination
02	PRODUÇÃO FLORESTAL		Forestry and logging
02.10-1	Produção florestal - florestas plantadas		
0210-1/01	Cultivo de eucalipto	0210	Silviculture and other forestry activities
0210-1/02	Cultivo de acácia-negra	0210	Silviculture and other forestry activities
0210-1/03	Cultivo de pinus	0210	Silviculture and other forestry activities
0210-1/04	Cultivo de teca	0210	Silviculture and other forestry activities

0210-1/05	Cultivo de espécies madeiras, exceto eucalipto, acácia-negra, pinus e teca	0210	Silviculture and other forestry activities
0210-1/06	Cultivo de mudas em viveiros florestais	0210	Silviculture and other forestry activities
0210-1/07	Extração de madeira em florestas plantadas	0220	Logging
0210-1/08	Produção de carvão vegetal - florestas plantadas	0220	Logging
0210-1/09	Produção de casca de acácia-negra - florestas plantadas	0230	Gathering of non-wood forest products
0210-1/99	Produção de produtos não-madeiros não especificados anteriormente em florestas plantadas	0230	Gathering of non-wood forest products
02.20-9	Produção florestal - florestas nativas		
0220-9/01	Extração de madeira em florestas nativas	0220	Logging
0220-9/02	Produção de carvão vegetal - florestas nativas	0220	Logging
0220-9/03	Coleta de castanha-do-pará em florestas nativas	0230	Gathering of non-wood forest products
0220-9/04	Coleta de látex em florestas nativas	0230	Gathering of non-wood forest products
0220-9/05	Coleta de palmito em florestas nativas	0230	Gathering of non-wood forest products
0220-9/06	Conservação de florestas nativas	0210	Silviculture and other forestry activities
0220-9/99	Coleta de produtos não-madeiros não especificados anteriormente em florestas nativas	0230	Gathering of non-wood forest products
02.30-6	Atividades de apoio à produção florestal		
0230-6/00	Atividades de apoio à produção florestal	0240	Support services to forestry

CIIU/ISIC rev. 4		CNAE 95 (1994-2001)	
Code	Denomination	Class Code	Denomination
A	Agriculture, forestry and fishing		
02	Forestry and logging	2119 2127	Silvicultura Exploração Florestal
0210	Silviculture and other forestry activities		
0220	Logging		
0230	Gathering of non-wood forest products		
0240	Support services to forestry	2135	Atividades de serviços relacionados com a silvicultura

Original data

2000 (1999 – 2001):

1999:

Brazilian Classification - CNAE 95 Class	Male	Female	Total
Silvicultura	8144	1229	9373
Exploração florestal	19455	1260	20715
Atividades de serviços relacionados com a silvicultura e a exploração florestal	25939	1784	27723
Total	53538	4273	57811

2000:

Brazilian Classification - CNAE 95 Class	Male	Female	Total
Silvicultura	9125	1649	10774
Exploração florestal	18641	1316	19957
Atividades de serviços relacionados com a silvicultura e a exploração florestal	32508	2013	34521
Total	60274	4978	65252

2001:

Brazilian Classification - CNAE 95 Class	Male	Female	Total
Silvicultura	11616	1697	13313
Exploração florestal	18496	1395	19891
Atividades de serviços relacionados com a silvicultura e a exploração florestal	34766	2911	37677
Total	64878	6003	70881

		2000		
Brazilian Classification	FRA Classification	Male	Female	Total
Silvicultura	Silviculture and other forestry activities and Logging	9628	1525	11153
Exploração florestal		18864	1324	20188
Atividades de serviços relacionados com a silvicultura e a exploração florestal	Support services to forestry	31071	2236	33307
Total		59563	5085	64648

2010 (2009 – 2011):

2009:

Brazilian Classification - CNAE 2.0 subclass	Male	Female	Total
0210 - Silviculture and other forestry activities	28390	5389	33779
Cultivo de eucalipto	15477	1859	17336
Cultivo de acácia-negra	143	7	150
Cultivo de pinus	5867	696	6563
Cultivo de teca	1645	89	1734
Cultivo de espécies madeireiras, exceto eucalipto, acácia-negra, pinus e teca	1011	160	1171
Cultivo de mudas em viveiros florestais	3856	2484	6340
Conservação de florestas nativas	391	94	485
0220 - Logging	28541	2384	30925

