ANNUAL MAP OF LAND USE AND LAND COVER IN BRAZIL FROM 1985 TO 2022
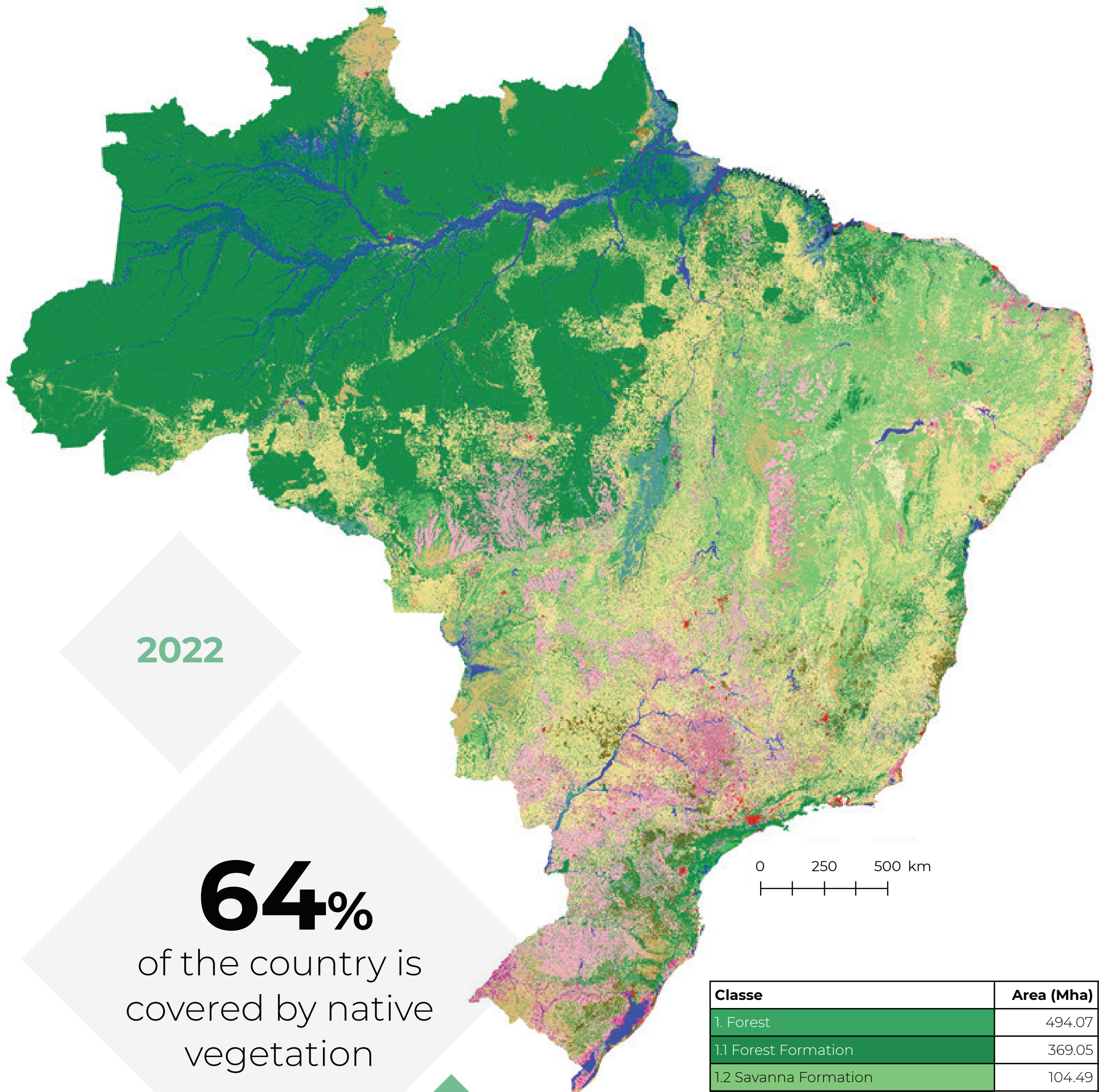
COLLECTION 8

29 classes, being two of them new: Floodable forest and Palm oil

Improvements in the entire collection since 1985 and addition of the latest year 2022

mapbiomas.org

LAND USE AND LAND COVER IN BRAZIL IN 2022

2022

64%
of the country is covered by native vegetation

33% of the country is covered by agriculture

29 classes maped

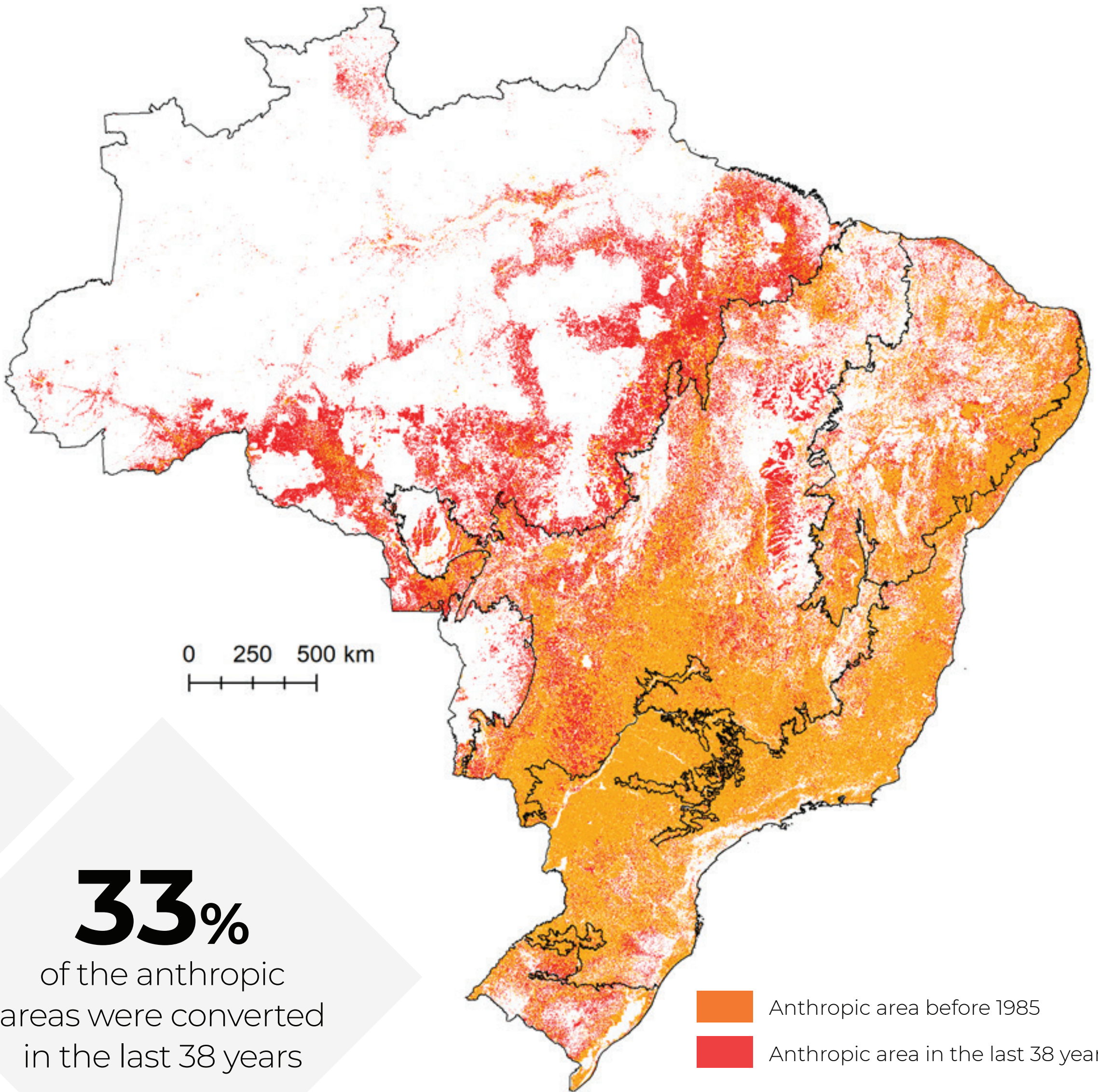**New classes:**
Floodable forest and Palm oil (beta)

Classe	Area (Mha)	%
1. Forest	494.07	58.08%
1.1 Forest Formation	369.05	43.38%
1.2 Savanna Formation	104.49	12.28%
1.3 Mangrove	1.04	0.12%
1.4 Floodable Forest (beta)	18.86	2.22%
1.5 Wooded Sandbank Vegetation	0.63	0.07%
2. Non Forest Natural Formation	48.90	5.75%
2.1 Wetland	14.61	1.72%
2.2 Grassland	32.46	3.82%
2.3 Grassland	0.05	0.01%
2.4 Rocky Outcrop	1.48	0.17%
2.5 Restinga Herbácea	0.28	0.03%
2.6 Outras Formações não Florestais	0.01	<0.01%
3 Farming	282.50	33.21%
3.1 Pasture	164.34	19.32%
3.2. Agriculture	61.04	7.18%
3.2.1 Temporary Crop	58.68	6.90%
3.2.1.1 Soybean	39.37	4.63%
3.2.1.2 Sugar cane	9.21	1.08%
3.2.1.3 Rice	1.45	0.17%
3.2.1.4 Cotton (beta)	0.26	0.03%
3.2.1.5 Other Temporary Crops	8.39	0.99%
3.2.2 Perennial Crop	2.36	0.28%
3.2.2.1 Coffee	1.31	0.15%
3.2.2.2 Citrus	0.23	0.03%
3.2.2.3 Palm Oil (beta)	0.18	0.02%
3.2.1.4 Other Perennial Crops	0.64	0.08%
3.3 Forest Plantation	8.79	1.03%
3.4 Mosaic of Uses	48.32	5.68%
4. Non vegetated area	6.85	0.81%
4.1 Beach, Dune and Sand Spot	0.39	0.05%
4.2 Urban Area	3.71	0.44%
4.3 Mining	0.44	0.05%
4.4 Other non Vegetated Areas	2.32	0.27%
5 Water	18.33	2.15%
5.1 River, Lake and Ocean	18.27	2.15%
5.2 Aquaculture	0.06	0.01%
6 Not Observed	0.01	<0.01%

ANTHROPIC AREAS IN BRAZIL 1985 - 2022
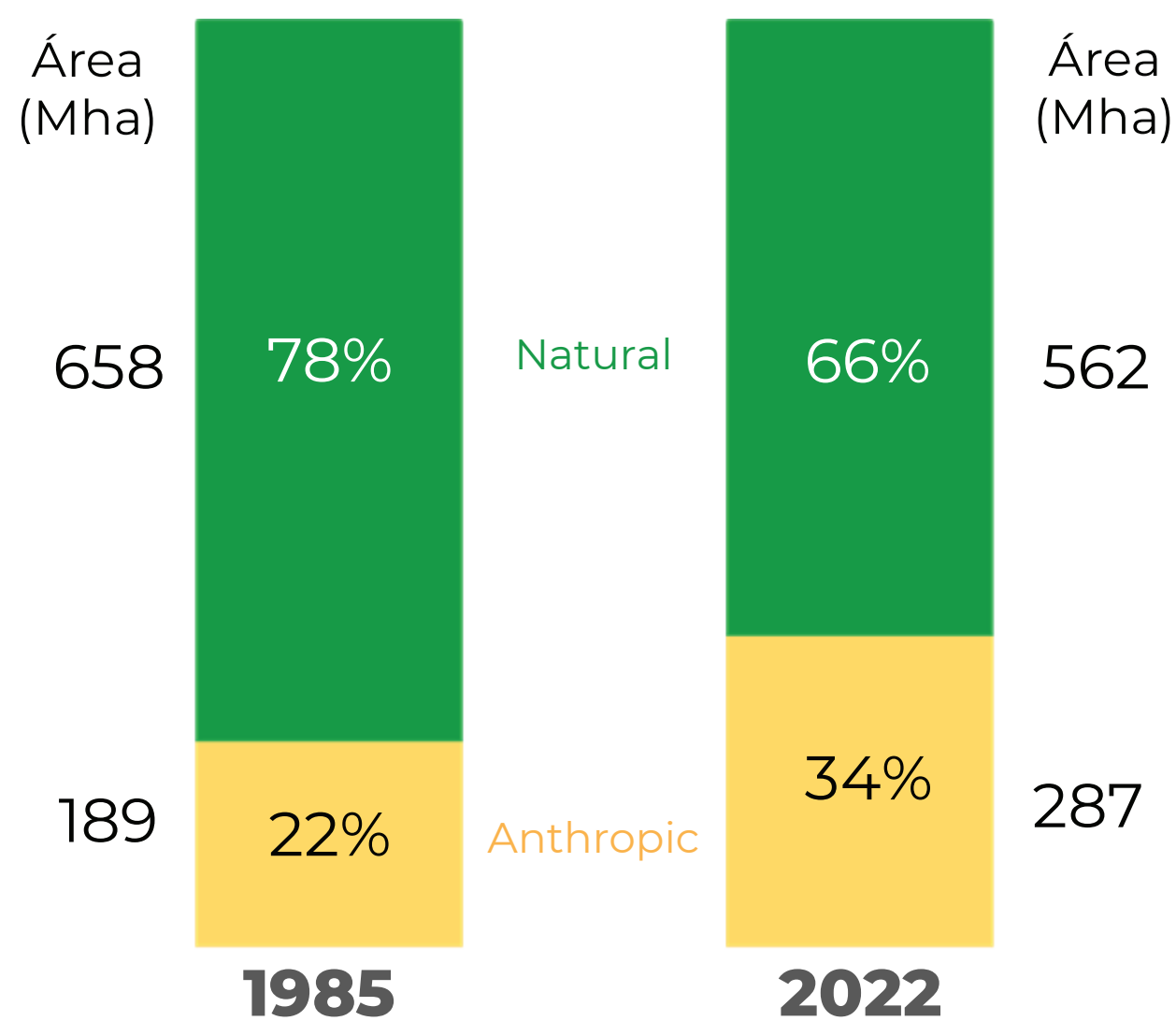
96 Mha (15%) of natural area loss* from 1985 to 2022 (52 Mha in the Amazon)

