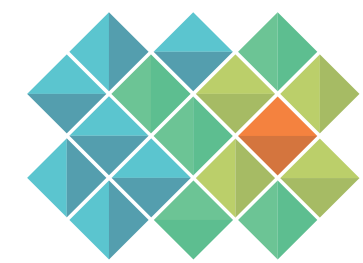


FACTSHEET
ANNUAL MAPPING OF LAND
COVER AND LAND USE IN THE
AMAZON 1985 - 2021

COLLECTION 4



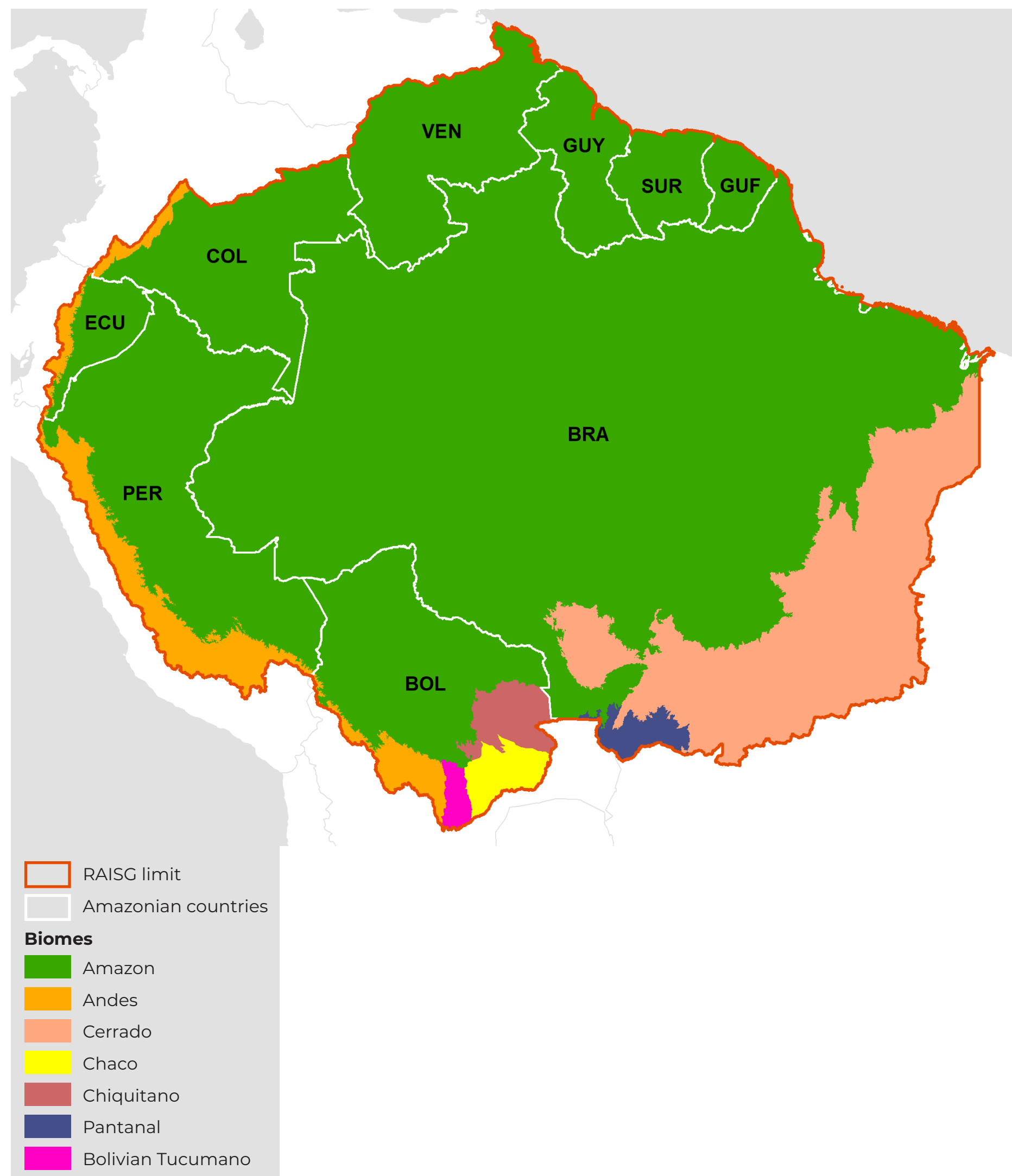
MAPBIOMAS [AMAZONIA]

RAISG
RED AMAZÓNICA DE INFORMACIÓN
SOCIOAMBIENTAL GEORREFERENCIADA

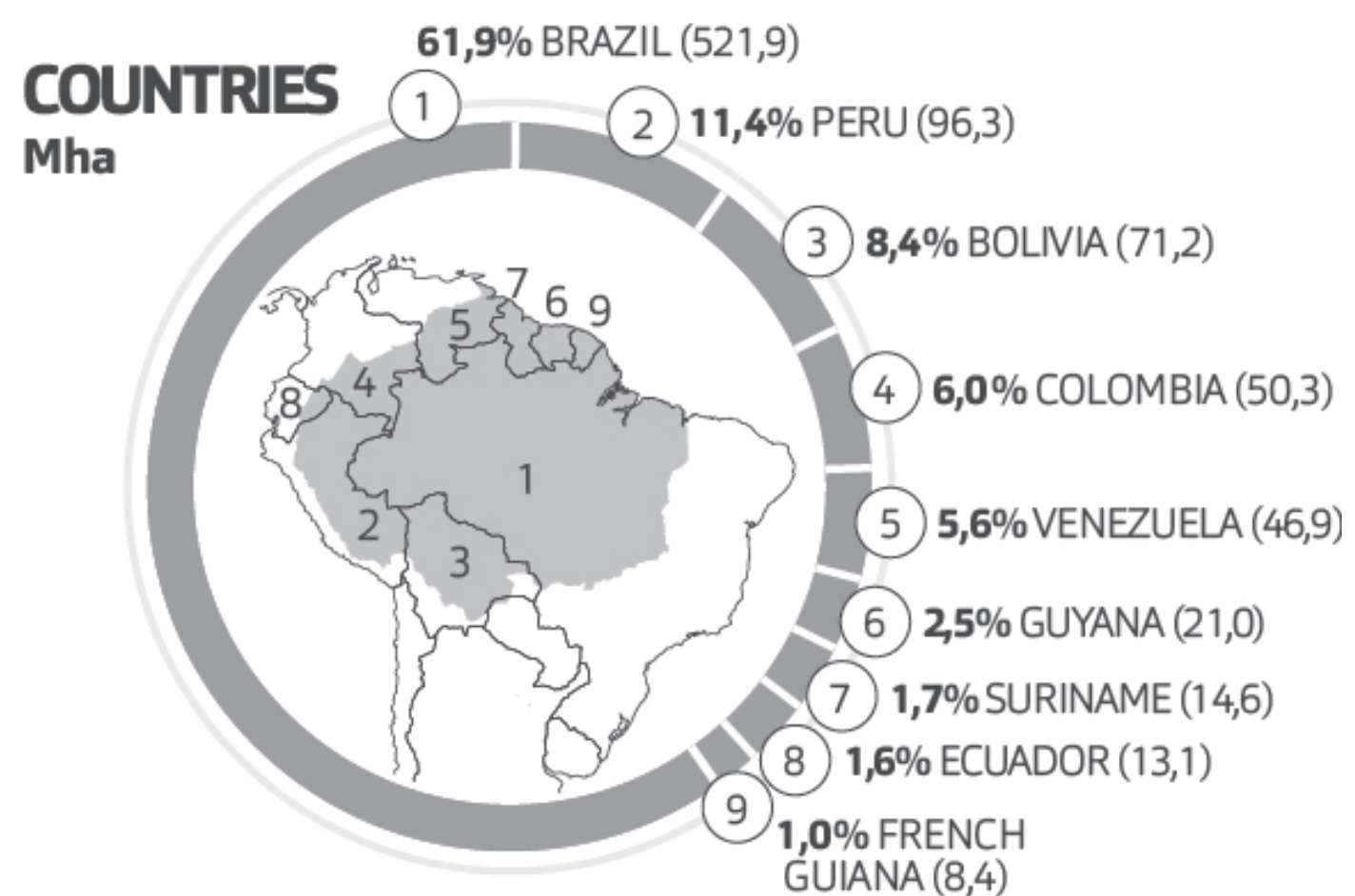
For more information:
amazonia.mapbiomas.org