Extração de madeira em florestas plantadas	14263	1214	15477
Produção de carvão vegetal - florestas plantadas	10615	943	11558
Extração de madeira em florestas nativas	1340	94	1434
Produção de carvão vegetal - florestas nativas	2323	133	2456
0230 - Gathering of non-wood forest products	3763	792	4555
Produção de casca de acácia-negra - florestas plantadas	40	6	46
Produção de produtos não-madeireiros não especificados anteriormente em florestas plantadas	1986	516	2502
Coleta de castanha-do-pará em florestas nativas	17	4	21
Coleta de látex em florestas nativas	341	60	401
Coleta de palmito em florestas nativas	92	18	110
Coleta de produtos não-madeireiros não especificados anteriormente em florestas nativas	1287	188	1475
0240 - Support services to forestry	39599	4820	44419
Atividades de apoio à produção florestal	39599	4820	44419
Total	100293	13385	113678

2010:

Brazilian Classification - CNAE 2.0 subclass	Male	Female	Total
0210 - Silviculture and other forestry activities	32123	6338	38461
Cultivo de eucalipto	18967	2354	21321
Cultivo de acácia-negra	146	25	171
Cultivo de pinus	6401	895	7296
Cultivo de teca	720	61	781
Cultivo de espécies madeireiras, exceto eucalipto, acácia-negra, pinus e teca	1169	172	1341
Cultivo de mudas em viveiros florestais	4109	2702	6811
Conservação de florestas nativas	611	129	740
0220 - Logging	30921	2593	33514
Extração de madeira em florestas plantadas	16208	1433	17641
Produção de carvão vegetal - florestas plantadas	10402	886	11288
Extração de madeira em florestas nativas	1517	106	1623
Produção de carvão vegetal - florestas nativas	2794	168	2962
0230 - Gathering of non-wood forest products	3685	974	4659

Produção de casca de acácia-negra - florestas plantadas	48	18	66
Produção de produtos não-madeireiros não especificados anteriormente em florestas plantadas	2147	611	2758
Coleta de castanha-do-pará em florestas nativas	21	20	41
Coleta de látex em florestas nativas	386	73	459
Coleta de palmito em florestas nativas	78	20	98
Coleta de produtos não-madeireiros não especificados anteriormente em florestas nativas	1005	232	1237
0240 - Support services to forestry	47176	5893	53069
Atividades de apoio à produção florestal	47176	5893	53069
Total	113905	15798	129703

2011:

Brazilian Classification - CNAE 2.0 subclass	Male	Female	Total
0210 - Silviculture and other forestry activities	32640	7073	39713
Cultivo de eucalipto	20528	3251	23779
Cultivo de acácia-negra	338	33	371
Cultivo de pinus	6301	938	7239
Cultivo de teca	489	53	542
Cultivo de espécies madeireiras, exceto eucalipto, acácia-negra, pinus e teca	677	99	776
Cultivo de mudas em viveiros florestais	3867	2557	6424
Conservação de florestas nativas	440	142	582
0220 - Logging	30979	2608	33587
Extração de madeira em florestas plantadas	15242	1240	16482
Produção de carvão vegetal - florestas plantadas	10313	976	11289
Extração de madeira em florestas nativas	1726	152	1878
Produção de carvão vegetal - florestas nativas	3698	240	3938
0230 - Gathering of non-wood forest products	3999	1206	5205
Produção de casca de acácia-negra - florestas plantadas	161	52	213
Produção de produtos não-madeireiros não especificados anteriormente em florestas plantadas	2387	814	3201
Coleta de castanha-do-pará em florestas nativas	17	5	22
Coleta de látex em florestas nativas	338	69	407
Coleta de palmito em florestas nativas	82	14	96

Coleta de produtos não-madeireiros não especificados anteriormente em florestas nativas	1014	252	1266
0240 - Support services to forestry	48979	5525	54504
Atividades de apoio à produção florestal	48979	5525	54504
Total	116597	16412	133009