287
Mha
of anthropic areas in Brazil

0   250   500 km

33% of the anthropic areas were converted in the last 38 years

Anthropic area before 1985

Anthropic area in the last 38 years

Área (Mha)

Área (Mha)

658   78%   Natural   66%   562

189   22%   Anthropic   34%   287
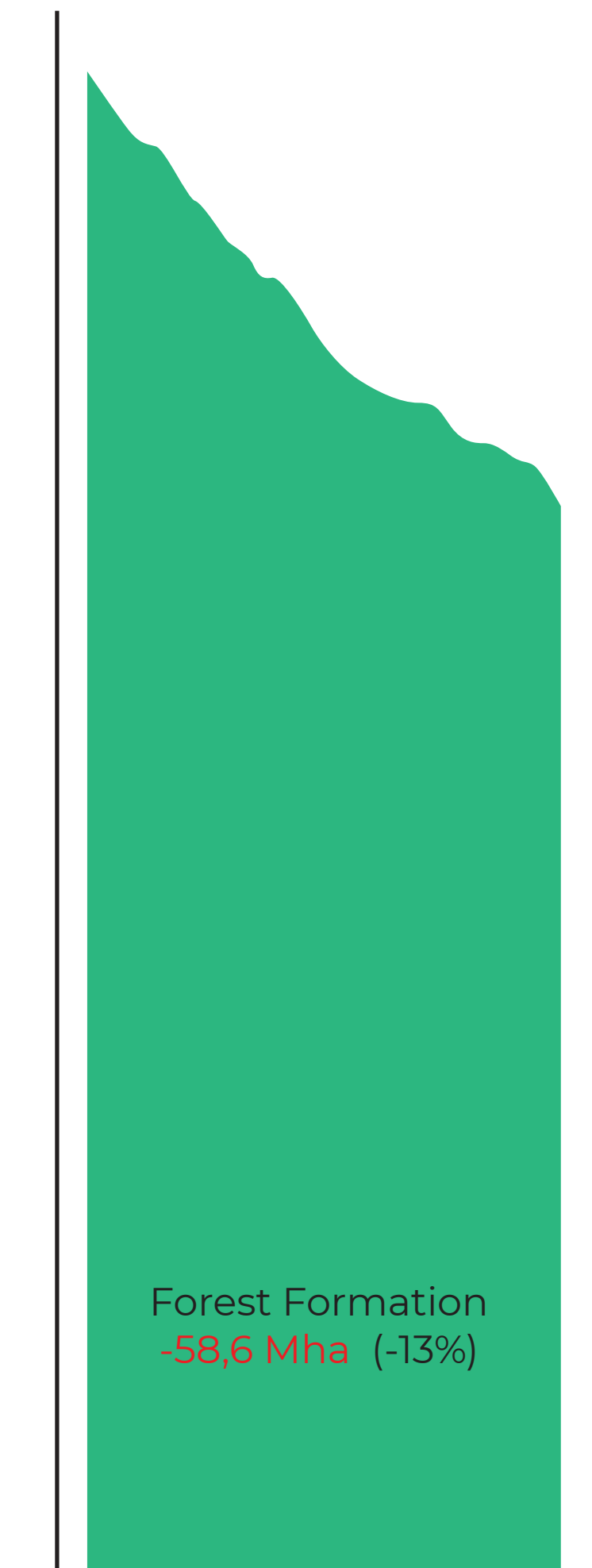
1985   **2022**

*Natural areas encompass the following classes: Forest,. Non Forest Natural Formation, Beach, Dune and Sand Spot, and River, Lake and Ocean.

LAND USE AND LAND COVER HISTORY IN BRAZIL 1985 - 2022
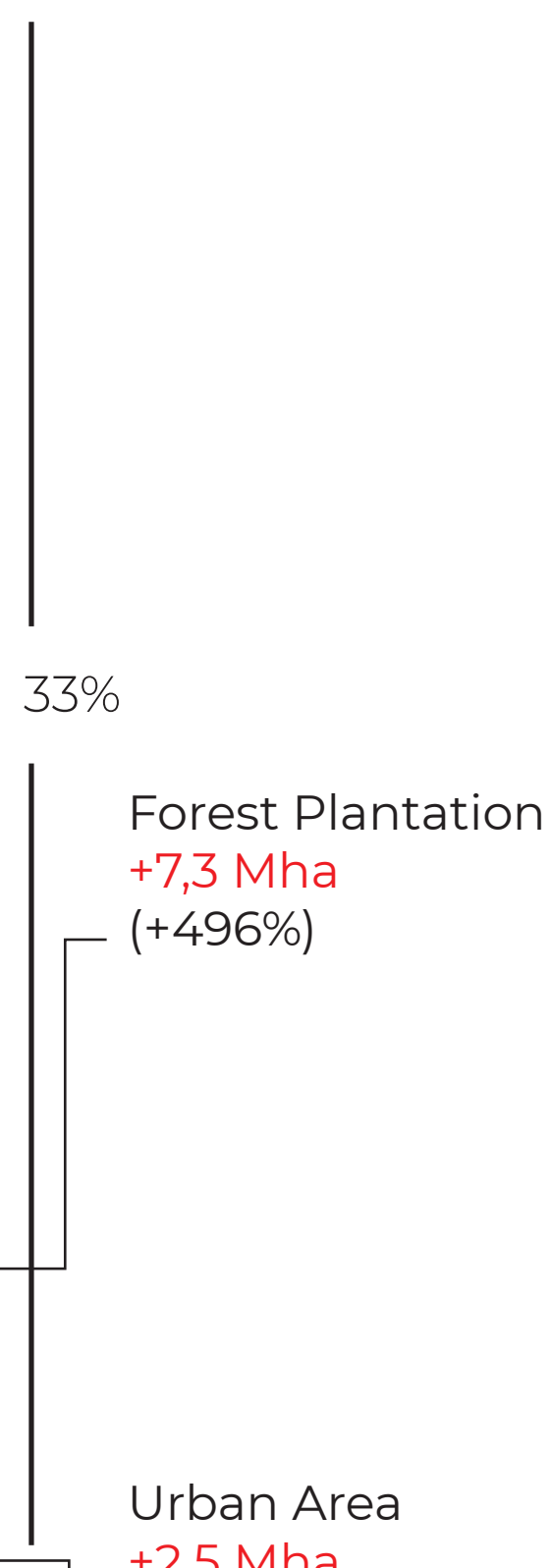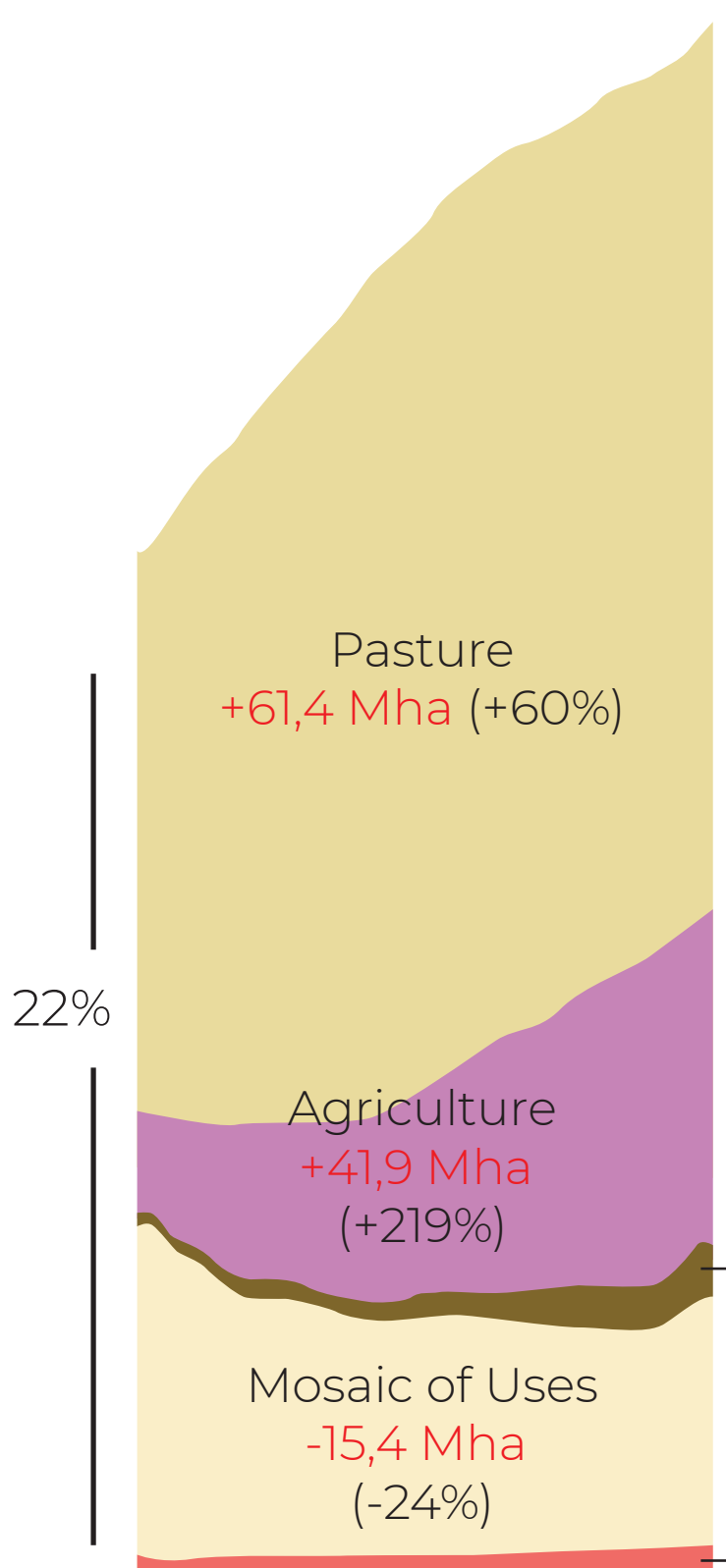
Native Vegetation

1985　　　　　2022

Forest formation
is the land use class with the greatest area loss

Forest Formation
-58,6 Mha (-13%)

Pasture and Agriculture are the land use classes that expanded the most

Anthropic

1985　　　　2022

75%　　　64%

Pasture
+61,4 Mha (+60%)

33%

Floodable Forest
-0,4 Mha (-2%)

Savanna Formation
-28,9 Mha (-22%)

Forest Plantation
+7,3 Mha
(+496%)

22%

Agriculture
+41,9 Mha
(+219%)

Grassland
-3,3 Mha (-9%)

Mosaic of Uses
-15,4 Mha
(-24%)

Urban Area
+2,5 Mha
(+210%)

Wetland
-4,5 Mha (-24%)

NATIVE VEGETATION LOSS IN BRAZIL
IN THE LAST THREE DECADES

The size of the boxes are equivalent to the lost native vegetation area

% of native vegetation in Brazil

74
72
70
68
66
64
62
60

1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012 2014 2016 2018 2020 2022