DECEMBER 2022

COUNTRIES AND BIOMES OF THE AMAZON



Percentage of each country in the Amazon



844 Mha
 is the total area of the Amazon

47% of South America

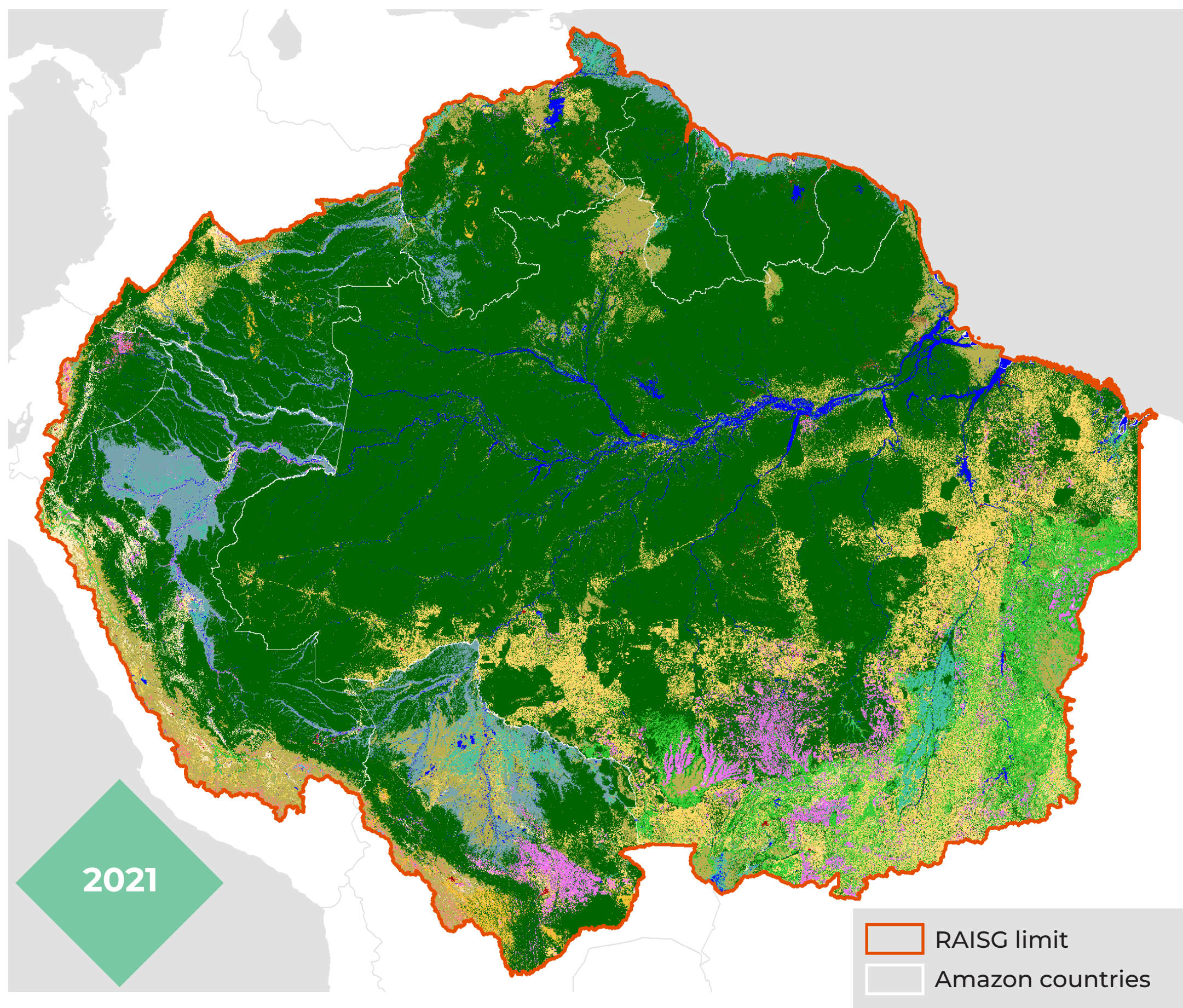
COUNTRIES AND BIOMES OF THE AMAZON

BIOME	Mha	%	BOLIVIA	BRAZIL	COLOMBIA	ECUADOR	GUYANA	FRENCH GUIANA	PERU	SURINAME	VENEZUELA
AMAZON	695.8	82.5	●	●	●	●	●	●	●	●	●
ANDES	30.4	3.6	●		●	●			●		
CERRADO	95	11.3		●							
CHACO	6.4	0.8	●								
CHIQUITANO	8.2	1	●								
PANTANAL	5.4	0.6		●							
BOLIVIAN TUCUMANO	2.5	0.3	●								
TOTAL	843.7	100									

**Area calculated from Google Earth Engine using ee.Image.pixelArea WGS84 UTM Web Mercator. The surfaces may differ from the data handled at the national level depending on their projections.

Mha Million hectares

LAND COVER AND LAND USE IN THE AMAZON IN 2021



MAPPED CLASSES

Legend description

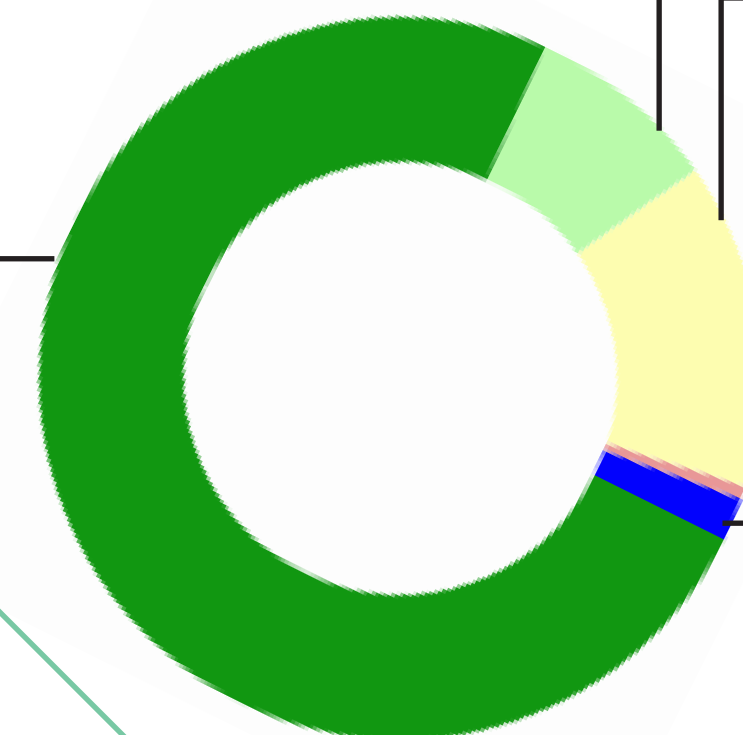
Category	Class	Description	
Natural vegetation	Natural Forest	Forest Formation	Evergreen, semi-deciduous, and deciduous natural tree cover, not floodable, larger than half a hectare. May include: natural areas with presence of bamboo and native palms, fragmented secondary forests, open forests or forest plantations.
		Savanna Formation	Area with vegetation types composed of scattered small trees and shrub-herbaceous stratum or rocky outcrops.
		Mangrove	Dense evergreen forest, growing in saline or coastal waters, associated with the coastal mangrove ecosystem.
	Non Forest Natural Formation	Flooded forest	Seasonally or permanently flooded natural forest cover close to water bodies, in flood plains with periods of flooding.
		Wetland	Natural herbaceous or shrubby vegetation area subjected to periodic or permanent flooding.
		Grassland	Natural cover composed mostly of herbaceous vegetation (grasses) with the presence of scattered trees and/or shrubs.
		Rocky outcrop	Naturally exposed rocks on the earth's surface, often with partial presence of saxicolous or rupicolous vegetation.
	Other non forest natural formation	Area with a predominance of shrub formations with the presence of grasslands. May have scattered trees. This class also includes areas with highly specialized flora, not mapped in other classes.	
Anthropic land use	Pasture	Area of planted or natural pasture related to livestock activity.	
	Agriculture	Area in which the original cover has been modified or replaced by annual, temporary and perennial crops.	
	Silviculture	Afforestation of exotic tree species for use and/or protection purposes (pines, eucalyptus, etc.).	
	Oil palm	Oil palm cultivation or monoculture. <i>Elaeis guineensis</i> Jacq.	
	Mosaic of agriculture and/or pasture	Agricultural use area made up of an association of crops and pastures distributed heterogeneously.	
	Mining	Mineral extraction area, with clear exposure of the soil. It does not differentiate whether it is industrial, artisanal, legal or illegal riparian.	
	Urban area	Settlements with built and urban environment infrastructure (buildings, roads, etc.)	
Others	Other non vegetated area	Area of little or no natural vegetation or anthropogenic origin not mapped in its classes.	
	River, lake and ocean	Extent of natural or artificial surface water. Includes rivers, lakes, reservoirs, reservoirs and other bodies of water.	
	Glacier	Masa de hielo permanente, localizada en las cumbres andinas, producto de la acumulación, compactación y recristalización de la nieve.	

LAND COVER AND LAND USE IN THE AMAZON IN 2021

Area (in hectares) and percentage of land cover and land use classes in the Amazon in 2021

LEVEL 1	LEVEL 2	AREA (HA)	PROPORTION (%)
1. NATURAL FOREST	FLOODED FOREST	36,233,280	4.3 %
	FOREST FORMATION	551,673,645	65.4 %
	MANGROVE	916,746	0.1 %
	SAVANNA FORMATION/OPEN FOREST	37,090,212	4.4 %
1. TOTAL NATURAL FOREST		625,913,884	74.2 %
2. NON-FOREST NATURAL FORMATION	GRASSLAND	52,296,909	6.2 %
	OTHER NON-FOREST NATURAL FORMATION	5,690,606	0.7 %
	ROCK OUTCROP	308,370	0.0 %
	WETLAND	14,836,440	1.8 %
2. TOTAL NON-FOREST NATURAL FORMATION		73,132,326	8.7 %
3. FARMING	AGRICULTURE	22,608,651	2.7 %
	MOSAIC OF AGRICULTURE AND/OR PASTURE	16,080,712	1.9 %
	OIL PALM	205,562	>0.1%
	PASTURE	83,743,701	9.9 %
	SILVICULTURE	736,299	0.1 %
3. TOTAL AGRICULTURE AND FORESTRY		123,374,926	14.6 %
4. NON VEGETATED AREA	MINING	571,174	0.1 %
	OTHER NON VEGETATED AREA	3,305,187	0.4 %
	URBAN AREA	929,613	0.1 %
4. TOTAL AREA WITHOUT VEGETATION		4,805,974	0.6 %
5. WATER BODY	GLACIER	93,267	>0.1%
	RIVER, LAKE OR OCEAN	16,407,946	1.9 %
5. TOTAL WATER BODY		16,501,213	2.00 %
6. NOT OBSERVED	NOT OBSERVED	10,043	>0.1%
6. TOTAL NOT OBSERVED		10,043	>0.1%
Total		843,738,365	

74.2%
NATURAL FOREST



8.7%
NON FOREST NATURAL FORMATION

14.6%
FARMING AND SILVICULTURE

0.6%
NON VEGETATED AREA

2%
WATER BODY

In 2021, **83%** from the Amazon is covered by natural vegetation (forests and non forest natural formations)

74% of the Amazon is forest

15% of the Amazon is anthropic use (agriculture, mining, urban area)