		2010		
Brazilian Classification	FRA Classification	Male	Female	Total
Produção florestal - florestas plantadas e nativas: cultivo de árvores, produção de viveiros florestais, conservação de florestas nativas	Silviculture and other forestry activities	31051	6267	37318
Produção florestal - florestas plantadas e nativas: extração de madeira	Logging	30147	2528	32675
Produção florestal - florestas plantadas e nativas: produção de produtos não madeireiros, coleta de produtos silvestres	Gathering of non-wood forest products	3816	991	4806
Atividades de apoio à produção florestal	Support services to forestry	45251	5413	50664
Total		110265	15198	125463

2015 (2014 – 2016):

2014:

Brazilian Classification - CNAE 2.0 subclass	Male	Female	Total
0210 - Silviculture and other forestry activities	31330	6622	37952
Cultivo de eucalipto	18351	2673	21024
Cultivo de acácia-negra	192	29	221
Cultivo de pinus	6996	1090	8086
Cultivo de teca	965	82	1047
Cultivo de espécies madeireiras, exceto eucalipto, acácia-negra, pinus e teca	687	93	780
Cultivo de mudas em viveiros florestais	2929	2474	5403
Conservação de florestas nativas	1210	181	1391
0220 - Logging	25727	2234	27961
Extração de madeira em florestas plantadas	11665	1003	12668
Produção de carvão vegetal - florestas plantadas	9268	852	10120
Extração de madeira em florestas nativas	2586	207	2793
Produção de carvão vegetal - florestas nativas	2208	172	2380
0230 - Gathering of non-wood forest products	3745	1156	4901
Produção de casca de acácia-negra - florestas plantadas	81	21	102
Produção de produtos não-madeireiros não especificados anteriormente em florestas plantadas	2292	776	3068

Coleta de castanha-do-pará em florestas nativas	29	24	53
Coleta de látex em florestas nativas	210	45	255
Coleta de palmito em florestas nativas	24	9	33
Coleta de produtos não-madeireiros não especificados anteriormente em florestas nativas	1109	281	1390
0240 - Support services to forestry	34520	4010	38530
Atividades de apoio à produção florestal	34520	4010	38530
Total	95322	14022	109344

2015:

Brazilian Classification - CNAE 2.0 subclass	Male	Female	Total
0210 - Silviculture and other forestry activities	33438	6578	40016
Cultivo de eucalipto	21264	2707	23971
Cultivo de acácia-negra	101	8	109
Cultivo de pinus	7010	1159	8169
Cultivo de teca	774	92	866
Cultivo de espécies madeireiras, exceto eucalipto, acácia-negra, pinus e teca	735	94	829
Cultivo de mudas em viveiros florestais	2763	2377	5140
Conservação de florestas nativas	791	141	932
0220 - Logging	22223	1989	24212
Extração de madeira em florestas plantadas	11691	1004	12695
Produção de carvão vegetal - florestas plantadas	7116	657	7773
Extração de madeira em florestas nativas	2352	217	2569
Produção de carvão vegetal - florestas nativas	1064	111	1175
0230 - Gathering of non-wood forest products	5231	1267	6498
Produção de casca de acácia-negra - florestas plantadas	59	19	78
Produção de produtos não-madeireiros não especificados anteriormente em florestas plantadas	2573	855	3428
Coleta de castanha-do-pará em florestas nativas	29	15	44
Coleta de látex em florestas nativas	154	39	193
Coleta de palmito em florestas nativas	23	8	31
Coleta de produtos não-madeireiros não especificados anteriormente em florestas nativas	2393	331	2724
0240 - Support services to forestry	29819	3230	33049

Atividades de apoio à produção florestal	29819	3230	33049
Total	90711	13064	103775

2016:

Brazilian Classification - CNAE 2.0 subclass	Male	Female	Total
0210 - Silviculture and other forestry activities	32976	6344	39320
Cultivo de eucalipto	21378	2496	23874
Cultivo de acácia-negra	57	1	58
Cultivo de pinus	6780	1120	7900
Cultivo de teca	766	84	850
Cultivo de espécies madeireiras, exceto eucalipto, acácia-negra, pinus e teca	687	101	788
Cultivo de mudas em viveiros florestais	2688	2361	5049
Conservação de florestas nativas	620	181	801
0220 - Logging	23285	1969	25254
Extração de madeira em florestas plantadas	11994	965	12959
Produção de carvão vegetal - florestas plantadas	7803	682	8485
Extração de madeira em florestas nativas	2465	214	2679
Produção de carvão vegetal - florestas nativas	1023	108	1131
0230 - Gathering of non-wood forest products	4503	1254	5757
Produção de casca de acácia-negra - florestas plantadas	82	31	113
Produção de produtos não-madeireiros não especificados anteriormente em florestas plantadas	2879	822	3701
Coleta de castanha-do-pará em florestas nativas	22	9	31
Coleta de látex em florestas nativas	194	38	232
Coleta de palmito em florestas nativas	26	5	31
Coleta de produtos não-madeireiros não especificados anteriormente em florestas nativas	1300	349	1649
0240 - Support services to forestry	28337	3179	31516
Atividades de apoio à produção florestal	28337	3179	31516
Total	89101	12746	101847

		2015		
Brazilian Classification	FRA Classification	Male	Female	Total
Produção florestal - florestas plantadas e nativas: cultivo de árvores, produção de viveiros florestais, conservação de florestas nativas	Silviculture and other forestry activities	32581	6515	39096

Produção florestal - florestas plantadas e nativas: extração de madeira	Logging	23745	2064	25809
Produção florestal - florestas plantadas e nativas: produção de produtos não madeireiros, coleta de produtos silvestres	Gathering of non-wood forest products	4493	1226	5719
Atividades de apoio à produção florestal	Support services to forestry	30892	3473	34365
Total		91711	13277	104989

FRA 2020 categories	Full-time equivalents (1000 FTE)											
	1990			2000			2010			2015		
	Total	Female	Male	Total	Female	Male	Total	Female	Male	Total	Female	Male
Employment in forestry and logging				64.65	5.09	59.56	125.46	15.20	110.27	104.99	13.28	91.71
...of which silviculture and other forestry activities							37.32	6.27	31.05	39.10	6.52	32.58
...of which logging							32.68	2.53	30.15	25.81	2.06	23.75
...of which gathering of non wood forest products							4.81	0.99	3.82	5.72	1.23	4.49
...of which support services to forestry				33.31	2.24	31.07	50.66	5.41	45.25	34.37	3.47	30.89

Comments

In 1990 the “Silviculture” and “Agriculture” classes of economic activities were aggregated in the RAIS database, making it impossible to complete the information for that year.

Considering the Brazilian classification of economic activity CNAE 95, available from 1994 until 2001, for 2000 it is not possible to define number of labors in each classification, once data is not available by subclasses.

Differently from FRA 2015, for this report, activities from ISIC divisions 16 and 17 were not considered.

7b Graduation of students in forest-related education

National Data

Data sources + type of data source eg NFI, etc

#	References to sources of information	Variable(s)
1	Ministry of Education / Ministério da Educação – GEOCAPES. Available at: https://geocapes.capes.gov.br/geocapes/	Number of students graduated in master's and doctoral degree
2	Ministry of Education / Ministério da Educação – Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira (INEP). Available at: http://portal.inep.gov.br/web/guest/sinopses-estatisticas-da-educacao-superior	Number of students graduated in Forest Engineering (bachelor's degree)

National classification and definitions

FRA Category	Brazilian classification
Forest-related education	Concerning Doctoral and Master's degree, the knowledge areas considered are: “Forest Resources and Forest Engineering”, that includes courses of “Wood Science and Technology”, “Forest Science”, “Agricultural Sciences”, “Environmental and Forest Science”, “Tropical Forest Science”, “Forest Science”, “Forest and Environmental Science”, “Biomaterials Engineering!”, “Forest Engineering”, “Protected Areas Management in Amazonia”, “Forest Resources” and “Pulp and Paper Technology”. For bachelor's degree, it was considered only Forest Engineering graduation.
Master's degree	Includes courses of master's and professional master's.