16.4 Mha

13.3 Mha

18.4 Mha

5.8 Mha

8.0 Mha

12.8 Mha

1993-1997   **1998-2002**   **2003-2007**   **2008-2012**   **2012-2017**   **2018-2022**
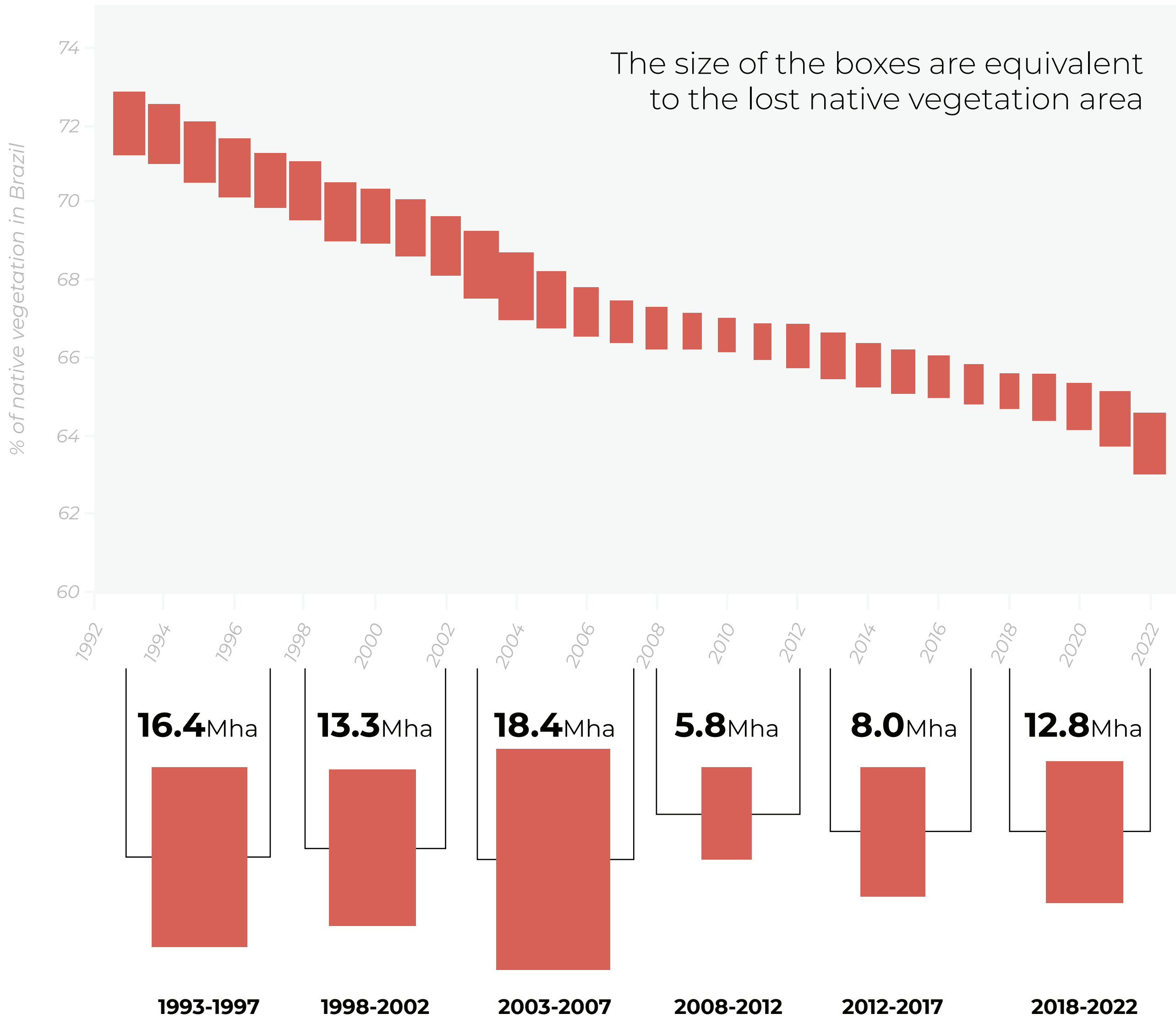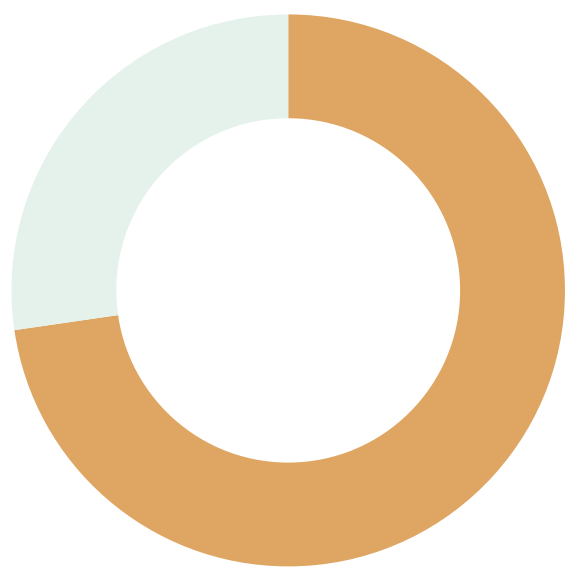
12.8 Mha
of native vegetation were lost in the last 5 years (2018 to 2022), an increase of 120% from 2008-2012.

The last decade has seen an **increase** in the loss of native vegetation.

In the 5-year period before the approval of the Forest Code (2008-2012), there was the **least loss** of native vegetation.

CONVERSION DYNAMICS
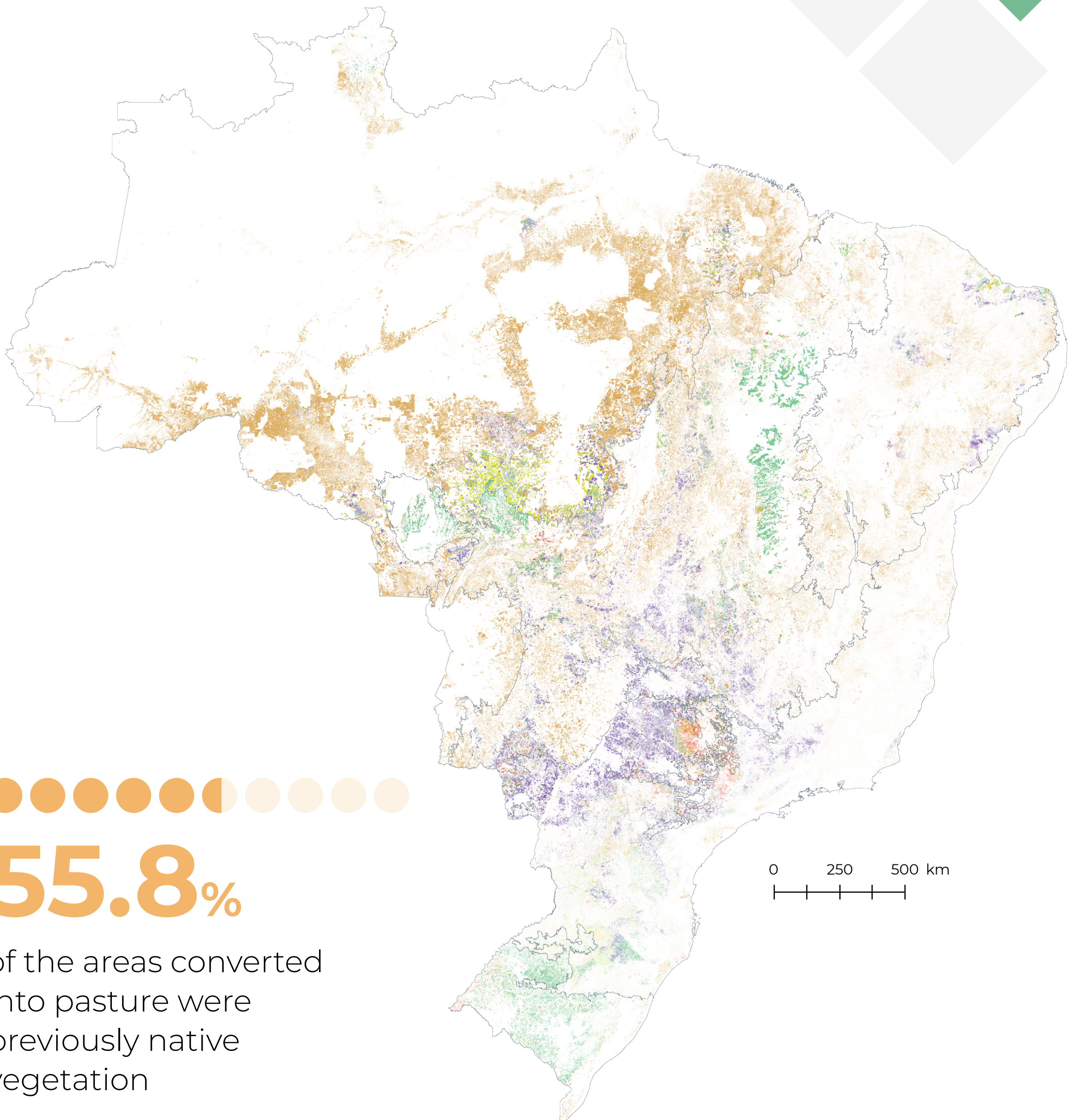# INTO FARMING IN BRAZIL FROM 1992 TO 2022

72.7% of the area converted into agriculture occurred in areas that had already been modified by humans, mainly pastureland

27.3% of the areas converted into temporary crops were previously native vegetation

55.8% of the areas converted into pasture were previously native vegetation

0   250   500 km

Native Vegetation → Pasture → Temporary Crops	🟨	5.4
Other anthropic areas → Temporary Crops	🟥	6.2
Native Vegetation → Temporary Crops	🟩	10.0
Pasture → Temporary Crops	🟪	15.1
Native Vegetation → Pasture	🟧	64.5

0   20   40   60   80

Área (Mha)
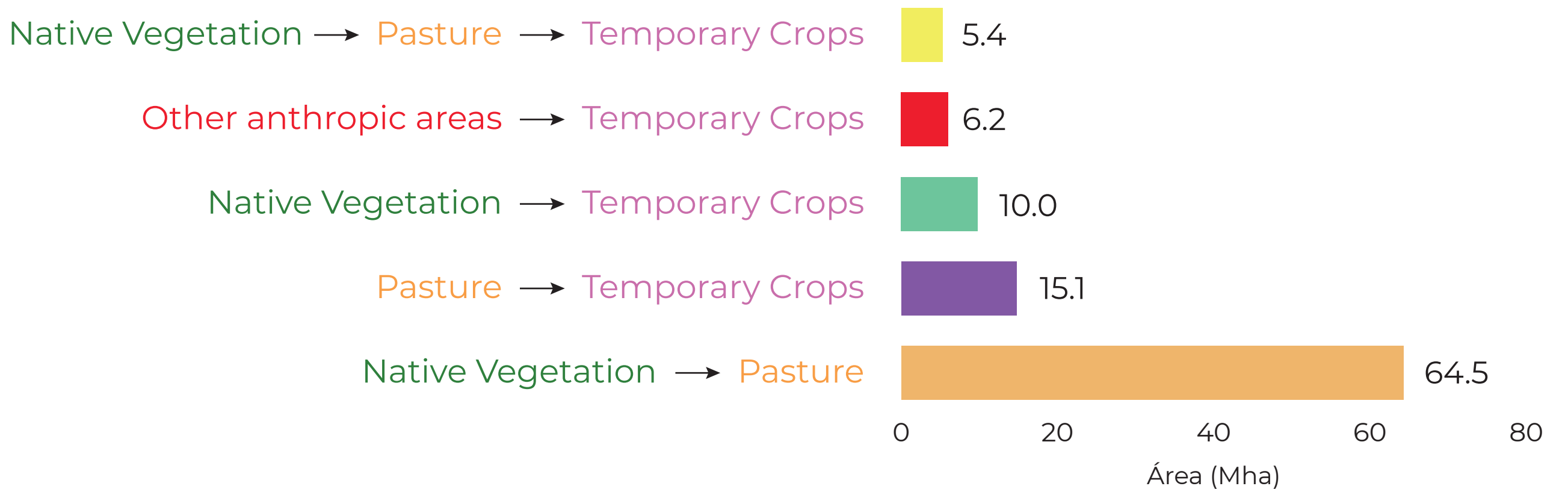
TEMPORARY CROPS EXPANSION IN BRAZIL FROM 1985 TO 2022

3,2x
Expansion of temporary crops in Brazil

9x
Expansion of Soybean crops in Brazil
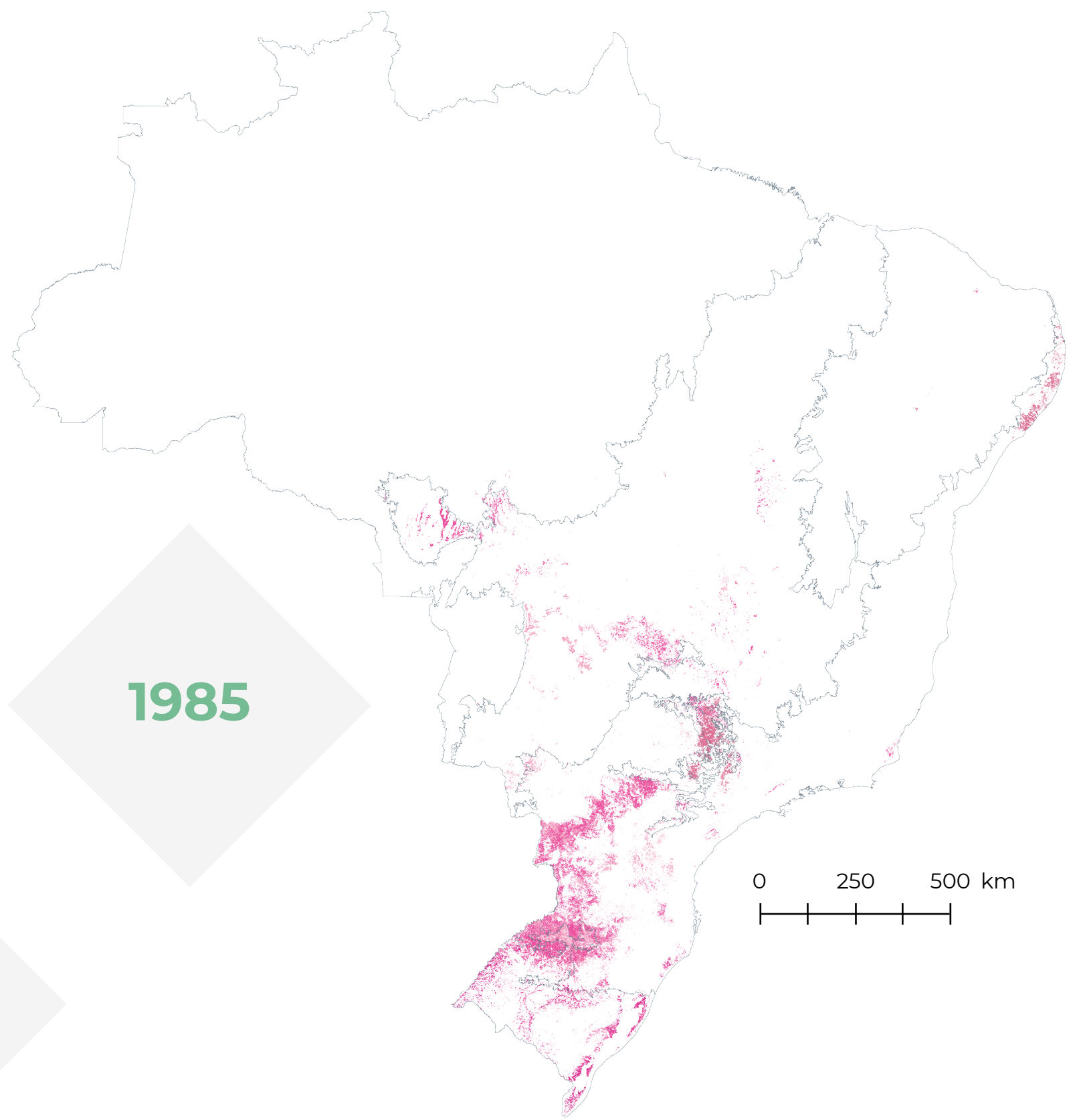
1985

