CLASSES DESCRIPTION OF THE LEGEND OF THE COLLECTION 9 OF MAPBIOMAS BRAZIL

Level 1	Level 2	Level 3	Level 4	Biome	Brief description	IBGE (1999; 2012) Classification	FAO (2012) Classification	National Inventory of GHG Emissions (2015) Classification	IUCN Global Ecosystem Typology 2.0
Forest	Forest Formation			Amazon	Dense Ombrophilous Forest, Evergreen Seasonal Forest, Open Ombrophilous Forest, Semi-deciduous Seasonal Forest, Deciduous Seasonal Forest, Wooded Savannah, areas under impacts of fire or logging, Forest resulting from natural successional processes, after total or partial primary vegetation suppression by anthropogenic actions or natural causes, which may have remaining trees from primary vegetation. Bamboo forest (Acre State).	Da, Db, Ds, Dm, Ha, Hb, Hs, Aa, Ab, As, Am, Fa, Fb, Fs, Fm, Ca, Cb, Cs, Cm, Ld, La, Vs	FDP, FEP, FSP, FEM, FDM, FSM	FNM, FM, FSec	T1
				Caatinga	Vegetation types with continuous canopy predominance - Wooded Steppe Savannah, Semi-deciduous and Deciduous Seasonal Forest.	Td, Fa, Fb, Fm, Fs, Cb, Cm, Cs	FEP, FSP	FNM, FM	T1, T4.1
				Cerrado	Vegetation types with tree species predominance, with continuous canopy formation (Riparian Forest, Gallery Forest, Dry Forest and Forested Savannah) (Ribeiro & Walter, 2008), as well as Semi-deciduous Seasonal Forests.	Aa, Ab, As, Cb, Cm, Cs, Da, Dm, Ds, F, Ml, Mm, P, Sd, Td	FEP, FDP, FSP	FNM, FM	T1.2, TF1.1
				Atlantic Forest	Dense, Open and Mixed Ombrophilous Forest, Semi-deciduous and Deciduous Seasonal Forest, and Pioneer Formation.	D, A, M, F, C, Pma	FEP, FSP	FNM, FM	T1
				Pampa	Vegetation with tree species predominance and continuous canopy. It includes forest typologies: Ombrophilous, Semi-deciduous and Deciduous and part of	Da, Db, Ds, Dm, Ma, Ms, Mm, Ml, Fa, Fb, Fs, Fm, Ca, Cb, Cs,	FEP, FDP, FSP	FNM, FM, FSec, CS	T2.4
				Pantanal	Tall trees and shrubs on lower stratum: Deciduous and Semi-deciduous Seasonal Forest, Wooded Savannah, Wooded Steppe Savannah, and Fluvial and/or Lacustre Influenced Pioneer Formations.	Ca, Cb, Cs, Fa, Fb, Fs, SN, Sd, Td, Pa	FEP, FSP	FNM, FM	T2.2, T1.2
	Savanna Formation			Amazon	Open plant formation with a more or less developed shrub and/or arboreal layer, herbaceous layer always present.	Sa, Ta	WS	FNM, FM	T3.1, T4.1
				Caatinga	Vegetation types with predominance of semi-continuous canopy species - Wooded Steppe Savannah and Wooded Savannah.	Sa, Ta	FDP	FNM, FM	T4.1
				Cerrado	Savanna formations with defined tree and shrub-herbaceous stratum (Cerrado Stricto Sensu: Dense, Typical, Sparse and Rupestrian Savanna).	Sa, Ta	FDP, FSP, WS	FNM, FM	T3.1, T4.2
				Atlantic Forest	Steppe, Forested and Wooded Savannah.	Sd, Td, Sa, Ta	FDP, FSP, WS	FNM, FM	T4.1
				Pantanal	Small tree species, sparsely arranged in the shrub and herbaceous continuous vegetation. The herbaceous vegetation mixes with erect and decumbent shrubs.	Sa, Sp, Sg, Td, Ta, Tp	FDP, FSP, WS	FNM, FM	T4.1
	Mangrove				Dense and Evergreen Forest formations, often flooded by tide and associated with the mangrove coastal ecosystem.	Pf	FEP, FEM	FNM, FM	MFT1.2
	Floodable Forest			Amazon	Alluvial Open Ombrophilous Forest established along the watercourses, occurring in periodically or permanently flooded plains and terraces, where in the Amazon represent the physiognomies of igapó and lowland forests, respectively.	Da, Db, Ds, Dm, Ha, Hb, Hs, Ld, La, Aa, Ab, As, Am, Fa, Fb, Fs, Fm, Ca, Cb, Cs, Cm, Vs	FDP, FEP, FSP, FEM, FDM, FSM	FNM, FM, FSec	TF1.1
	Wooded Sandbank Vegetation			Atlantic Forest	Forest formations on sandy soils in the coastal region.	Pma	FEP, FEM	FNM, FM	MT2
				Pampa	Forest formations on sandy soils in the coastal region.	Pma	FEP, FEM	FNM, FM	T2.4

			Description				
Herbaceous and Shrubby Vegetation	Wetland	Amazon	Lowland or grassland vegetation that suffers fluvial and/or lacustrine influence.	Pa	OM	GNM, GM, GSec	TF1.2, TF1.3