Original data

Doctoral and Master's degree:

		Number of students graduated			
Reference Year	Year	Doctoral Degree	Master's degree (academic)	Master's degree (professional)	Total Master's degree
2000	1999	22	105	0	105
	2000	29	155	0	155
	2001	25	119	0	119
Total		76	379	0	379
Average		25	126		126
		Number of students graduated			
Reference Year	Year	Doctoral Degree	Master's degree (academic)	Master's degree (professional)	Total Master's degree
2010	2009	74	280	1	281
	2010	103	258	16	274
	2011	83	383	24	407
Total		260	921	41	962
Média		86,66	307	13,66	320,66
		Number of students graduateds			
Reference Year	Year	Doctoral Degree	Master's degree (academic)	Master's degree (professional)	Total Master's degree

2015	2014	161	418	18	436
	2015	122	309	16	325
	2016	116	406	12	418
Total		399	1133	46	1179
Média		133	377,66	15,33	393

Bachelor's degree:

Reference Year	Year	Number of students graduated
2000	1999	389
	2000	333
	2001	419
Total		1.141
Average		380,33
Reference Year	Year	Number of students graduated
2010	2009	1.109
	2010	1.134
	2011	1.419
Total		3.662
Average		1.220,66
Reference Year	Year	Number of students graduated
2015	2014	1.409
	2015	1.517
	2016	1.815
Total		4.741
Average		1.580,33

FRA 2020 categories	Number of graduated students											
	1990			2000			2010			2015		
	Total	Female	Male	Total	Female	Male	Total	Female	Male	Total	Female	Male
Doctoral degree				25.00			86.00			133.00		
Master's degree				126.00			320.00			393.00		
Bachelor's degree				380.00			1 220.00			1 580.00		
Technician certificate / diploma												
Total												

Comments

Original data of post graduation and graduation are not provided by gender.

7c Non wood forest products removals and value 2015

National Data

Data sources + type of data source eg NFI, etc

#	References to sources of information	Variable(s)
	Brazilian Institute of Geography and Statistics / Instituto Brasileiro de Geografia e Estatísticas - IBGE. Forestry and silviculture production/Produção da Extração Vegetal e Silvicultura – PEVS 2015. Available at: https://www.ibge.gov.br/estatisticas-novoportal/economicas/agricultura-e-pecuaria/9105-producao-da-extracao-vegetal-e-da-silvicultura.html?=&t=o-que-e	Quantity and value of non-wood forest products removals.

National classification and definitions

FRA Category	Brazilian classification
Non Wood Forest Products	Includes non-wood plant products
Forestry and silviculture production research	Provides information on the quantity and value of production resulting from the processes of exploitation of the native plant resources and the planted forest masses, having as collection unit the municipality. It encompasses food, rubber, wax, fiber, wood, oleaginous, black acacia shells, eucalyptus leaves, resin, among others.

Original data

Data from PEVS 2015 containing information about quantity and value of non-wood plant products, ordered according to value.

#	Non-wood forest product	Quantity	Value (1000 R\$)
1	1.1 - Açaí (fruto) (Toneladas)	216071	480637
2	1.4 - Erva-mate (Toneladas)	338801	396282
3	2.3 - Resina (Toneladas)	95831	278867
4	4.2 - Carnaúba (pó) (Toneladas)	19974	195649
5	8.1 - Babaçu (amêndoa) (Toneladas)	77955	107746
6	1.3 - Castanha-do-pará (Toneladas)	40643	107443
7	5.3 - Piaçava (Toneladas)	44805	101300
8	4.1 - Carnaúba (cera) (Toneladas)	2060	29976
9	1.8 - Pinhão (Toneladas)	8393	21187
10	1.6 - Palmito (Toneladas)	4669	14406
11	1.7 - Pequi (fruto) (Toneladas)	18866	14236
12	2.1 - Acácia-negra (casca) (Toneladas)	62946	11869
13	1.9 - Umbu (fruto) (Toneladas)	8094	10154
14	1.2 - Castanha-de-caju (Toneladas)	2280	4906
15	8.6 - Pequi (amêndoa) (Toneladas)	2228	4897
16	3.2 - Hevea (látex coagulado) (Toneladas)	1447	4838
17	8.4 - Licuri (coquilho) (Toneladas)	4072	4039
18	8.2 - Copaíba (óleo) (Toneladas)	153	3432