2022

0   250   500 km
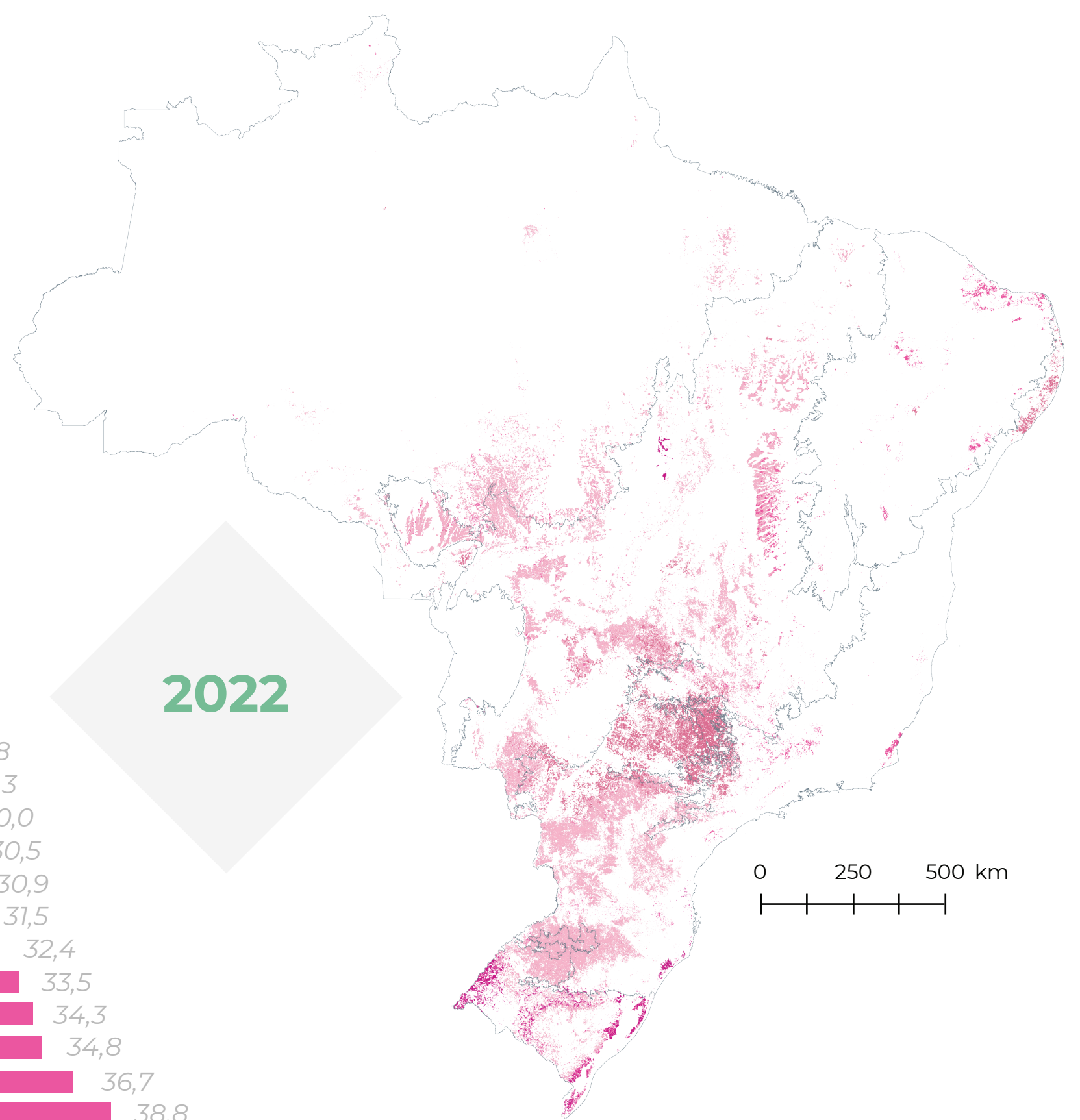
Temporary crops area in Brazil from 1985 to 2022 (Mha)

Year	Area (Mha)
1985	18,3
1986	18,4
1987	20,0
1988	21,3
1989	22,7
1990	24,4
1991	26,5
1992	27,2
1993	28,1
1994	28,8
1995	29,3
1996	30,0
1997	30,5
1998	30,9
1999	31,5
2000	32,4
2001	33,5
2002	34,3
2003	34,8
2004	36,7
2005	38,8
2006	40,8
2007	42,4
2008	43,9
2009	45,1
2010	46,0
2011	46,6
2012	47,7
2013	49,5
2014	51,7
2015	53,5
2016	54,9
2017	56,4
2018	56,7
2019	57,2
2020	58,0
2021	58,2
2022	58,7

0   20   40   60
Area (Mha)

Legend: Soy | Rice | Sugar cane | Cotton | Other temporary crops

Brazil's soybean area increased by **39.3 Mha**, which is equivalent to the area of Paraguay.

# LAND USE AND LAND COVER HISTORY IN THE BIOMES 1985 - 2022
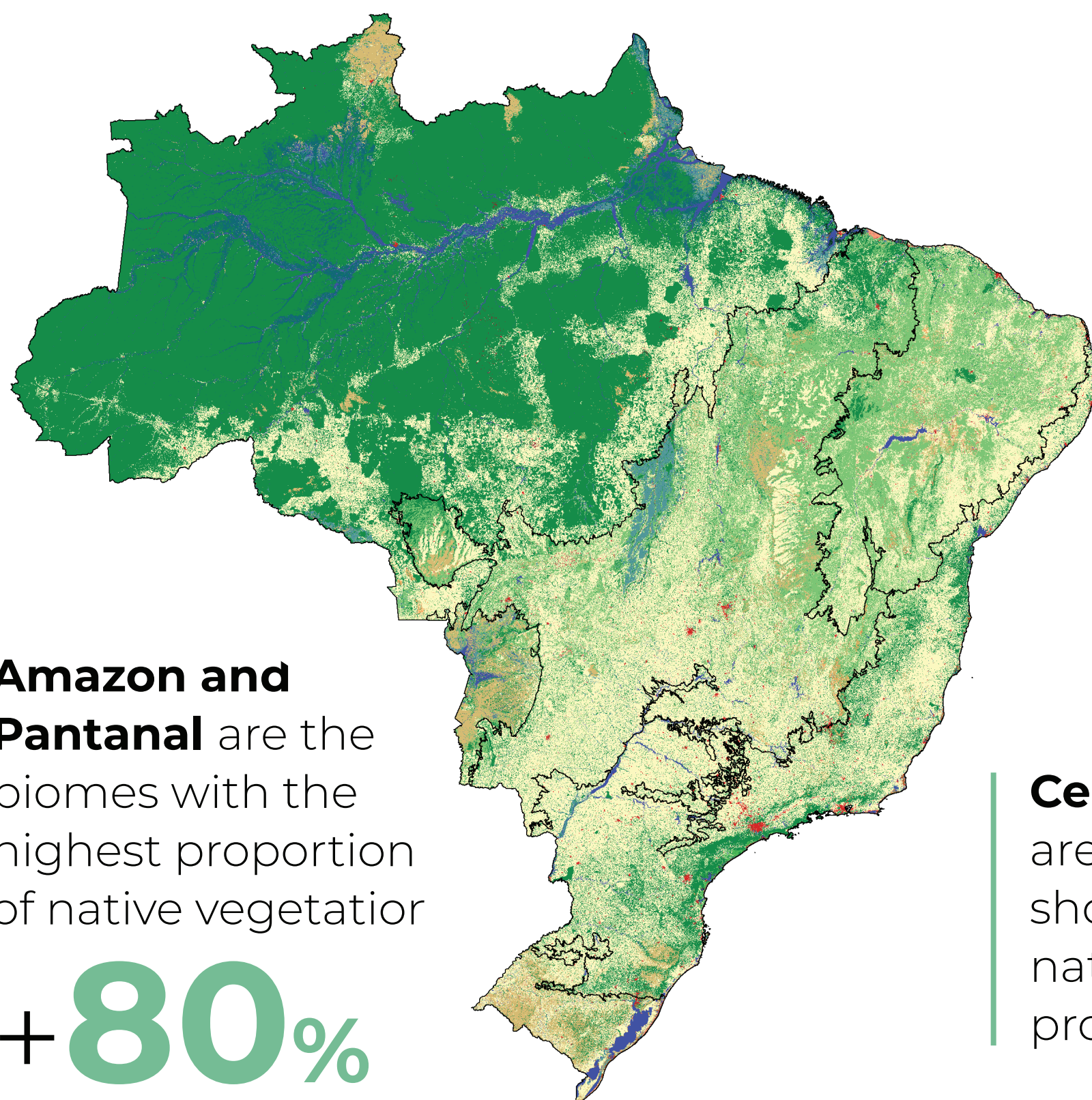
**Amazon and Cerrado** showed the greatest native vegetation loss in area

Amazon and Pantanal are the biomes with the highest proportion of native vegetation

+80%

Cerrado and Pampa are the biomes that showed the greatest native vegetation loss proportionately
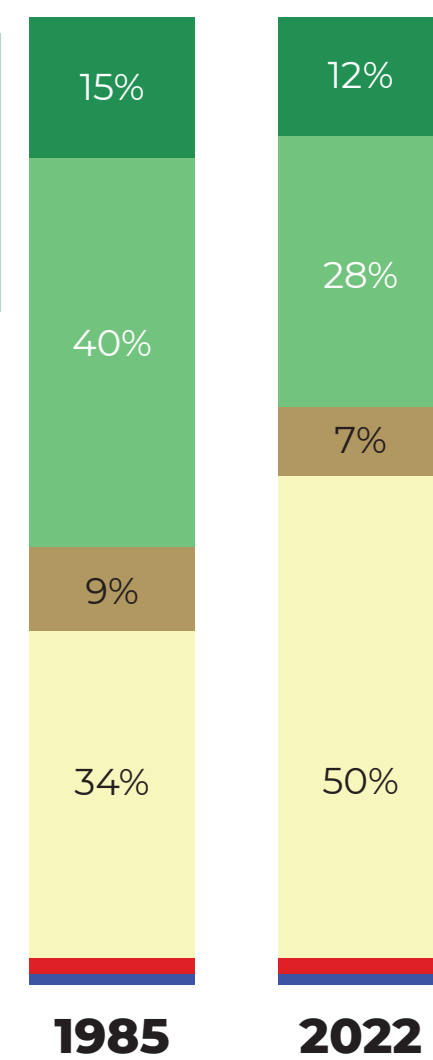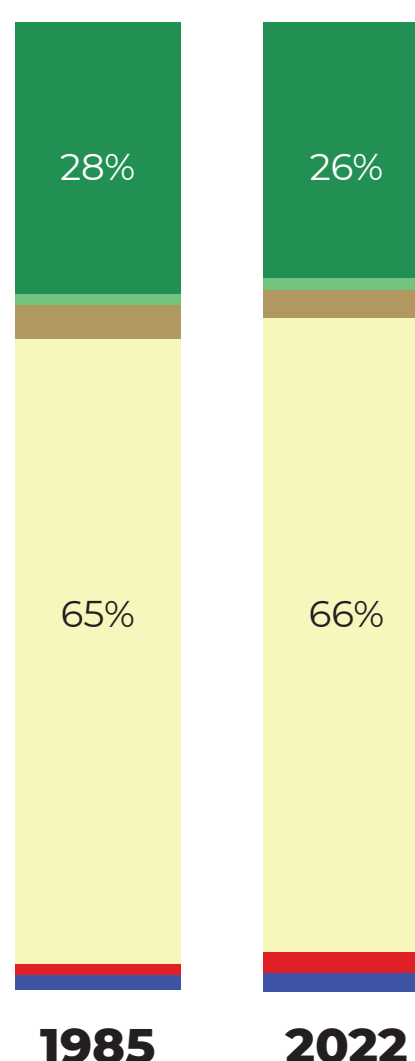
AMAZON
Native vegetation loss
1985 - 2022
13%
(53.2 Mha)
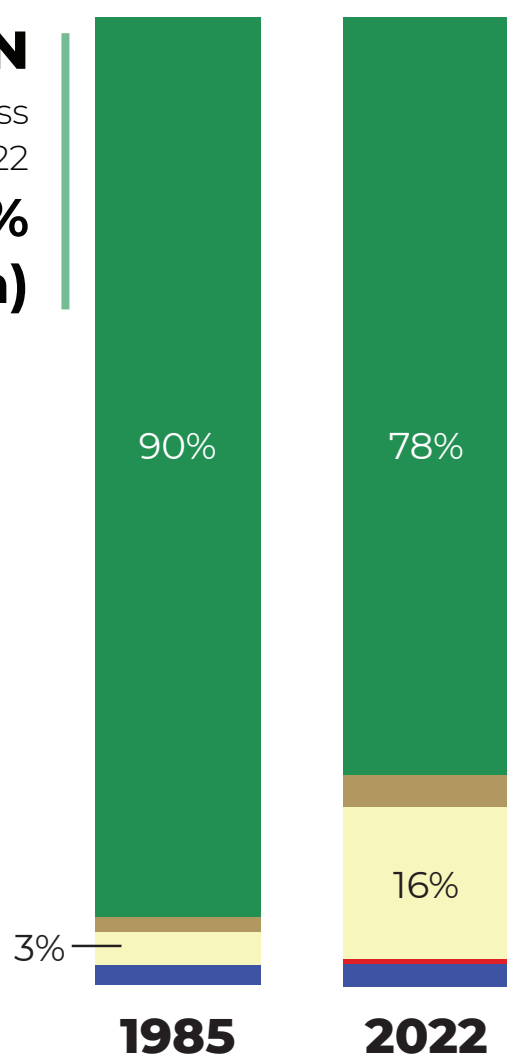
1985	2022
90%	78%
	16%
3%	