		Cerrado	Vegetation with a predominance of herbaceous strata subject to seasonal flooding (e.g. Campo Umido) or under fluvial/lacustrine influence (e.g. Brejo). In some regions, the herbaceous matrix is associated with arboreal species of savannah formation (e.g. Parque de Cerrado) or palm trees (Vereda, Palmeiral).	Pa, Sp	OM	GNM, GM, GSec	TF1.3, TF1.4
		Atlantic Forest	Wetlands with fluvial influence.	Pa	OM	GNM, GM, GSec	TF1.2
		Pampa	Wetland areas, regionally called banhados or marshes (saline influence). Vegetation typically hygrophilous, with aquatic plants emerging, submerged or floating. They occupy plains and depressions of the terrain with waterlogged soil and also the shallow edges of ponds or water reservoirs.	P, Pa, Pm	OM	A, Res	TF1.3, MFT1.3
		Pantanal	Herbaceous vegetation with a predominance of grasses subject to permanent or temporary flooding (at least once a year) according to the natural flood pulses. The woody element can be present on the grasslands matrix forming a mosaic with shrub or tree plants (e.g.: cambarazal, paratudal and carandazal). Swampy areas generally occur on the banks of temporary or permanent lagoons occupied by emergent, submerged or floating aquatic plants (e.g.: swamps and barns). Areas with a water surface, but difficult to classify due to the amount of macrophytes, eutrophication or sediments, were also included in this category.	Tg, Sp, Pa, Tp	OM	GNM, GM, GSec	TF1.4
	Grassland Formation	Amazon	Savannah, Park Savannah (Marajó), Steppe Savannah (Roraima), Grassland Savannah, Campinarana, for regions outside the Amazon/Cerrado Ecotone. And for regions within the Amazon/Cerrado Ecotone, predominance of herbaceous strata.	Sa, Sp, Sg, Ta, Tp, Tg	WG, OG, WS	GNM, GM, GSec	T4.5
		Caatinga	Vegetation type with predominance of herbaceous species (Park Steppe Savannah, Herbaceous-Woody Steppe Savannah, Park Savannah, Herbaceous-Woody Savannah) + (Flooded areas with an interconnected pond net, located along waterways and in lowlands areas that accumulate water, vegetation predominantly herbaceous to shrub).	Tp, Sg, Rm, Sp, Tg, Rl	WG, OG, WS	GNM, GM, GSec	T3.1
		Cerrado	Grassland formations with a predominance of herbaceous strata (dirty, clean and rupestrian grasslands) and some areas of savannah formations such as the rupestrian cerrado.	Sg, Tp, Tg	WG, OG	GNM, GM, GSec	T4.5, T3.4
		Atlantic Forest	Park and Grassland Steppe Savannas, Steppe and Shrub and Herbaceous Pioneers.	Sp, Sg, Tp, Tg, E, Pa	WS,OG	GNM, GM, GSec	T4.5
		Pampa	Vegetation with a predominance of grassy strata, with the presence of herbaceous and sub-shrub dicots. The botanical composition is influenced by edaphic and topographic gradients and by pasture management (livestock). They occur in deep to shallow soils, including rocky (rupestrian grasslands) and sandy (sandy or psamophile grasslands). Ocurs at well-drained soil (mesic grasslands) to soils with higher moisture content (wet grasslands - with a strong presence of sedges). In most cases, it corresponds to native vegetation, though spots of exotic invasive vegetation or exotic forage use (planted pasture) may be present.	E, Ea, Ep, Eg, T, Ta, Tp, P, Pa, Pm	WG, OG	GNM, GM, GSec	T4.5

			Description	Col1	Col2	Col3	Col4
		Pantanal	Vegetation with a predominance of grassy stratum, with the presence of isolated and stunted woody shrubs. The botanical composition is influenced by the edaphic and topographical gradients and pasture management (livestock). Invasive exotic vegetation or forage use (planted pasture) spots may be present forming mosaics with native vegetation.	Sg, Sp, Ta, Tg	WG, OG	GNM, GM, GSec	T4.5