19	1.10 - Outros (Toneladas)	2412	3272
20	8.3 - Cumaru (amêndoa) (Toneladas)	97	2911
21	5.2 - Carnaúba (Toneladas)	1298	2517
22	5.1 - Buriti (Toneladas)	451	2226
23	2.2 - Eucalipto (folha) (Toneladas)	36462	2145
24	8.8 - Outros (Toneladas)	674	1649
25	1.5 - Mangaba (fruto) (Toneladas)	663	1575
26	8.7 - Tucum (amêndoa) (Toneladas)	489	1166
27	5.4 - Outras (Toneladas)	286	994
28	2.2 - Jaborandi (folha) (Toneladas)	238	909
29	3.3 - Hevea (látex líquido) (Toneladas)	52	407
30	2.4 - Outros (Toneladas)	225	390
31	10.1 - Angico (casca) (Toneladas)	112	116
32	2.1 - Ipecacuanha ou poaia (raiz) (Toneladas)	1	90
33	6.1 - Balata (Toneladas)	2	36
34	10.3 - Outros (Toneladas)	2	16
35	8.5 - Oiticica (semente) (Toneladas)	12	9
36	10.2 - Barbatimão (casca) (Toneladas)	5	9
37	6.3 - Sorva (Toneladas)	1	2
38	2.3 - Urucum (semente) (Toneladas)	0	0

	Name of NWFP product	Key species	Quantity	Unit	Value (1000 local currency)	NWFP category
#1	Açaí fruit	Euterpe oleracea	216 071	Tons	480 637	1 Food
#2	Mate herb	Ilex paraguariensis	338 801	Tons	396 282	1 Food
#3	Resin	Pinus sp.	95 831	Tons	278 867	7 Exudates
#4	Carnaúba powder	Copernicia prunifera	19 974	Tons	195 649	8 Other plant products
#5	Babassu nut	Attalea ssp.	77 955	Tons	107 746	1 Food
#6	Brazilian nut	Bertholletia excelsa	40 643	Tons	107 443	1 Food
#7	Piaçava fiber	Attalea funifera	44 805	Tons	101 300	5 Raw material for utensils handicrafts construction
#8	Carnauba wax	Copernicia prunifera	2 060	Tons	29 976	8 Other plant products
#9	Araucaria Pine nut	Araucaria angustifolia	8 393	Tons	21 187	1 Food
#10	Palm heart	Euterpe edulis	4 669	Tons	14 406	1 Food
All other plant products					78 810	
All other animal products						
Total					1 812 303	

Name of currency	R\$
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Comments

“All other plant products” includes 28 non-wood products listed on the item “Original Data”, from # 11. There is no information about all possible products removed from Brazilian forests. There is no information available about non wood animal products.

8 Sustainable Development Goal 15

8a Sustainable Development Goal 15

SDG Indicator 15.1.1 Forest area as proportion of total land area 2015

Indicator	Percent							
	2000	2010	2015	2016	2017	2018	2019	2020
Forest area as proportion of total land area 2015	65.93	61.21	60.29	60.07	59.83	59.71	59.56	59.42

Name of agency responsible	
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SDG Indicator 15.2.1 Progress towards sustainable forest management

Sub-Indicator 1	Percent						
	2000-2010	2010-2015	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020
Forest area annual net change rate	-0.74	-0.30	-0.36	-0.40	-0.21	-0.25	-0.24

Name of agency responsible	
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Sub-Indicator 2	Forest biomass (tonnes/ha)							
	2000	2010	2015	2016	2017	2018	2019	2020
Above-ground biomass stock in forest	166.30	169.44	171.08	171.26	171.44	171.63	171.78	171.92

Name of agency responsible	
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Sub-Indicator 3	Percent (2015 forest area baseline)							
	2000	2010	2015	2016	2017	2018	2019	2020
Proportion of forest area located within legally established protected areas	21.26	27.78	28.44	28.90	28.91	29.22	29.45	29.68

Name of agency responsible	
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Sub-Indicator 4	Percent (2015 forest area baseline)							
	2000	2010	2015	2016	2017	2018	2019	2020
Proportion of forest area under long-term forest management plan	1.83	4.70	6.28	7.27	7.27	8.19	8.50	8.96

Name of agency responsible	
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Sub-Indicator 5	Forest area (1000 ha)							
	2000	2010	2015	2016	2017	2018	2019	2020
Forest area under independently verified forest management certification schemes	638.42	5 979.63	6 400.62	6 595.85	7 305.84	6 905.47	—	—