CAATINGA
Native vegetation loss
1985 - 2022
11%
(6.0 Mha)
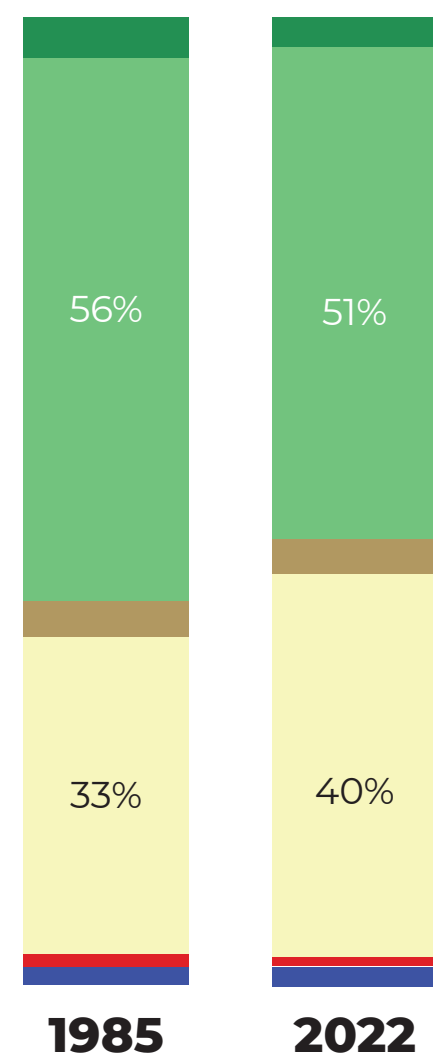
1985	2022
56%	51%
33%	40%

CERRADO
Native vegetation loss
1985 - 2022
25%
(32.1 Mha)

1985	2022
15%	12%
40%	28%
9%	7%
34%	50%

ATLANTIC FOREST
Native vegetation loss
1985 - 2022
7%
(2.4 Mha)

1985	2022
28%	26%
65%	66%

PAMPA
Native vegetation loss
1985 - 2022
24%
(2.8 Mha)

1985	2022
12%	12%
48%	34%
29%	44%
9%	9%
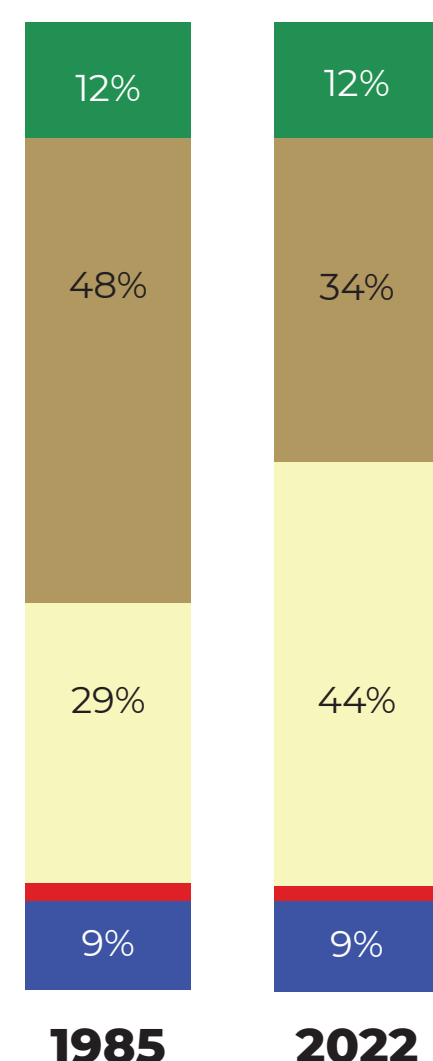
PANTANAL
Native vegetation loss
1985 - 2022
10%*
(1.5 Mha)

1985	2022
19%	16%
17%	16%
36%	49%
5%	15%
23%	5%
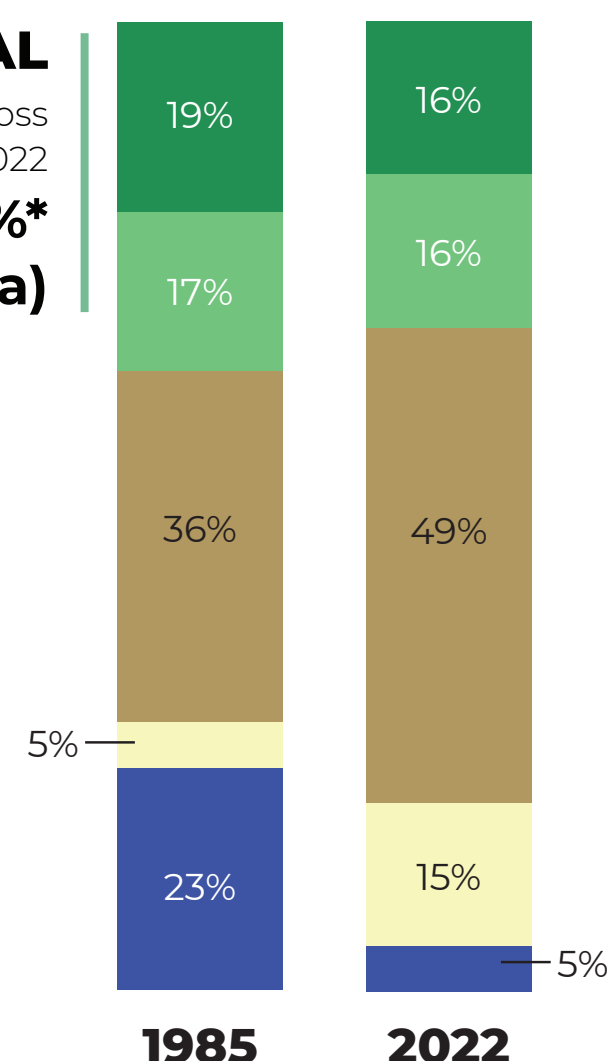
Legend:
- Forest Formation
- Savanna Formation
- Non Forest Natural Formation
- Farming
- Non vegetated area
- Water

*Native vegetation loss is the conversion into anthropic use and disregards the increase in pasture due to water shrinking.

NATURAL AND ANTHROPIC AREAS IN THE STATES 1985 – 2022

Porcentagem (%)

AC
- 97% / 85%
- 3% / 14%

AL
- 25% / 20%
- 44% / 53%

AM
- 97% / 95%

AP
- 98% / 95%
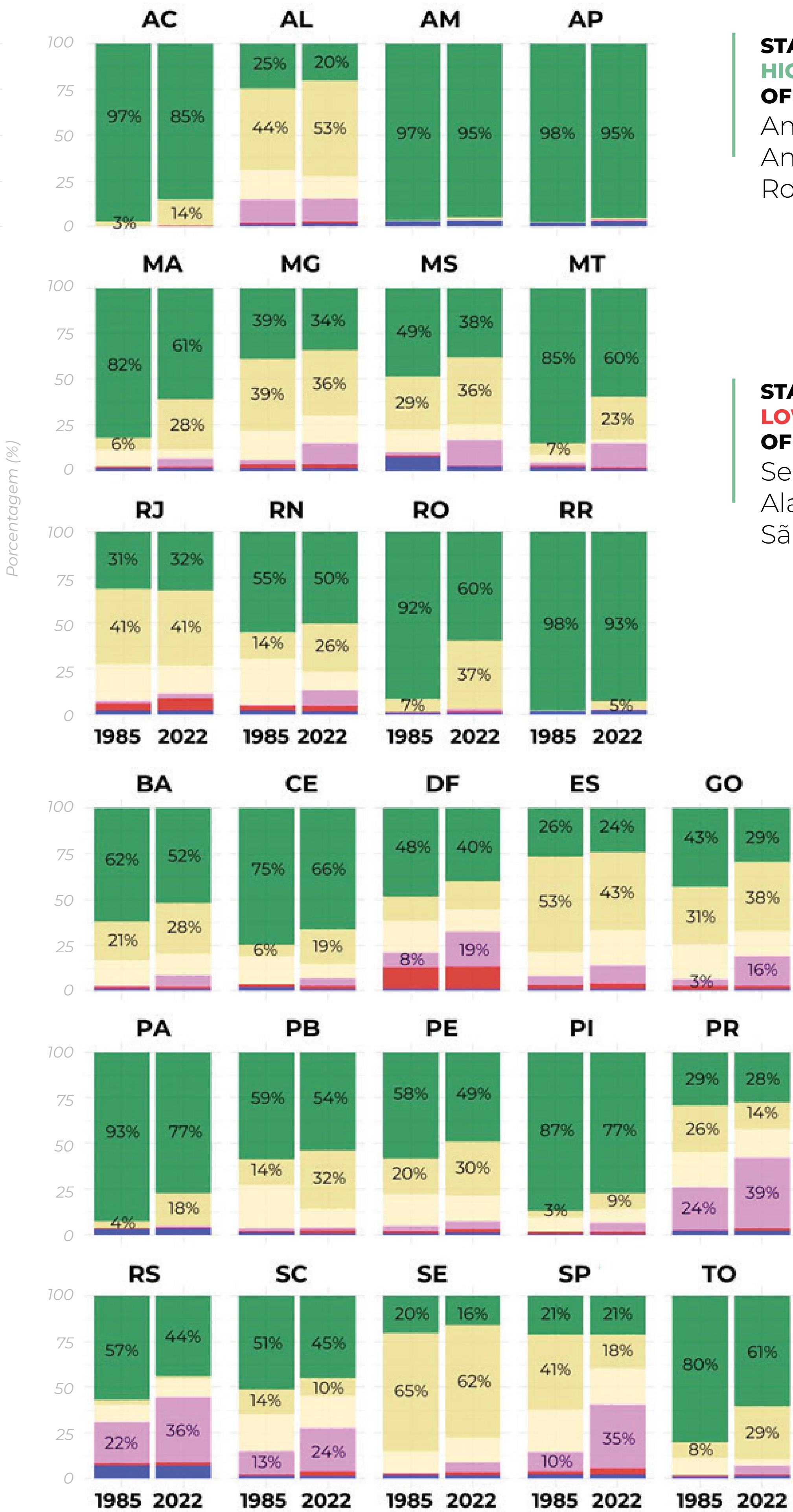
STATES WITH THE HIGHEST PROPORTION OF NATIVE VEGETATION
Amapá (95%)
Amazonas (95%)
Roraima (93%)

MA
- 82% / 61%
- 6% / 28%

MG
- 39% / 34%
- 39% / 36%

MS
- 49% / 38%
- 29% / 36%

MT
- 85% / 60%
- 7% / 23%

STATES WITH THE LOWEST PROPORTION OF NATIVE VEGETATION
Sergipe (16%)
Alagoas (20%)
São Paulo (21%)

RJ
- 31% / 32%
- 41% / 41%

RN
- 55% / 50%
- 14% / 26%

RO
- 92% / 60%
- 7% / 37%

RR
- 98% / 93%
- 5%

1985 2022 | 1985 2022 | 1985 2022 | 1985 2022

BA
- 62% / 52%
- 21% / 28%

CE
- 75% / 66%
- 6% / 19%

DF
- 48% / 40%
- 8% / 19%

ES
- 26% / 24%
- 53% / 43%

GO
- 43% / 29%
- 31% / 38%
- 3% / 16%

25 states
showed native vegetation loss

PA
- 93% / 77%
- 4% / 18%

PB
- 59% / 54%
- 14% / 32%

PE
- 58% / 49%
- 20% / 30%

PI
- 87% / 77%
- 3% / 9%

PR
- 29% / 28%
- 26% / 14%
- 24% / 39%

RS
- 57% / 44%
- 22% / 36%

SC
- 51% / 45%
- 14% / 10%
- 13% / 24%

SE
- 20% / 16%
- 65% / 62%

SP
- 21% / 21%
- 41% / 18%
- 10% / 35%

TO
- 80% / 61%
- 8% / 29%

1 state
showed native vegetation area increase (RJ)

1985 2022 | 1985 2022 | 1985 2022 | 1985 2022 | 1985 2022

Legend:
- Native vegetation
- Savanna Formation
- Non Forest Natural Formation
- Non vegetated areas
- Pasture
- Agriculture
- Mosaic of uses
- Water
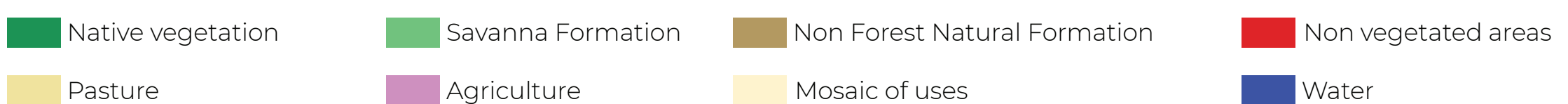
PREDOMINANT LAND USE AND LAND COVER IN EACH MUNICIPALITY

1985

Legend:
- Forest Formation
- Savanna Formation
- Wetland
- Grassland
- Floodable Forest
- Pasture
- Agriculture
- Mosaic of uses
- Urban Area
- Water

2022

1985
- 24%
- 22%
- 33%
- 8%
- 9%

2022
- 19%
- 17%
- 37%
- 18%
- 6%

In 1985, **50% OF THE MUNICIPALITIES** were dominated by farming.