	Hypersaline Tidal Flat		"Apicuns" or hypersaline tidal flats are formations often without tree vegetation, associated to a higher, hypersaline and less flooded area in the mangrove, generally in the transition between this area and the continent.	Pf, Pfh	OM, OX	NA	NA
	Rocky Outcrop	Amazon	Naturally exposed rocks without soil cover, often with the partial presence of rupicolous vegetation and high slope.	Ar	OX	ArM, ArNM	T3.4
		Caatinga	Naturally exposed rocks without soil cover, often with the partial presence of rupicolous vegetation and high slope.	Ar	OX	ArM, ArNM	T3.4
		Cerrado	Monolithic features, bedrock or slabs naturally exposed on the earth's surface without soil cover, often with partial presence of rock vegetation and high slope.	Ar	OX	ARM, ArNM	T3.4
		Atlantic Forest	Naturally exposed rocks without soil cover, often with the partial presence of rupicolous vegetation and high slope.	Ar	OX	ARM, ArNM	T3.4
		Pampa	Naturally exposed rocks without soil cover, often with the partial presence of rupicolous vegetation and high slope.	Ar	OX	ArM, ArNM	T3.4
	Herbaceous Sandbank Vegetation	Atlantic Forest	Herbaceous vegetation that is established on sandy soils or on dunes in the coastal zone.	Pmb, Pmh	WG, OG	GNM, GM	MT2.1
		Caatinga	Herbaceous vegetation that is established on sandy soils or on dunes in the coastal zone.	Pmb, Pmh	WG, OG	GNM, GM	MT2.1
		Pampa	Herbaceous vegetation that is established on sandy soils or on dunes in the coastal zone.	Pmb, Pmh	WG, OG	GNM, GM	MT2.1
Farming	Pasture		Pasture area, predominantly planted, linked to livestock production activities. Areas of natural pasture are predominantly classified as grassland or wetland, that may or may not be grazed. In Amazon, this class may occurr on recently deforestated areas, even if farming activities haven't started yet.	AP, PE, PS	OP, OG	Ap	T7.2, T7.5
	Agriculture	Temporary Crop — Soybean	Cultivated areas with soybean.	AMc (s)	OCA	AC	T7.1
		Sugar cane	Cultivated areas with sugar cane.	AMc (c)	OCA	AC	T7.1
		Rice	Cultivated areas with rice, exclusively under irrigation, in the states of Rio Grande do Sul, Tocantins, Santa Catarina and Coast of Paraná. It's the same map shown on irrigation module, at "Irrigated Rice" class.	AMc	OCA	AC	T7.1
		Cotton (beta)	Cultivated areas with cotton.	AMc (s)	OCA	AC	T7.1
		Other Temporary Crops	Areas occupied with short or medium-term agricultural crops, generally with a vegetative cycle of less than one year, which after harvesting need to be planted again to produce.	AMc	OCA	AC	T7.1
		Perennial Crop — Coffee	Cultivated areas with coffee plantation.	AMp (c)	OCP	PER	T7.3
		Citrus	Cultivated areas with citrus plantation.	AMp	OCP	PER	T7.3
		Palm Oil	Cultivated areas with palm oil plantation.	AMp	OCP	PER	T7.3
		Other Perennial Crops	Areas occupied with agricultural crops which has a long vegetative cycle (more than one year) and allows successive harvests, without the need for new planting. In this version, the map covers mostly cashew areas on the northeast coast and oil palm in the northeast region of Pará state, but without distinction between them.	AMp	OCP	PER	T7.3
	Forest Plantation		Tree species planted for commercial purposes (e.g. pinus, eucalyptus, araucaria).	R	FPB, FPC, FPM	Ref	T7.3
		Caatinga	Not distinguishable between pasture and agriculture farm areas . It may include peri-urban occupation areas, such as small farms, rural properties, and housing estates.	AP, PE, PS, ATp, ATc, ATpc	OCA, OCM, OP, OG, OB	AC, PER, Ap, APD, S	T7.5

Category	Class	Biome	Description				
	Mosaic of Uses	Cerrado	Not distinguishable between pasture and/or agriculture farming areas. May include areas of abandoned pasture at an early stage of regrowth of native vegetation. May include anthropized areas in protected areas (except APA and TI). It may include peri-urban occupation areas, such as small farms, rural properties, and housing estates.	AP, PE, PS, ATp, ATc, ATpc	OCA, OCM, OP, OG, OB	AC, PER, S	T7.5