Land cover and land use dynamic in the Amazon between 1985 - 2021

NATURAL FOREST

- FOREST FORMATION
- SAVANNA FORMATION
- MANGROVE
- FLOODED FOREST

NON FOREST NATURAL FORMATION

- WETLAND
- GRASSLAND
- ROCKY OUTCROP
- OTHER NON FOREST NATURAL FORMATION

FARMING

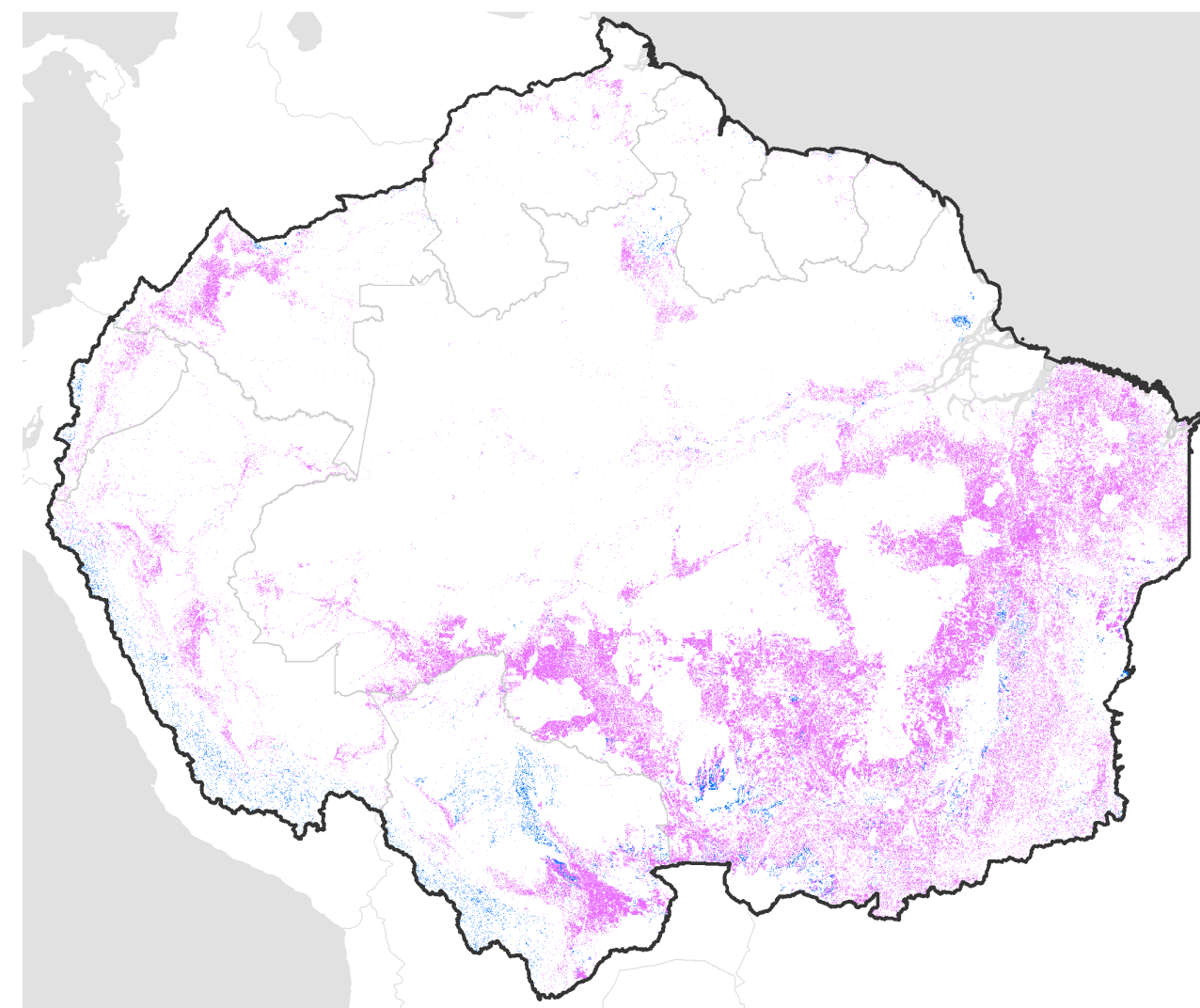
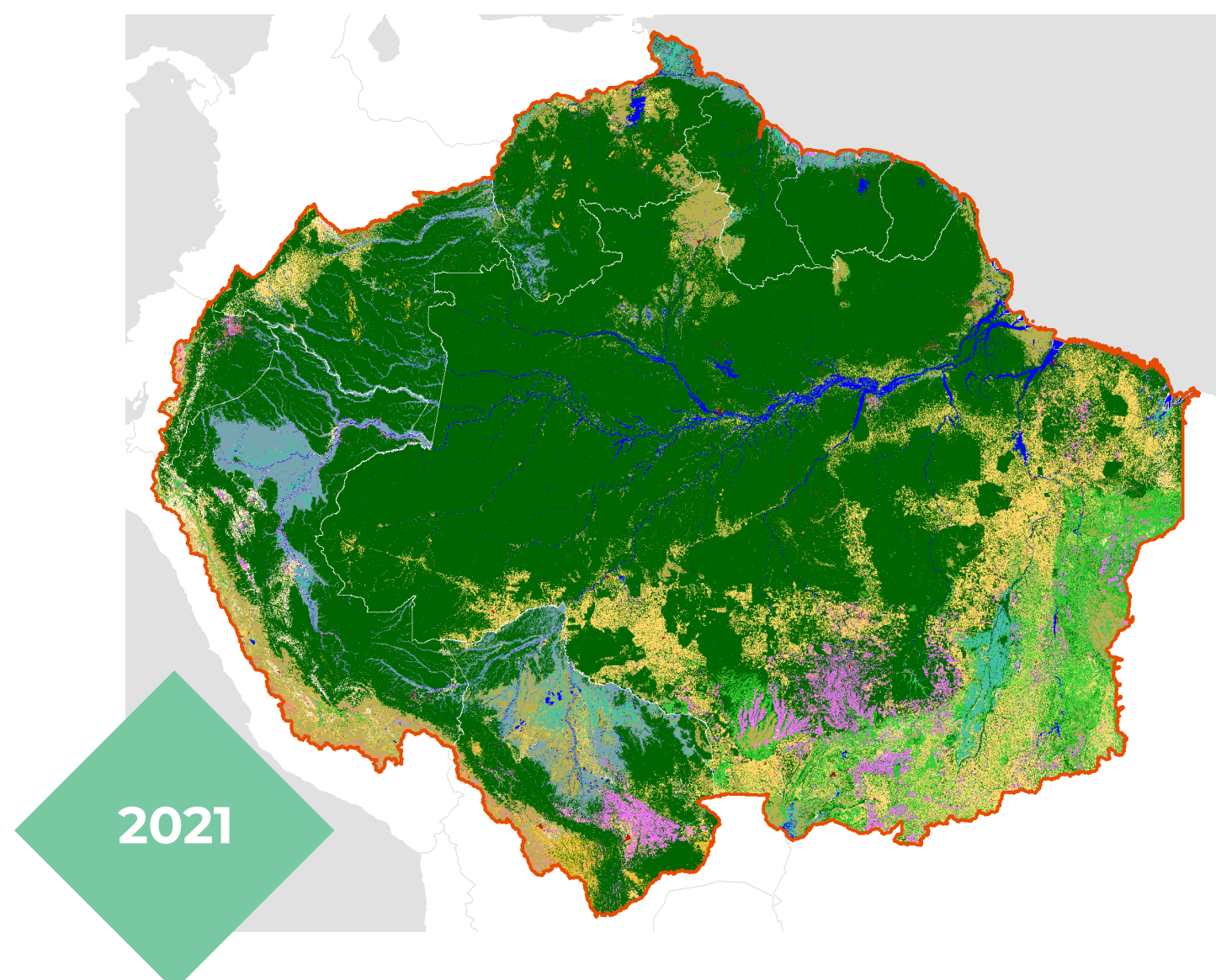
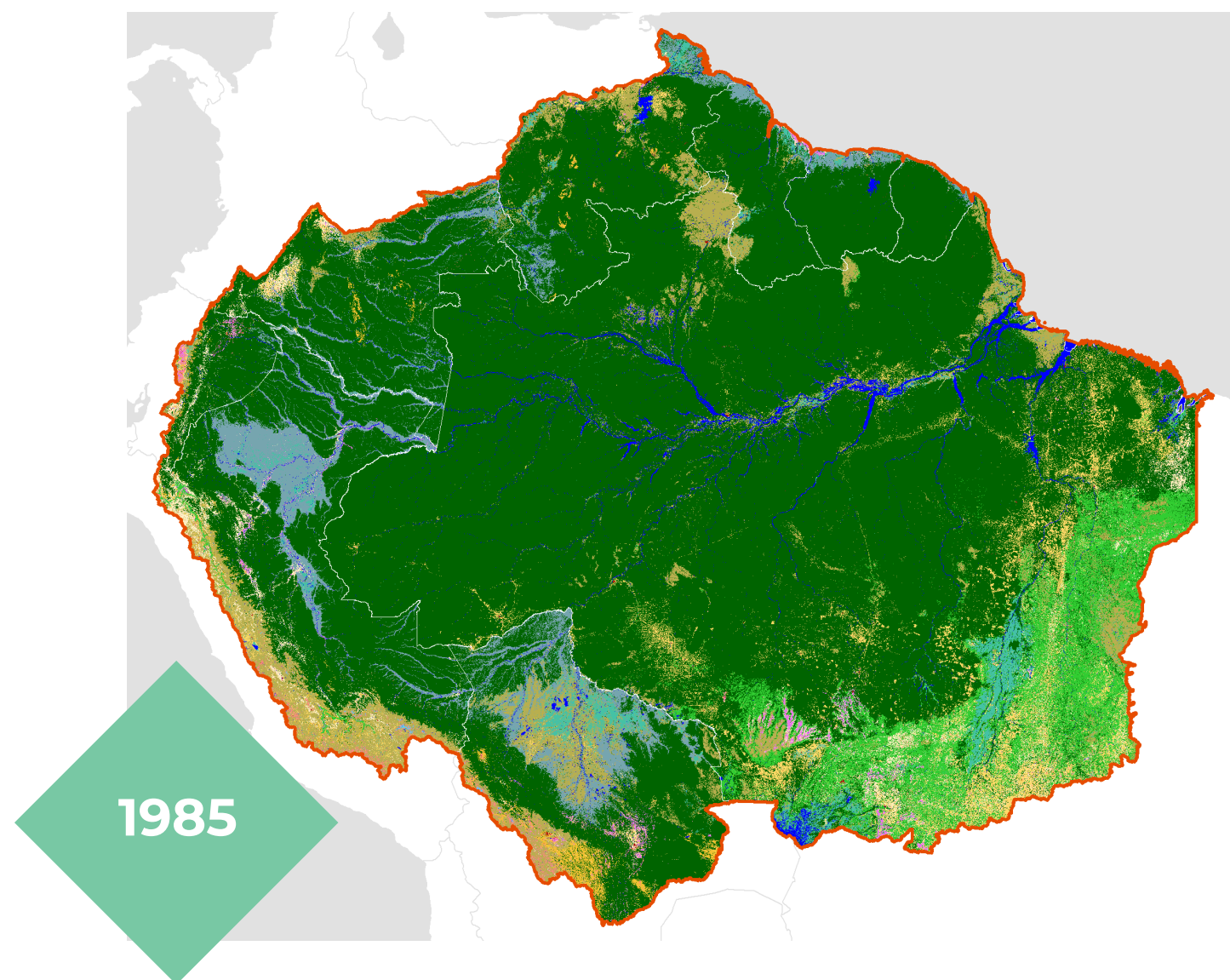
- PASTURE
- AGRICULTURE
- SILVICULTURE
- OIL PALM
- MOSAIC OF AGRICULTURE AND/OR PASTURE