In 2022, this percentage increased to **60%.**
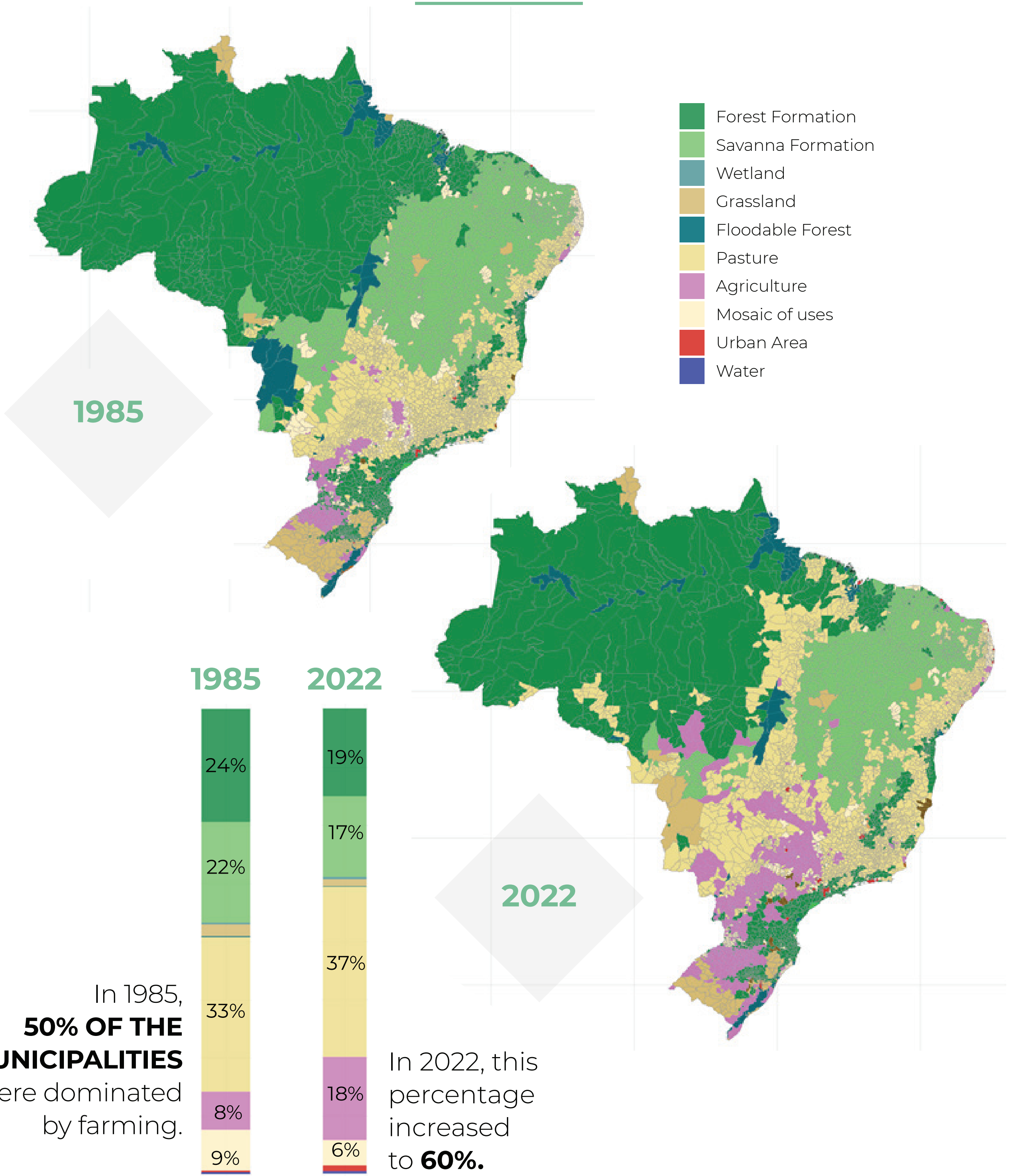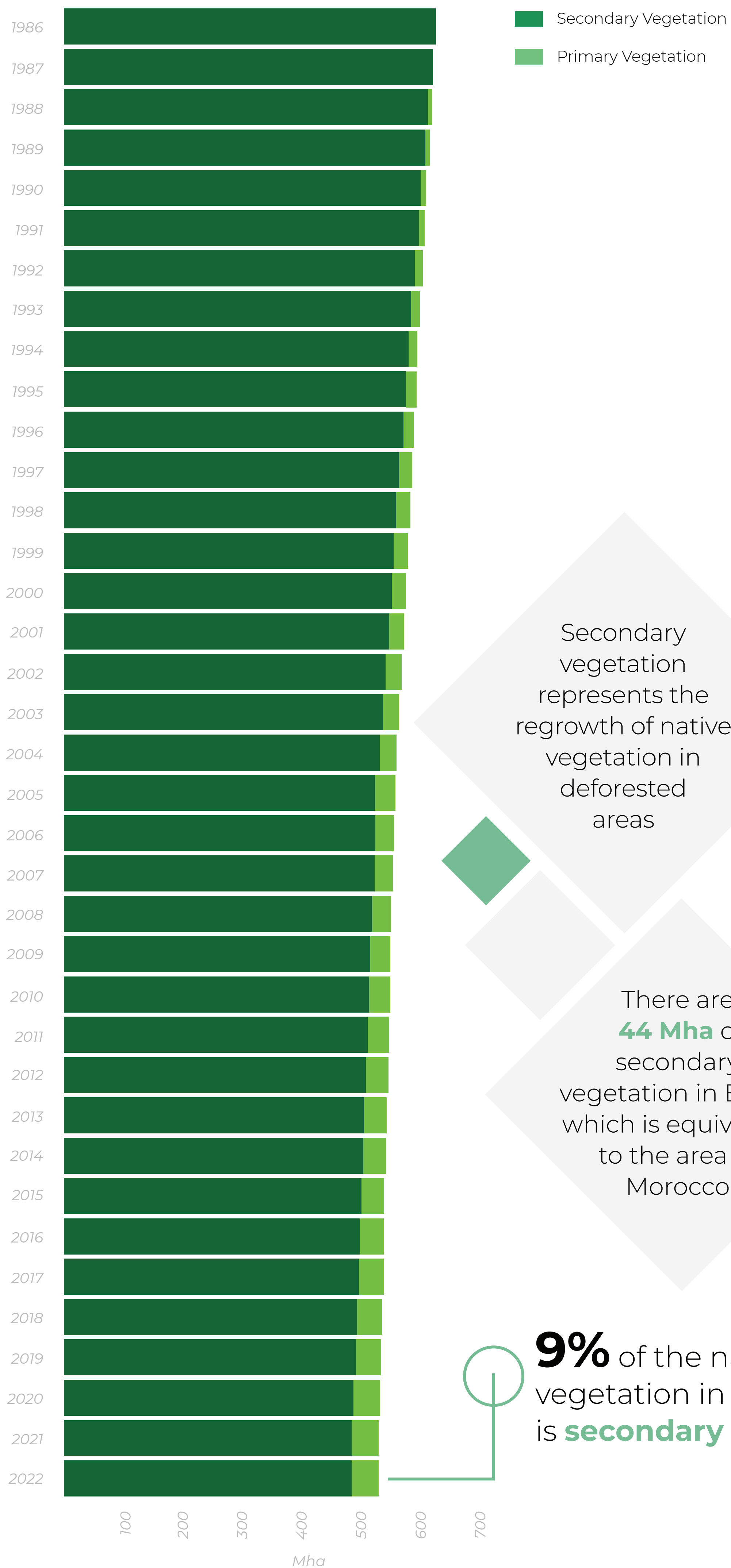
602
MUNICIPALITIES
no longer have native vegetation as predominant land cover comparing 1985 and 2022

Net difference in municipalities by type of predominant land cover between 1985 and 2022

Quantidade de municípios

- 527
- 174
- 54
- -9
- -54
- -182
- -243
- -296

400

200

0

-200
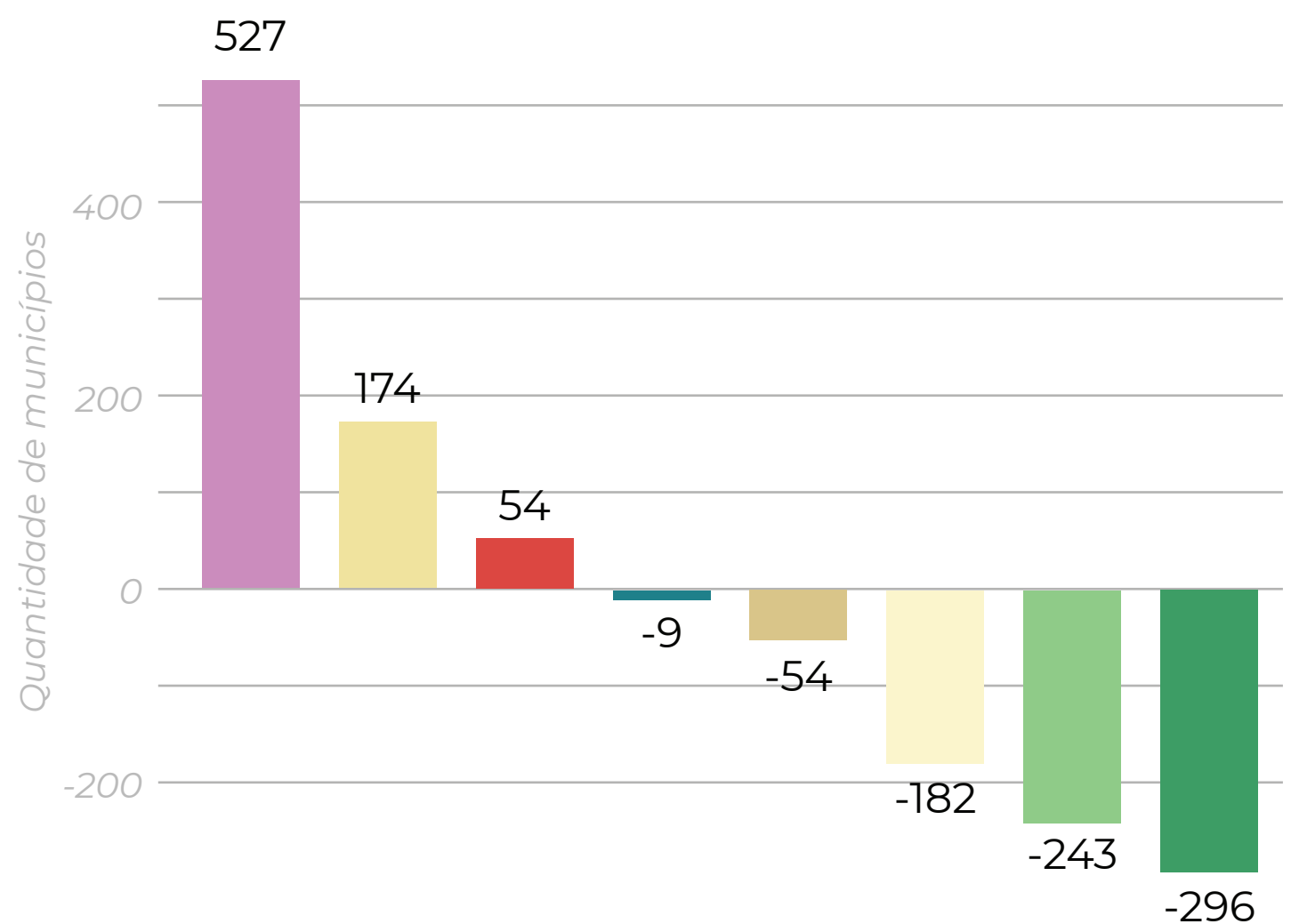
SECONDARY NATIVE VEGETATION IN BRAZIL 1986-2022

Legend:
- Secondary Vegetation
- Primary Vegetation

Years (top to bottom): 1986, 1987, 1988, 1989, 1990, 1991, 1992, 1993, 1994, 1995, 1996, 1997, 1998, 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022

X-axis: 100, 200, 300, 400, 500, 600, 700

Mha

Secondary vegetation represents the regrowth of native vegetation in deforested areas

There are **44 Mha** of secondary vegetation in Brazil, which is equivalent to the area of Morocco