		Atlantic Forest	Not distinguishable between pasture and agriculture farming areas. It may include peri-urban occupation areas, such as small farms, rural properties, and housing estates.	AP, PE, PS, ATp, ATc, ATpc	OCA, OCM, OP, OG, OB	AC, PER, S	T7.5
		Pampa	Not distinguishable between pasture and agriculture farming areas. It may include cropland, winter or summer pasture and horticulture. Includes rest areas between agricultural crops (pousio). It may include peri-urban occupation areas, such as small farms, rural properties, and housing estates.	AP, AS, AT, AM, PE, PS, Ag, Ap, Ac, Acc, Acp, AA	OCA, OCM, OP, OG, OF, OB	AC, PER, Ap, APD, S	T7.5
Non Vegetated Area	Beach, Dune and Sand Spot		Sandy areas, with bright white color, with no vegetation predominance of any kind.	Dn	OX	DnM,DnNM	MT1.3
	Urban Area		Urban areas with high density of roads, edifications and predominance of non-vegetated surfaces, including open areas with no buildings and infrastructure.	Iu	OB	S	T7.4
	Mining		Areas of industrial or artisanal mineral extraction (garimpos), with clear exposure of the soil due to anthropogenic action. Only areas close to CPRM (GeoSGB), AhkBrasilien (AHK), DETER (INPE) and Instituto Socioambiental (ISA) mining resource spatial references are considered.	MCA	OQ	Min	NA
	Other Non Vegetated Areas	Amazon	Non-permeable surface areas (infrastructure, urban expansion or mining) not mapped into their classes	AU, MCA	OB, OQ	S, Min	NA
		Caatinga	Non-permeable surface areas (infrastructure, urban expansion or mining) not mapped into their classes	AU,MCA	OB, OQ	S, Min	NA
		Cerrado	Non-permeable surfaces areas (infrastructure, urban expansion or mining) not mapped in their respective classes, regions of exposed soil in natural areas (e.g. erosion and landslides) or in crop areas between harvest seasons.	AU, MCA	OB, OQ	S, Min	NA
		Atlantic Forest	Non-permeable surface areas (infrastructure, urban expansion or mining) not mapped into their classes.	AU, MCA	OB, OQ	S, Min	NA
		Pampa	Mixed class that includes natural and anthropic areas. Natural areas include sandy surfaces including mainly river and sandy beaches. Anthropic areas include exposed soil and non-permeable surfaces (infrastructure, urban expansion or mining).	AU, MCA, Dn, Iu	OB, OQ, OX	S, SE, DnM, DnNM, Min	NA
		Pantanal	Exposed soil areas (mainly sandy soil) not classified as Grassland Formation or Pasture.	PE, Sg	OX	Ap, GNM, GSec	NA
Water	River, Lake and Ocean		Rivers, lakes, dams, reservoir and other water bodies.	NA	IRP, IRS, IL, ID	A, Res	F1.1, F1.2, F2.1, F2.2, F3.1, F3.2, F3.5, FM1.2, FM1.3
	Aquaculture		Artificial lakes, with a predominance of aquaculture and/or salt production activities.	NA	NA	NA	NA
Not Observed			Blocked areas by clouds or atmospheric noise, or with absence of ground observation masked out from analysis.	NA	NA	NO	NA

References: Instituto Brasileiro de Geografia e Estatística - IBGE. Manual técnico de uso da terra, IBGE: Rio de Janeiro, Brazil, 1999, 58p.; Instituto Brasileiro de Geografia e Estatística - IBGE. Manual técnico da vegetação brasileira, 2nd ed., IBGE: Rio de Janeiro, Brazil, 2012. pp.157-160; Food and Agriculture Organization of the United Nations - FAO. Manual for integrated field data collection. FAO: Rome, Italy, 2012, 175p.; Ministério da Ciência, Tecnologia e Inovações. Secretaria de Pesquisa e Formação Científica. Quarta Comunicação Nacional do Brasil à Convenção-Quadro das Nações Unidas sobre Mudança do Clima, Brasília, 2020, 620p. ; Keith, D.A., Ferrer-Paris, J.R., Nicholson, E. and Kingsford, R.T. (eds.). The IUCN Global Ecosystem Typology 2.0: Descriptive profiles for biomes and ecosystem functional groups. Gland, Switzerland: IUCN, 2020, 192 p.