NON VEGETATED AREA

- MINING
- URBAN AREA
- OTHER NON VEGETATED AREA

WATER BODY

- RIVER, LAKE AND OCEAN
- GLACIER



Change between 1985 to 2021

- Forest loss
- Non forest natural formation loss

Between 1985 to 2021 the natural vegetation loss was **75 Mha**

Where **96%** was natural forest loss

and **4%** non forest natural formation loss

99% related with expansion of agriculture, pasture and silviculture

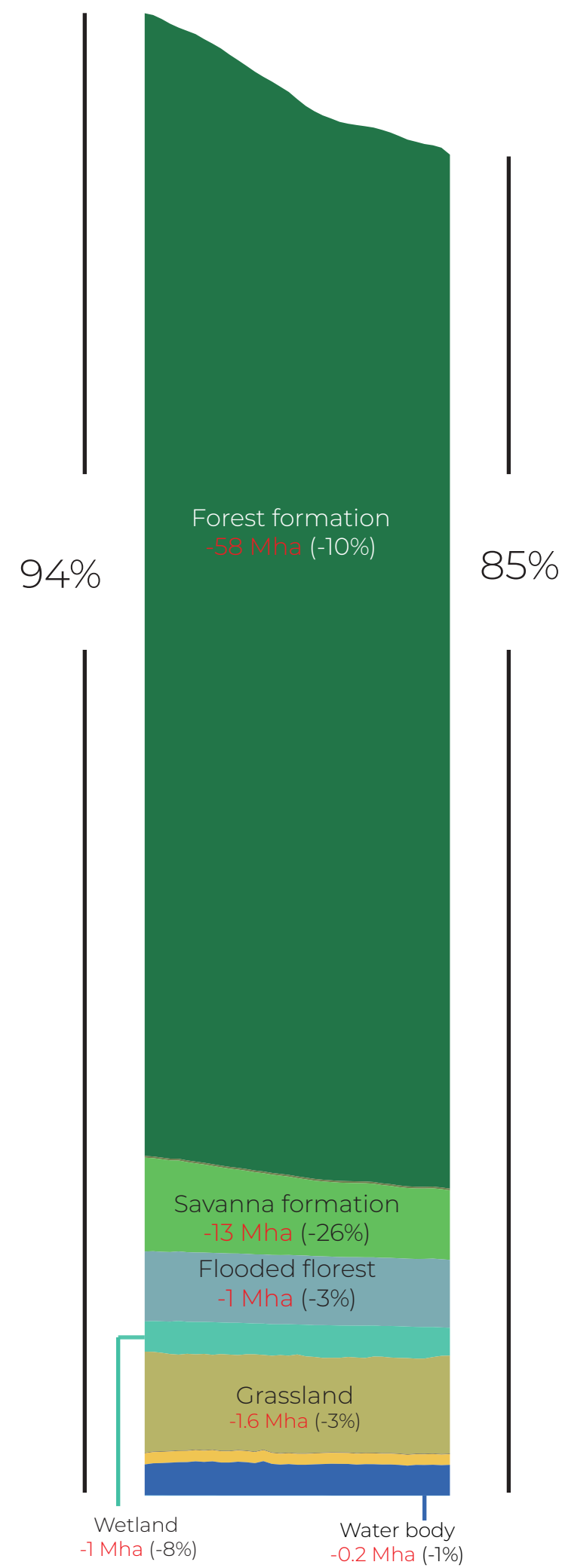
Anthropic land use areas increased **75 Mha**

and **1%** other land uses such as mining and urban area

Land cover and land use dynamics in the Amazon 1985 -2021

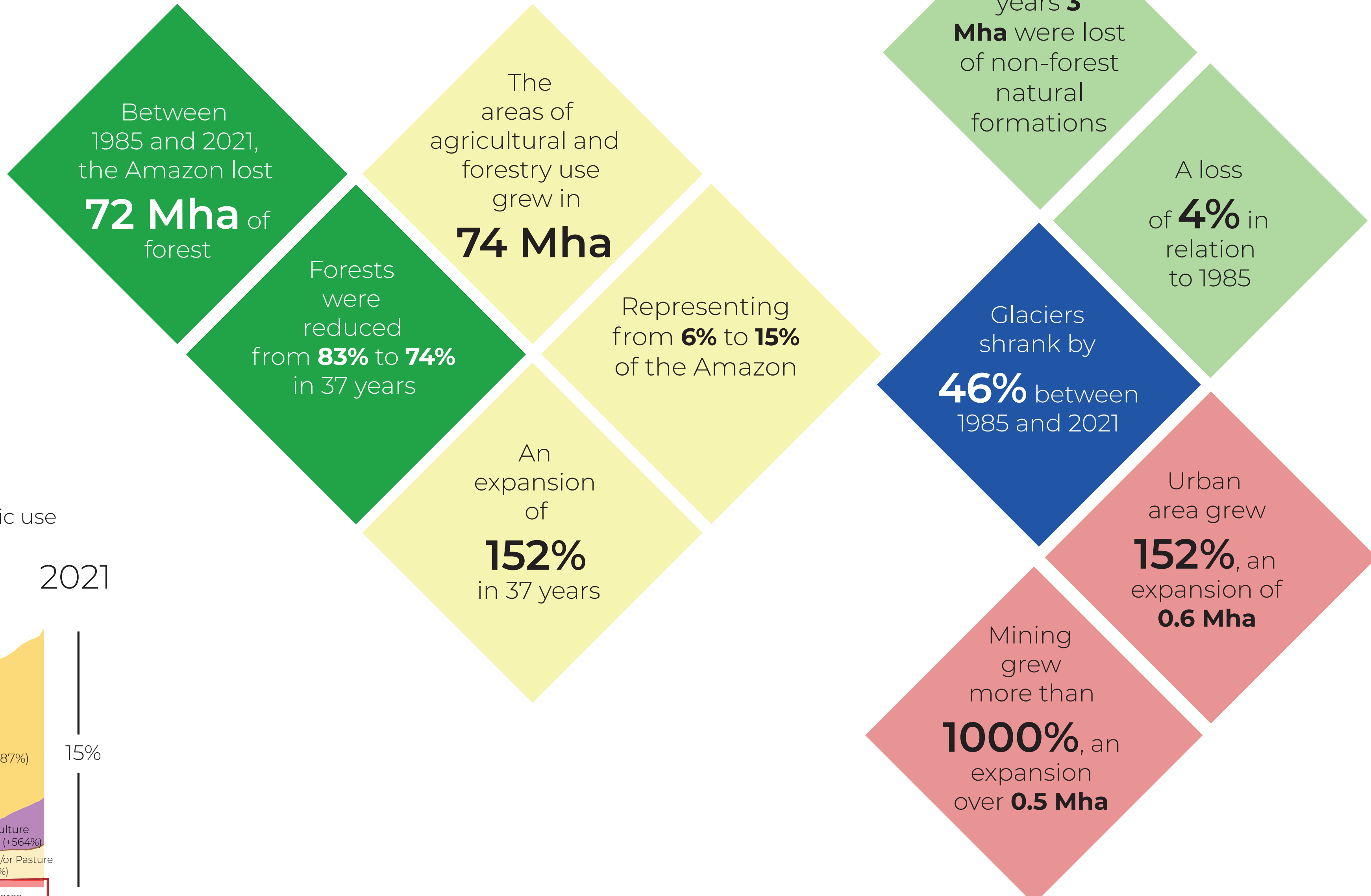
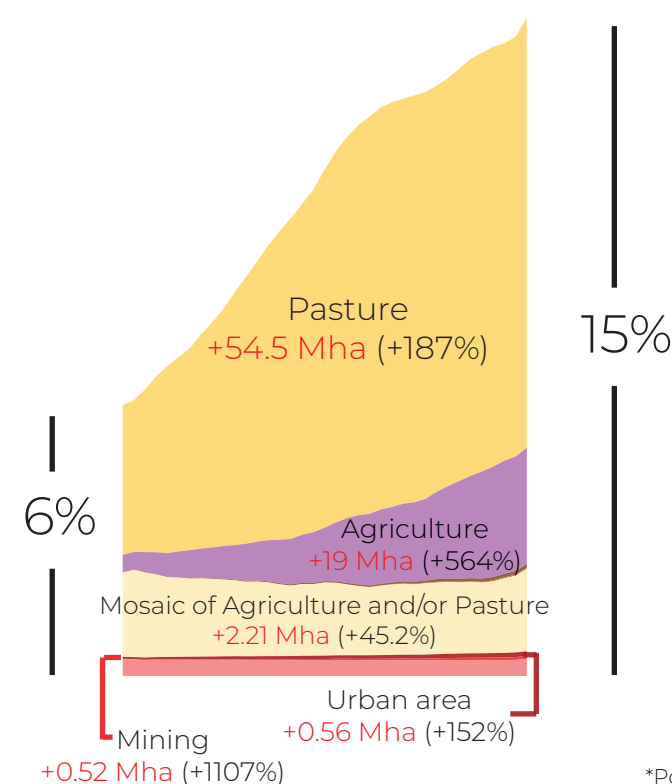
Natural vegetation