9% of the native vegetation in Brazil is **secondary**

LAND USE AND LAND COVER BY LAND TENURE 1985-2022

PRIVATE LAND

- Assentamento
- CAR
- SIGEF
- Terra Legal
- Infraestrutura

0   500   1000 km

PROTECTED AREAS

- Território Comunitário
- Terras Indígenas
- Unidades de Conservação

0   500   1000 km

PUBLIC LAND

- Área Pública
- Não Destinadas
- Vazio Fundiário

0   500   1000 km
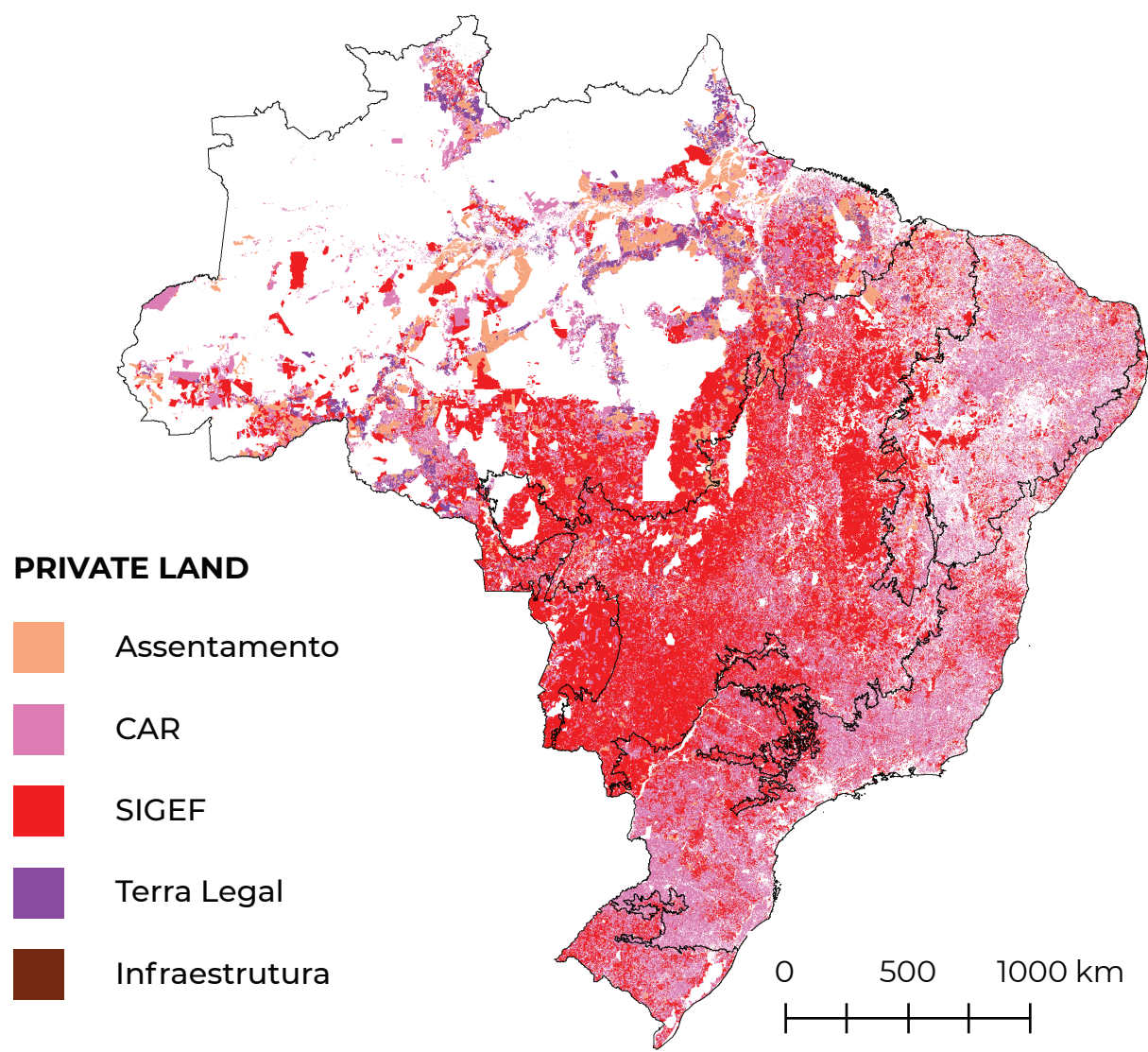
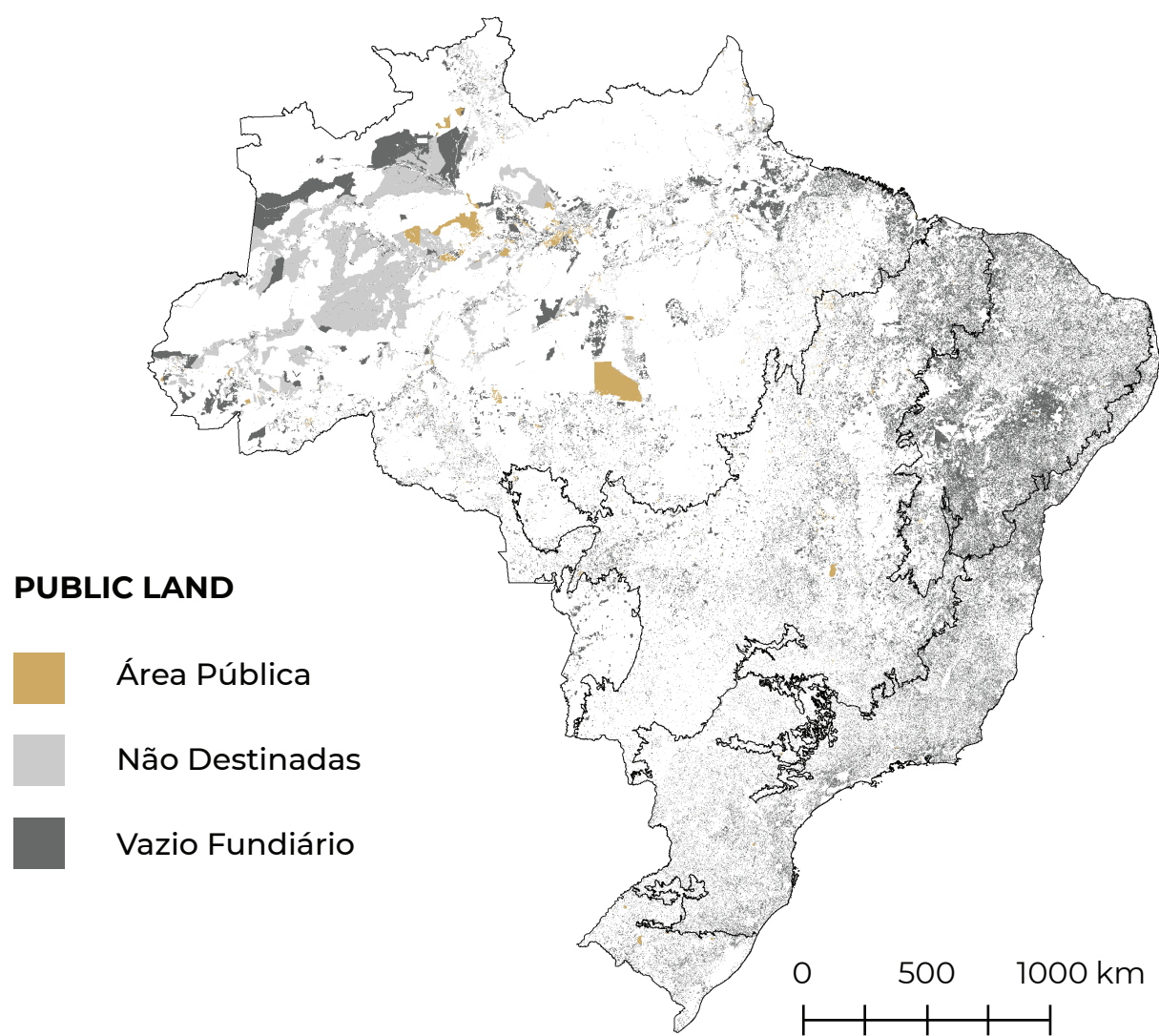Most of the native vegetation loss (85%) was in **private lands**