1985 2021



Anthropogenic use

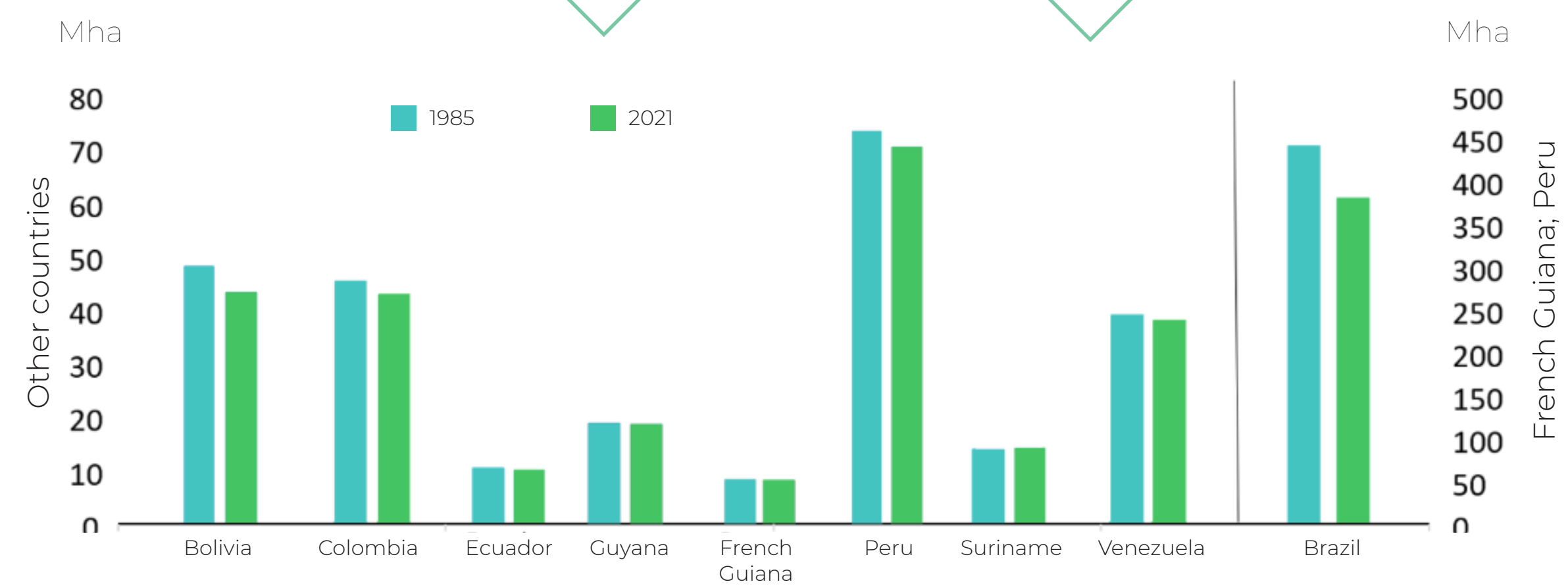
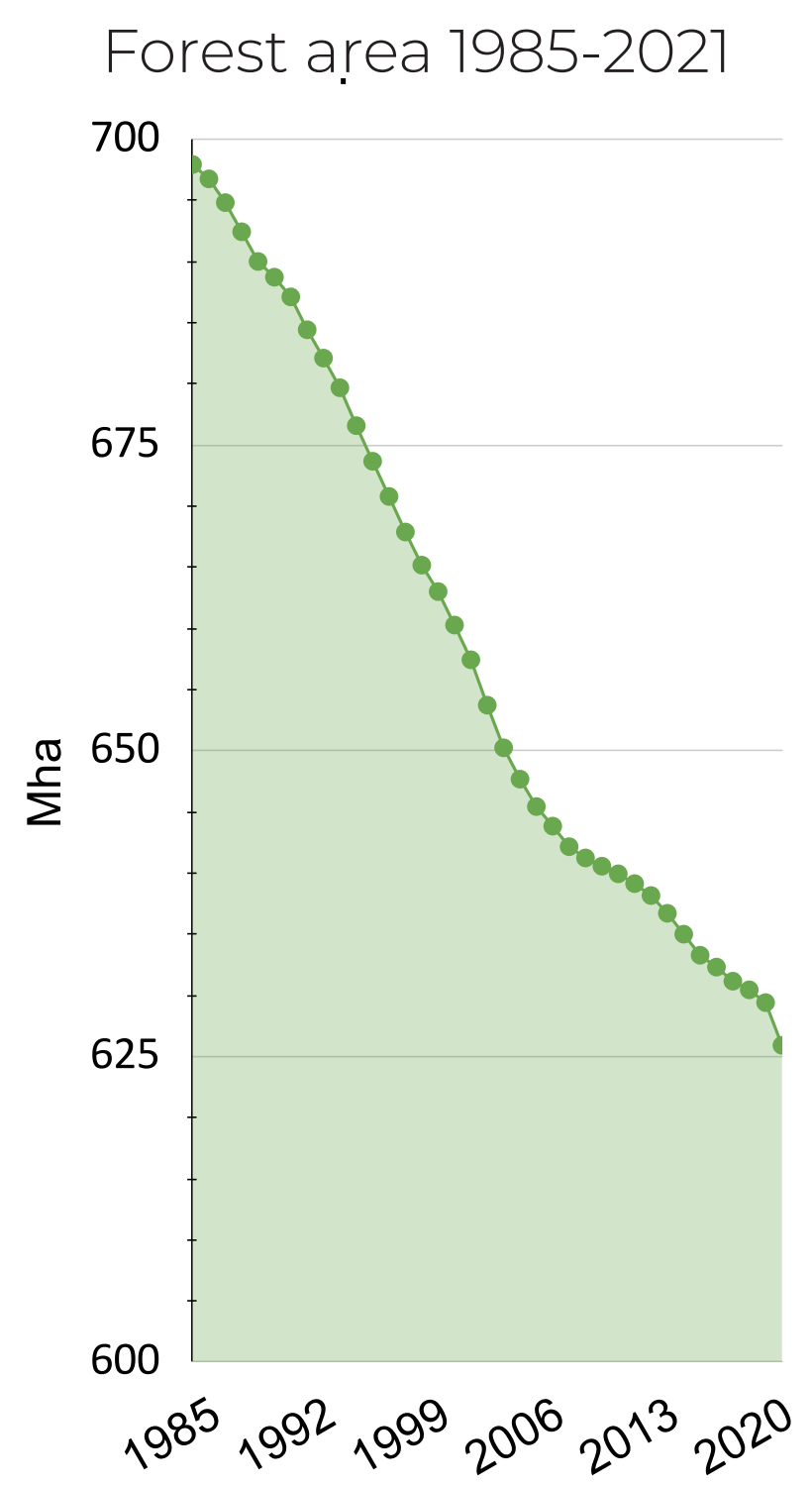
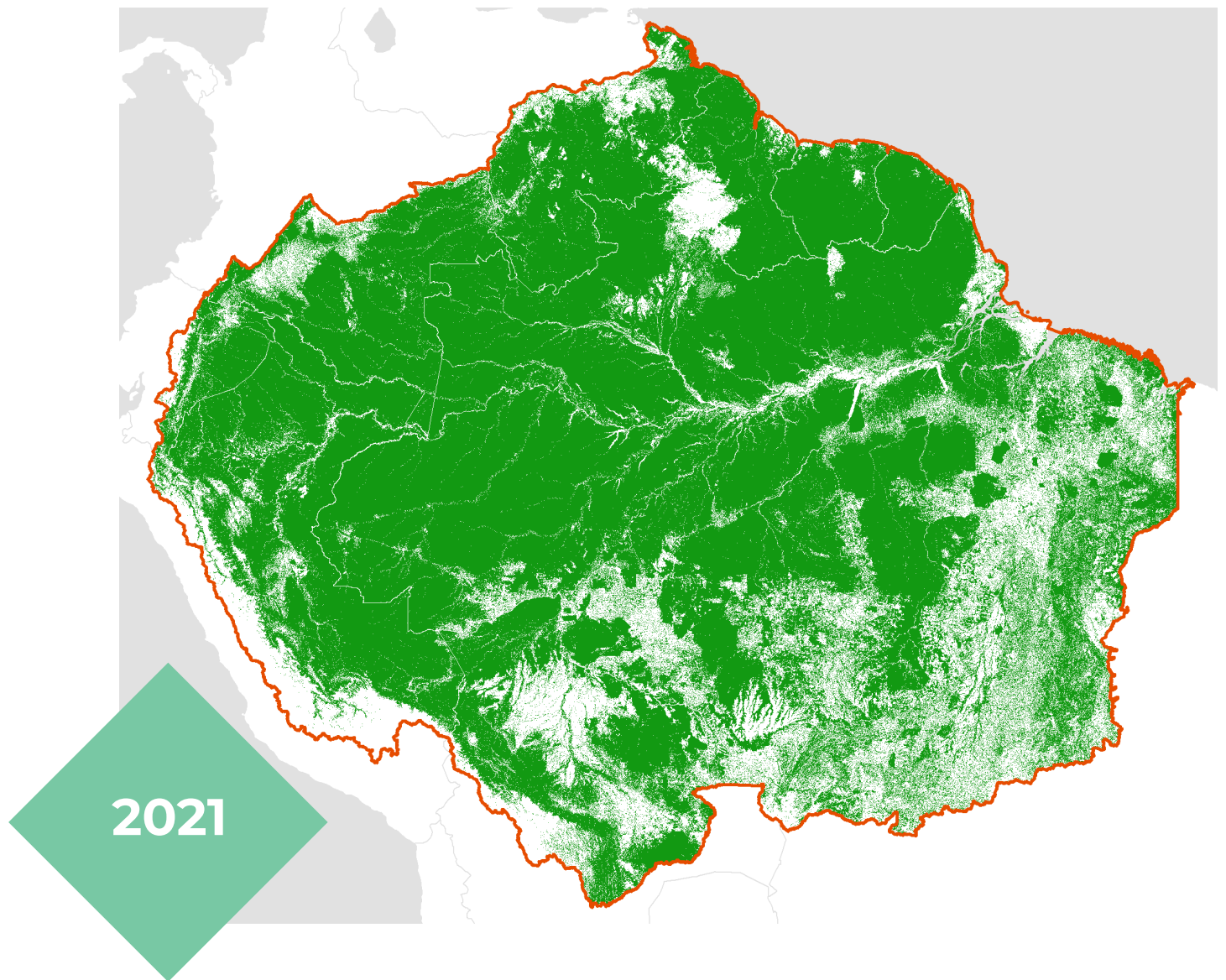
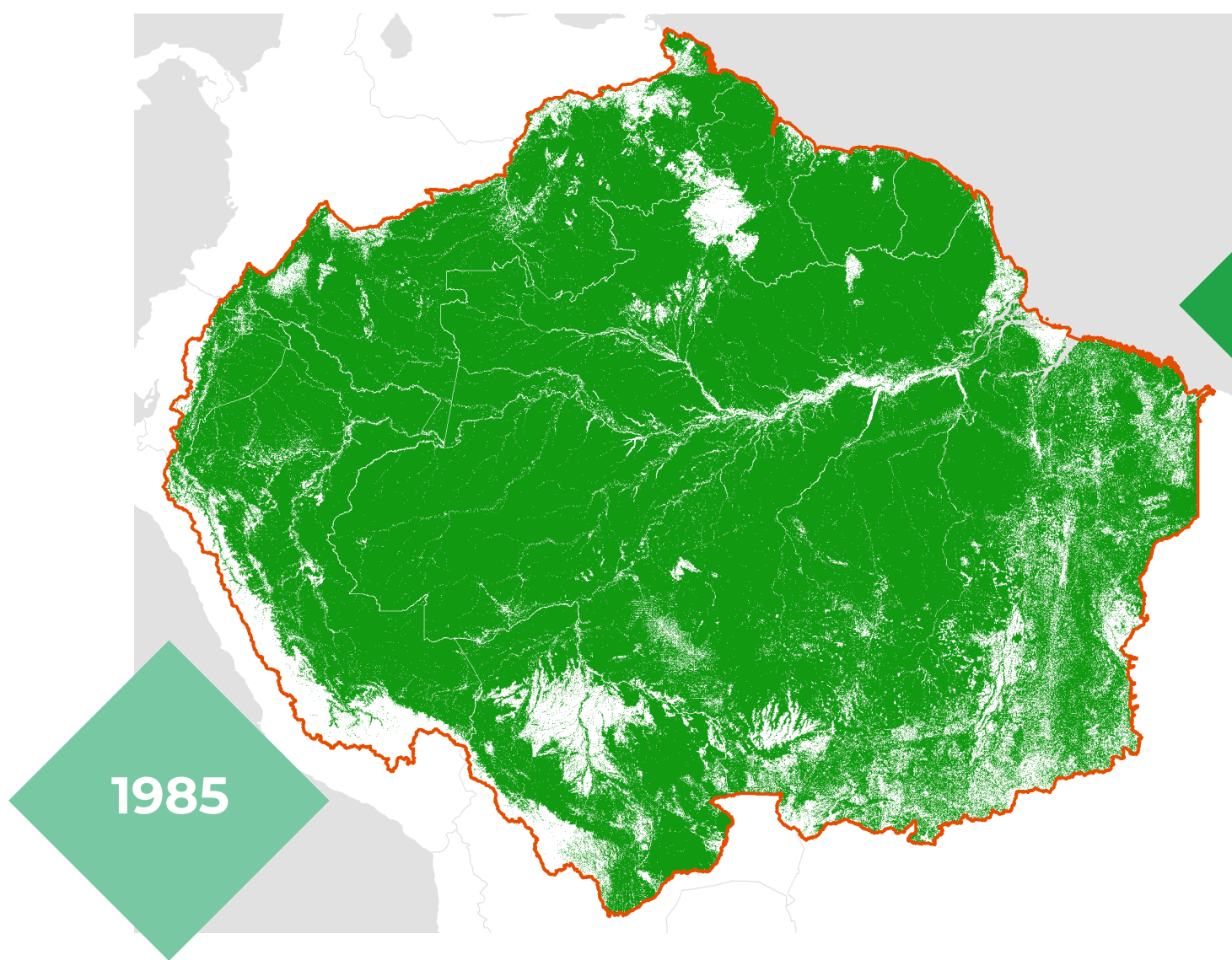
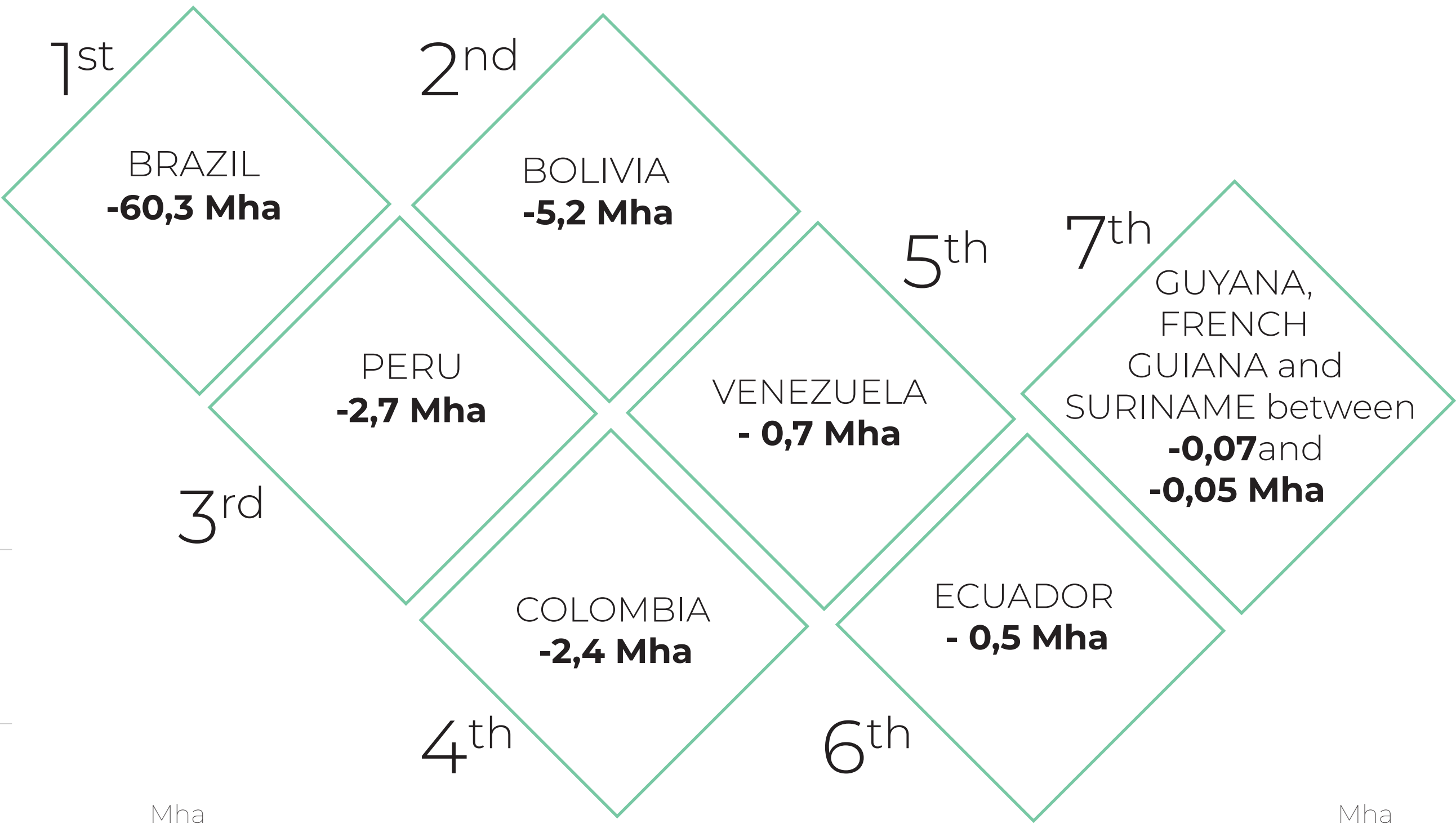
1985 2021



*Porcentajes calculados considerando el área total de la Amazonia (844 Mha) * Mha Million hectareas

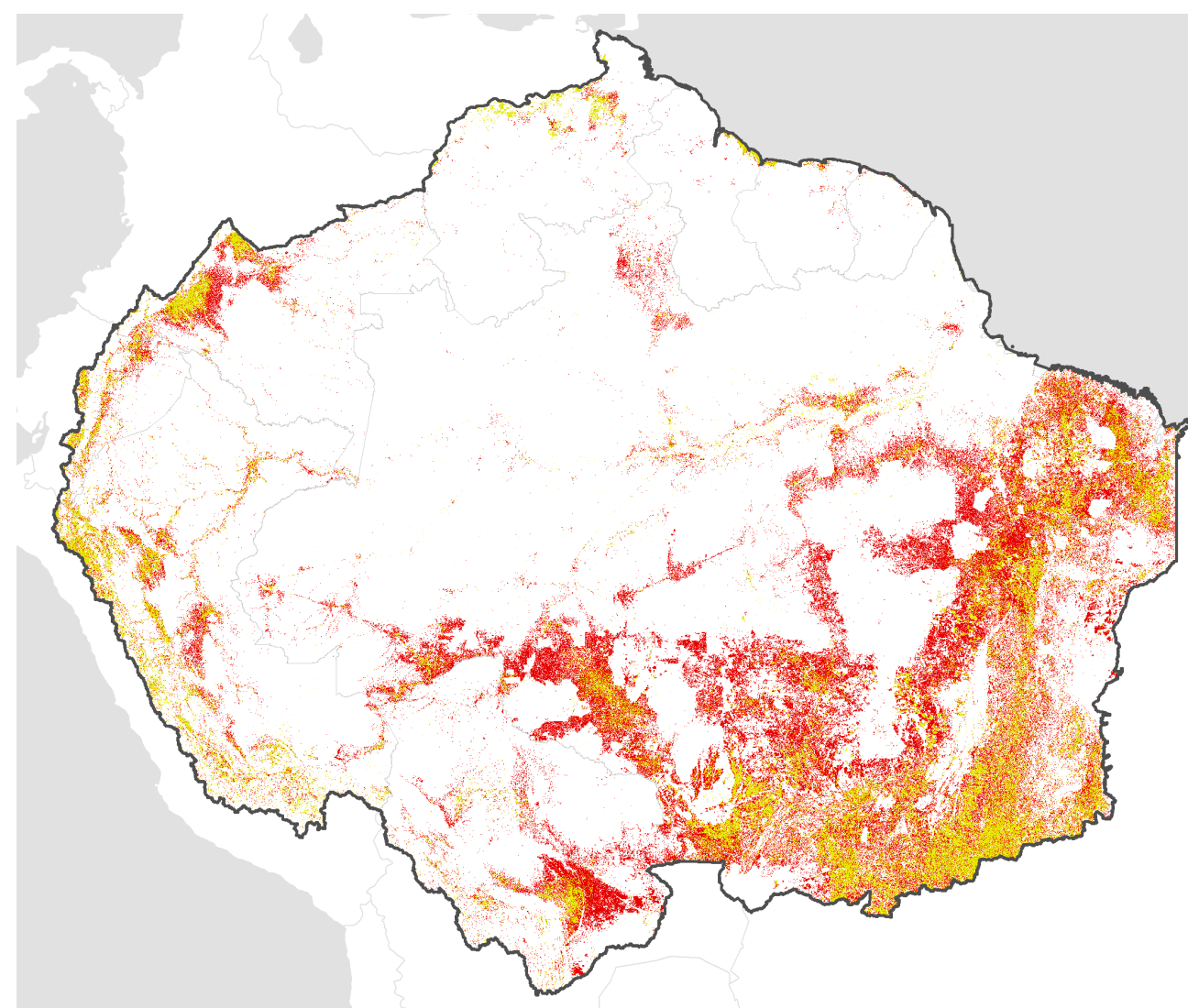
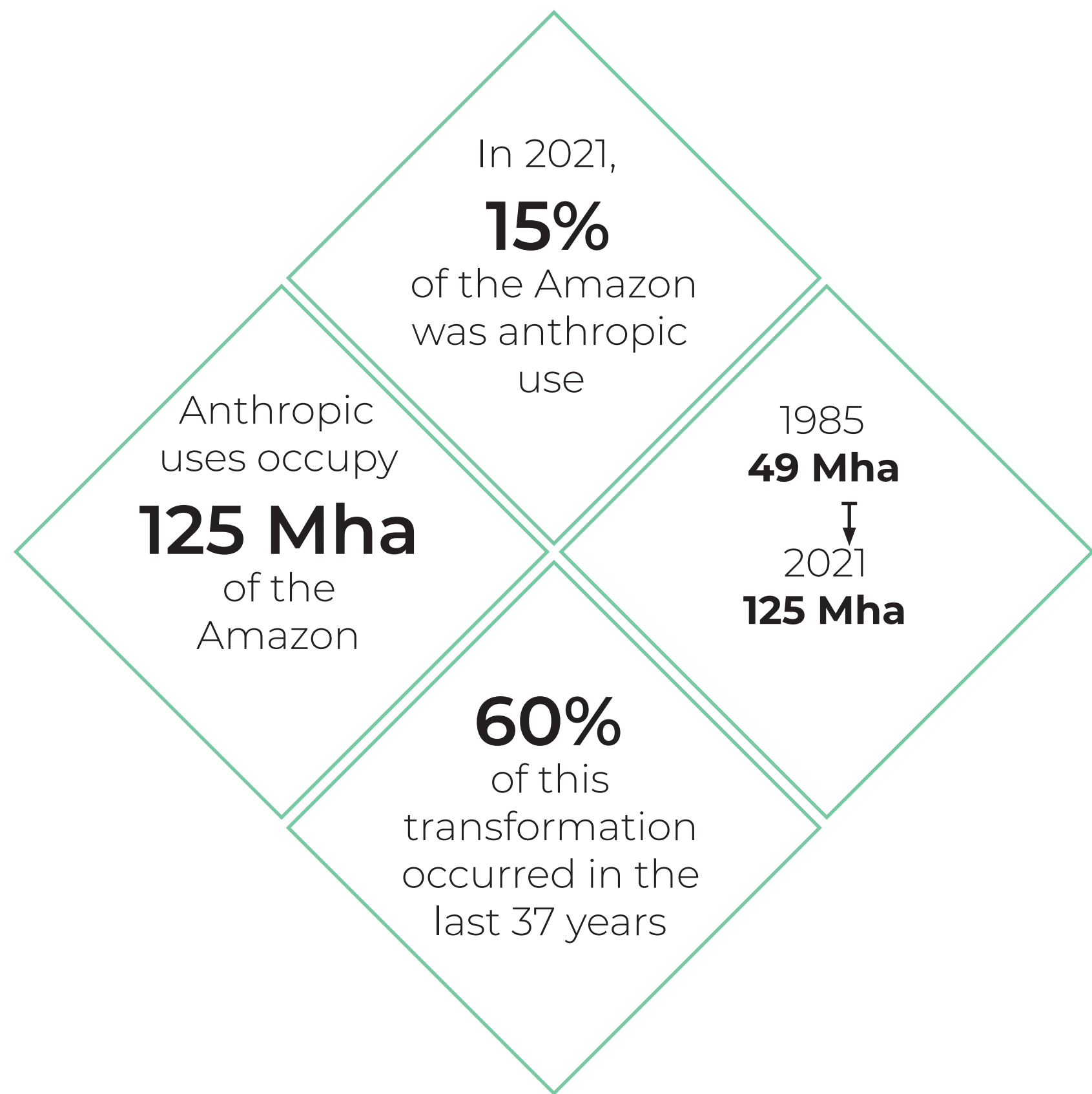
NET LOSS OF FOREST COVER IN THE AMAZON 1985 - 2021