Native vegetation **occupies less than half** of the area of private lands
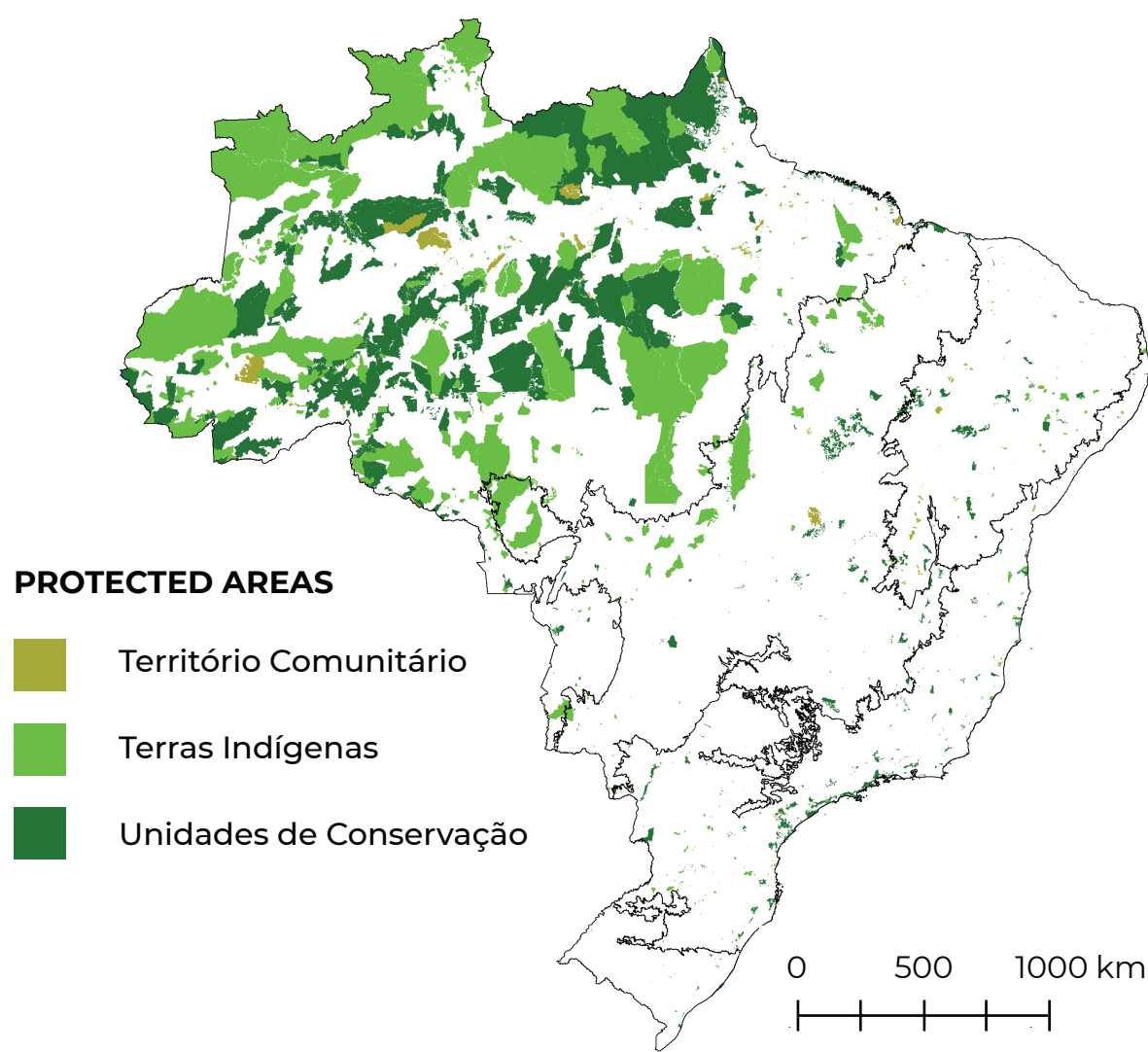
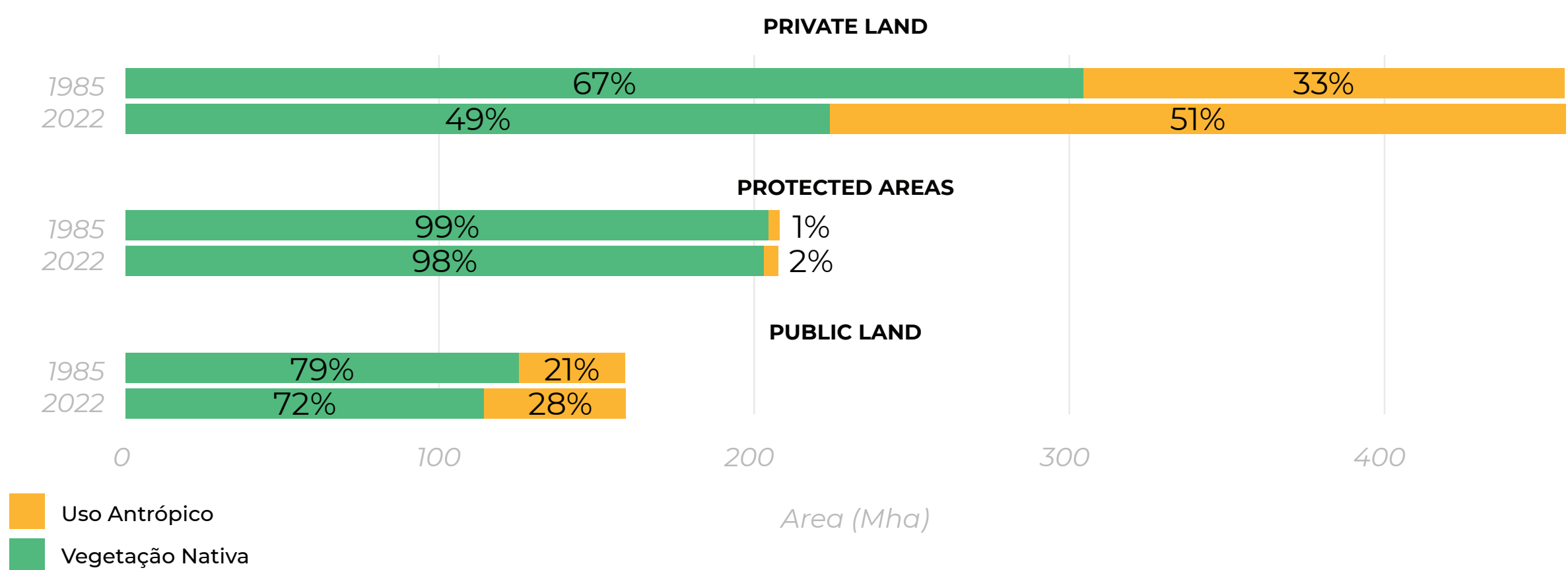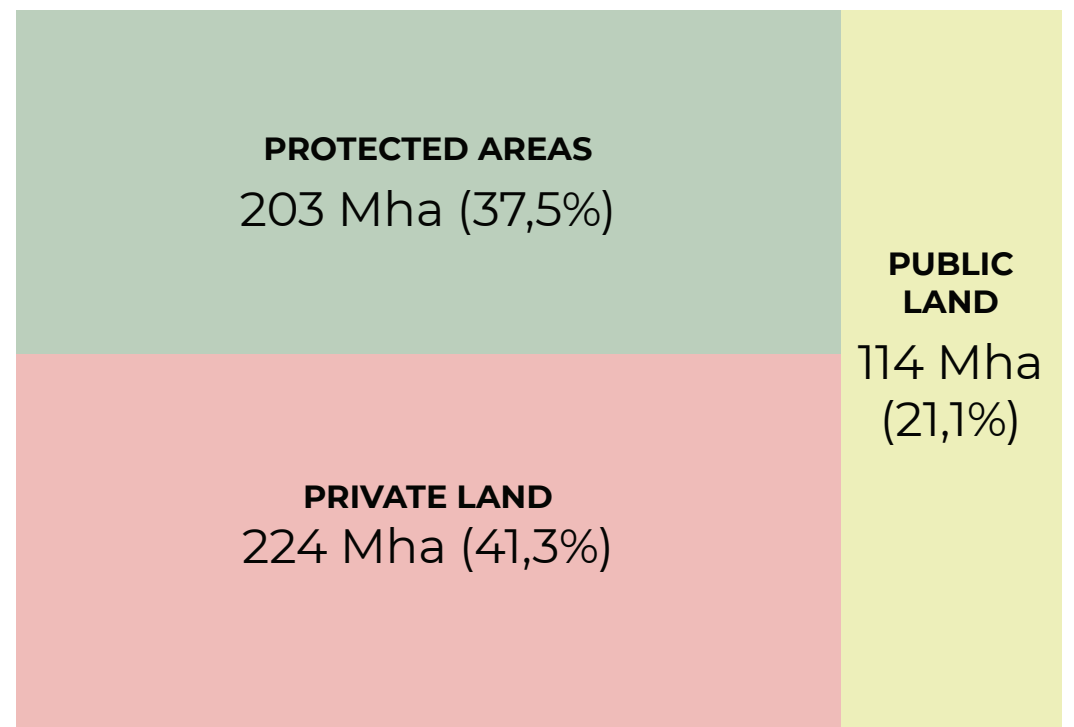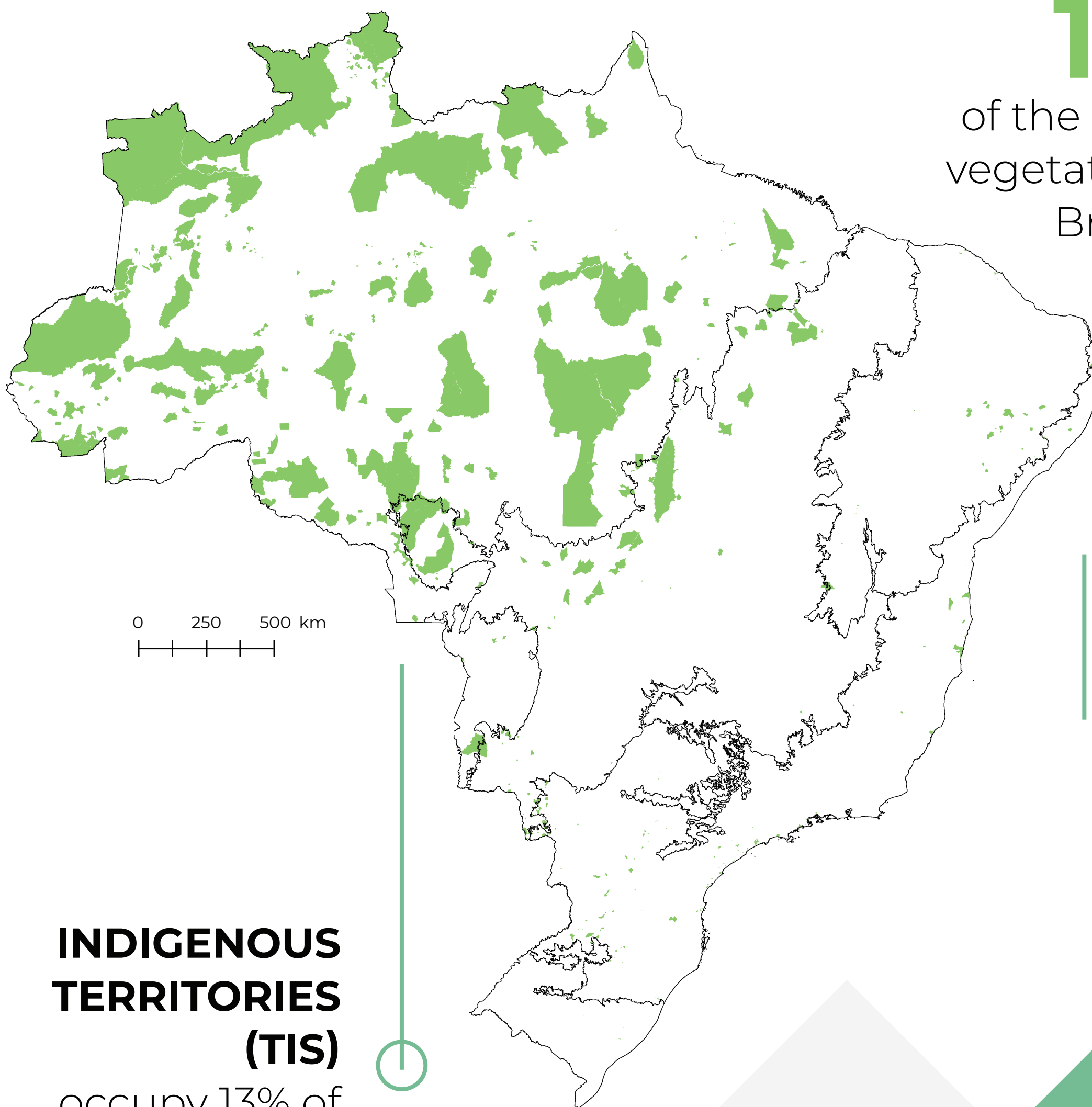**41,3%** of the native vegetation in Brazil is in private lands
SIGEF, CAR, Terra Legal, Assentamento, Infra. Urbana

Native Vegetation (2022)

PROTECTED AREAS
203 Mha (37,5%)

PUBLIC LAND
114 Mha (21,1%)

PRIVATE LAND
224 Mha (41,3%)

PRIVATE LAND

	Vegetação Nativa	Uso Antrópico
1985	67%	33%
2022	49%	51%

PROTECTED AREAS

	Vegetação Nativa	Uso Antrópico
1985	99%	1%
2022	98%	2%

PUBLIC LAND

	Vegetação Nativa	Uso Antrópico
1985	79%	21%
2022	72%	28%

0   100   200   300   400

Area (Mha)

- Uso Antrópico
- Vegetação Nativa

NATIVE VEGETATION IN INDIGENOUS LANDS

**19%** of the native vegetation in Brazil in 2022

1% **of the native vegetation loss** of the entire country in the last three decades

0   250   500 km

INDIGENOUS TERRITORIES (TIS) occupy 13% of the Brazilian territory and comprise **112 Mha** of native vegetation

Among other and tenure categories TIs are one of the most conserved, with around **1 Mha of deforested.**

In Brazil, from 1985 to 2022, **TIs lost less than 1%** of the native vegetation, while **private lands lost 17%**

17%

1%

TIs   Private lands
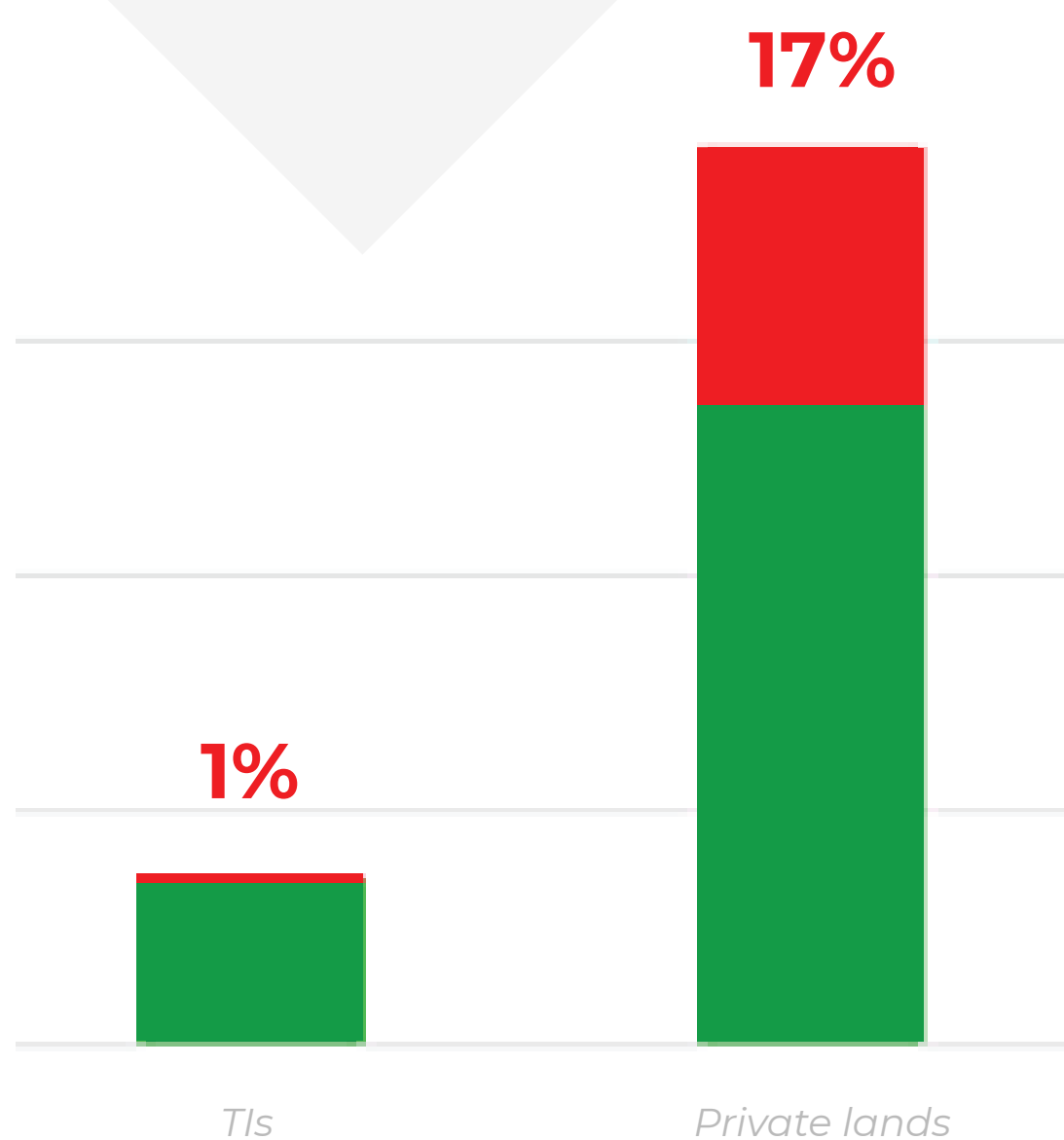
KEY FEATURES OF THE METHOD

Collaborative network
+100 specialists from universities, NGOs, and technology startups from Brazil

Processing all Landsat images
available in 38 years
Landsat 5, 7 and 8
(more than 150 thousand images)

Annual data on 29 land use and land cover classes from 1985 to 2022
30m resolution

Cloud processing using artificial intelligence algorithms
Google Earth Engine Platform

HOW TO REFERENCE:

MapBiomas data is free and open access under a Creative Commons CC-BY-SA license and is cited in the following format:

"MapBiomas Project - Annual Land Use and Land Cover Mapping of Brazil - Collection 8, accessed on [DATA] through the link: [LINK]"

The complete description of the methodology applied in Collection 8 of MapBiomas can be accessed at **https://mapbiomas.org/download-dos-atbds**

Learn more at: mapbiomas.org