Net **loss** of forest in the Amazon was **72 Mha** between 1985-2021

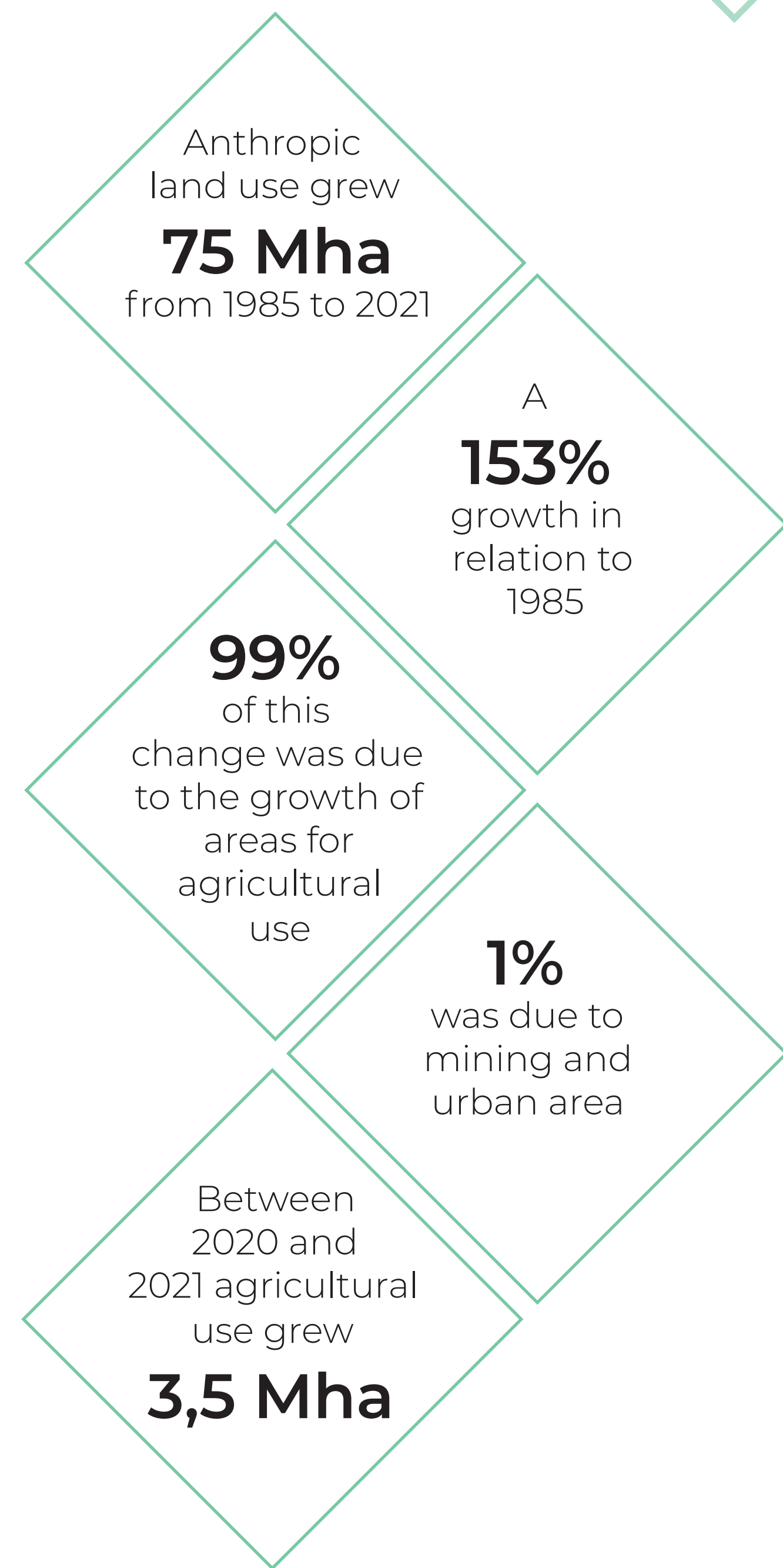
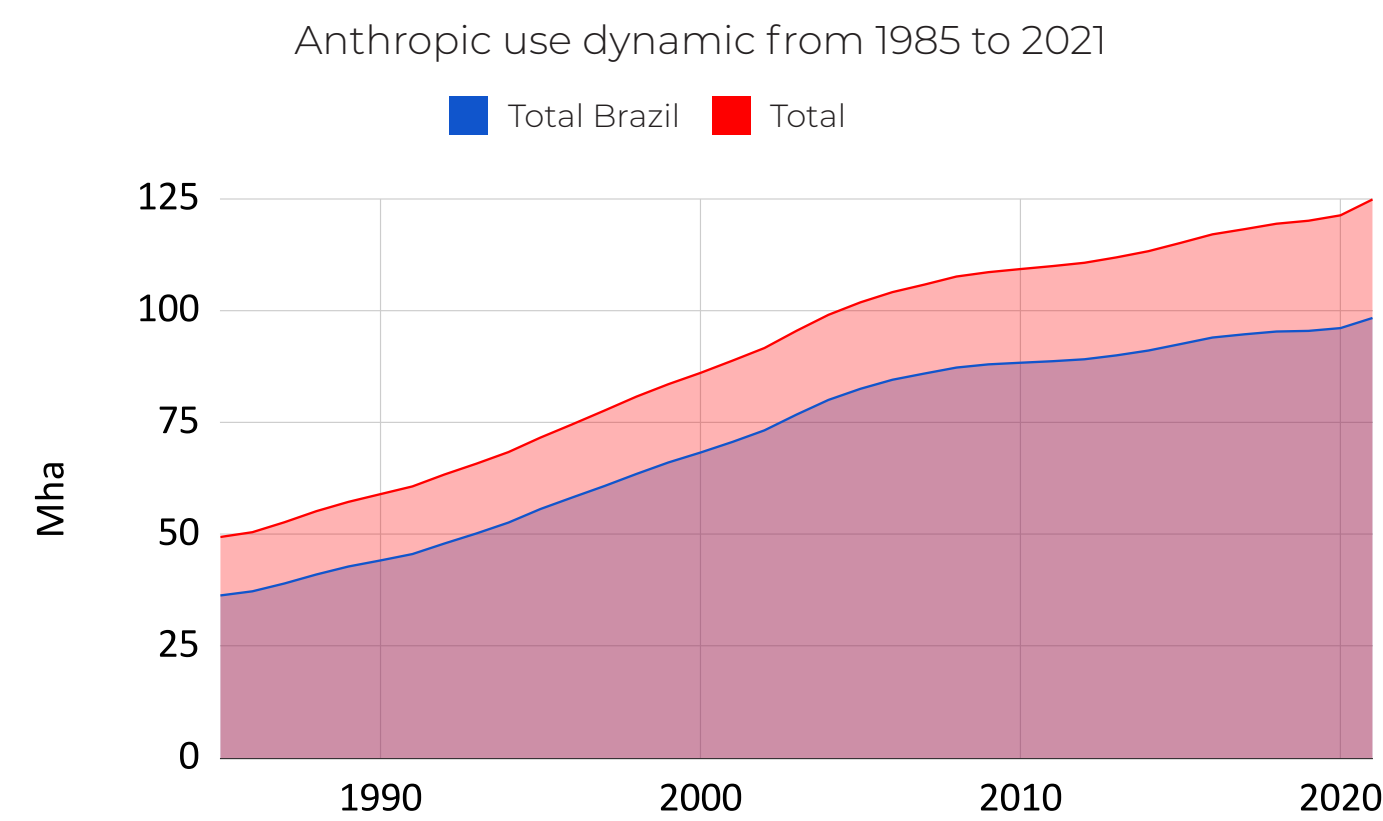
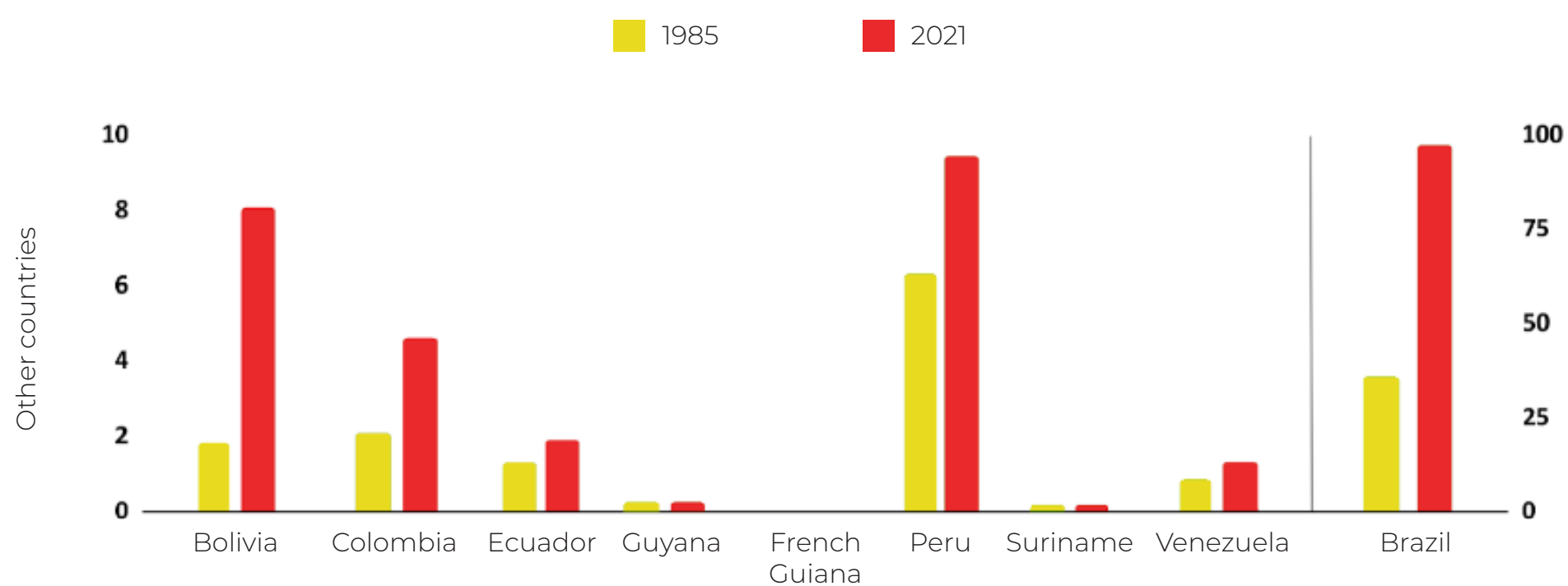


*Mha: MILLION HECTARES

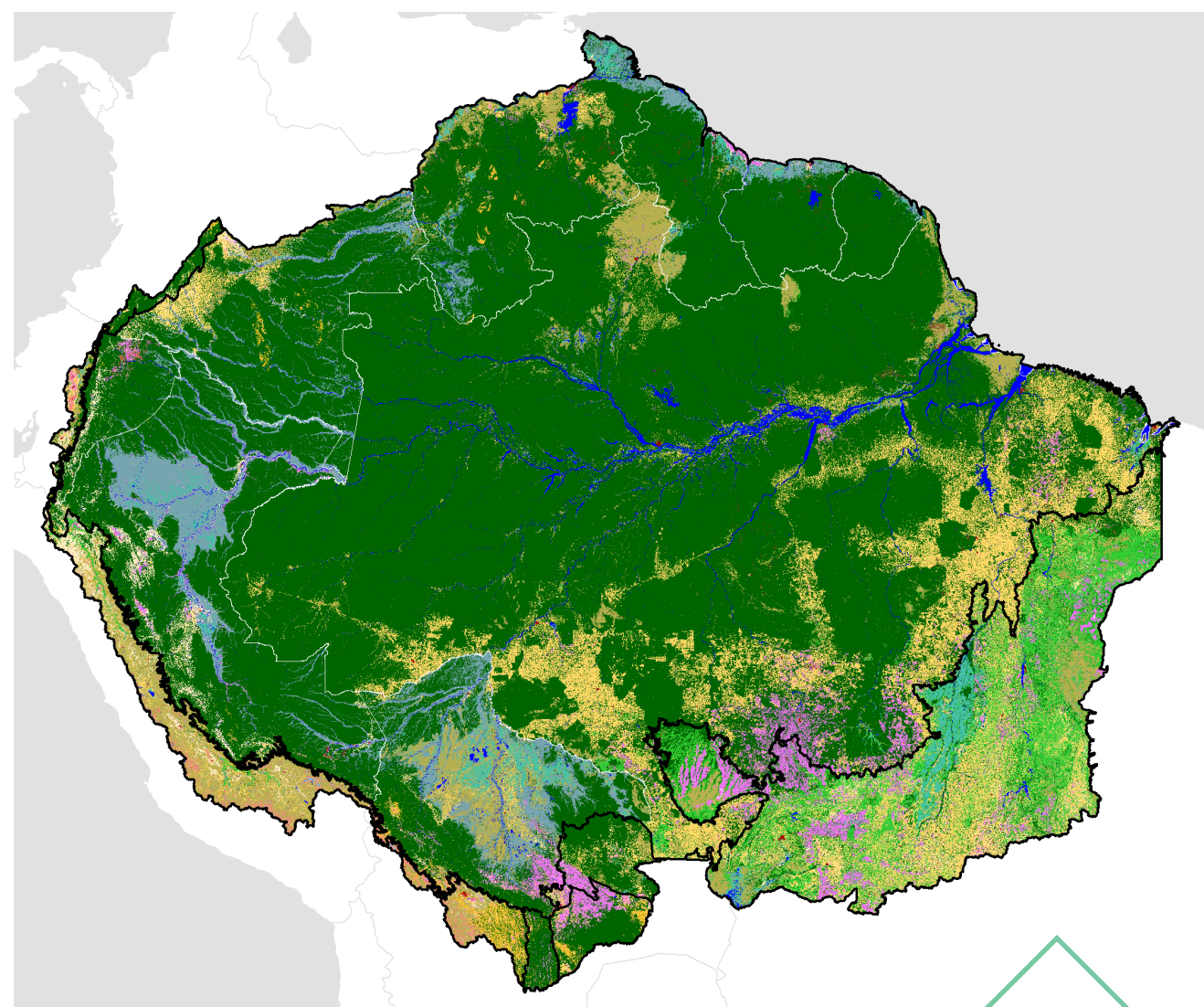
ANTHROPIC USE AREAS GROWTH IN AMAZON



■ ANTHROPIC AREAS UNTIL 1985
■ ANTHROPIC AREAS GROWTH UNTIL 2021

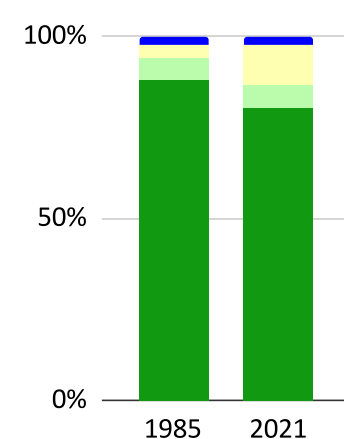


NATURAL VEGETATION LOSS 1985 - 2022 - BY BIOME INSIDE AMAZON

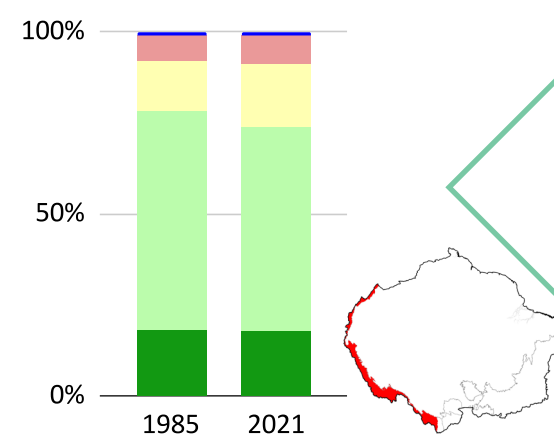


EXTENSION BY BIOME IN 2021 (MHA)

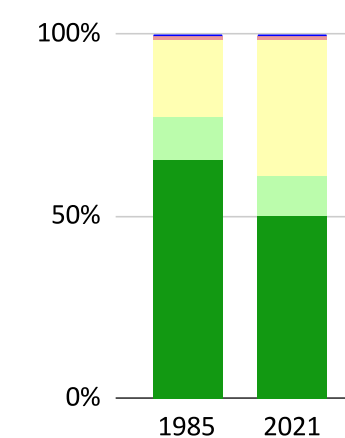
CLASS	AMAZON	ANDES	CERRADO	CHACO	CHIQUITANO	PANTANAL	BOLIVIAN TUCUMANO
NATURAL FOREST	559.7	5.4	47.6	3.8	5.3	1.9	2.2
NON FOREST NATURAL FORMATION	42.1	17.1	10.3	0.6	0.7	2.3	0.2
FARMING AND SILVICULTURE	77.1	5.2	35.9	2	2.1	1	0.2
NON VEGETATED AREA	1.7	2.5	0.5	0.1	0	0	0
WATER	15.3	0.2	0.6	0	0	0.2	0
TOTAL	695.8	30.4	95	6.4	8.2	5.4	2.5



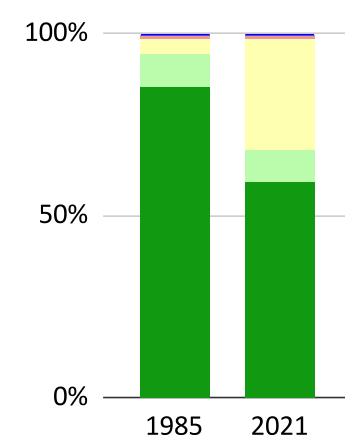
AMAZON
8% loss
(nearly **55 Mha**)
of its natural
vegetation



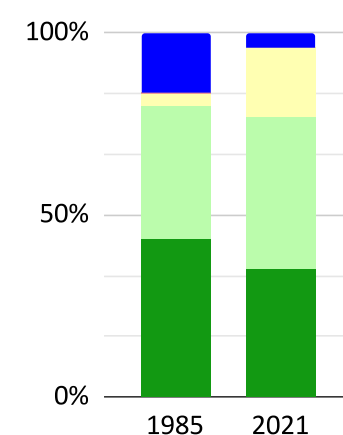
ANDES
6% loss
(over **1 Mha**)
of its natural
vegetation



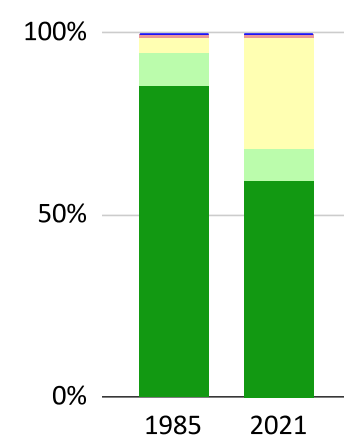
CERRADO
21% loss
(nearly **16 Mha**)
of its natural
vegetation



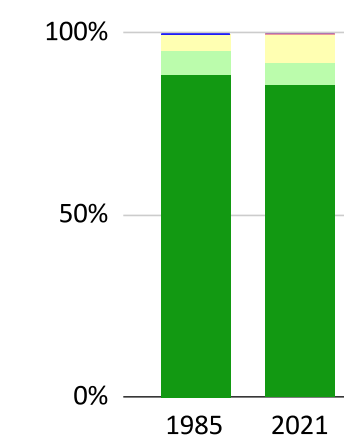
CHACO
28% loss
(nearly **2 Mha**)
of its natural
vegetation



PANTANAL
20% loss
(nearly **0.5 Mha**)
of its forests



CHIQUITANO
21% loss
(nearly **2 Mha**)
of its natural
vegetation



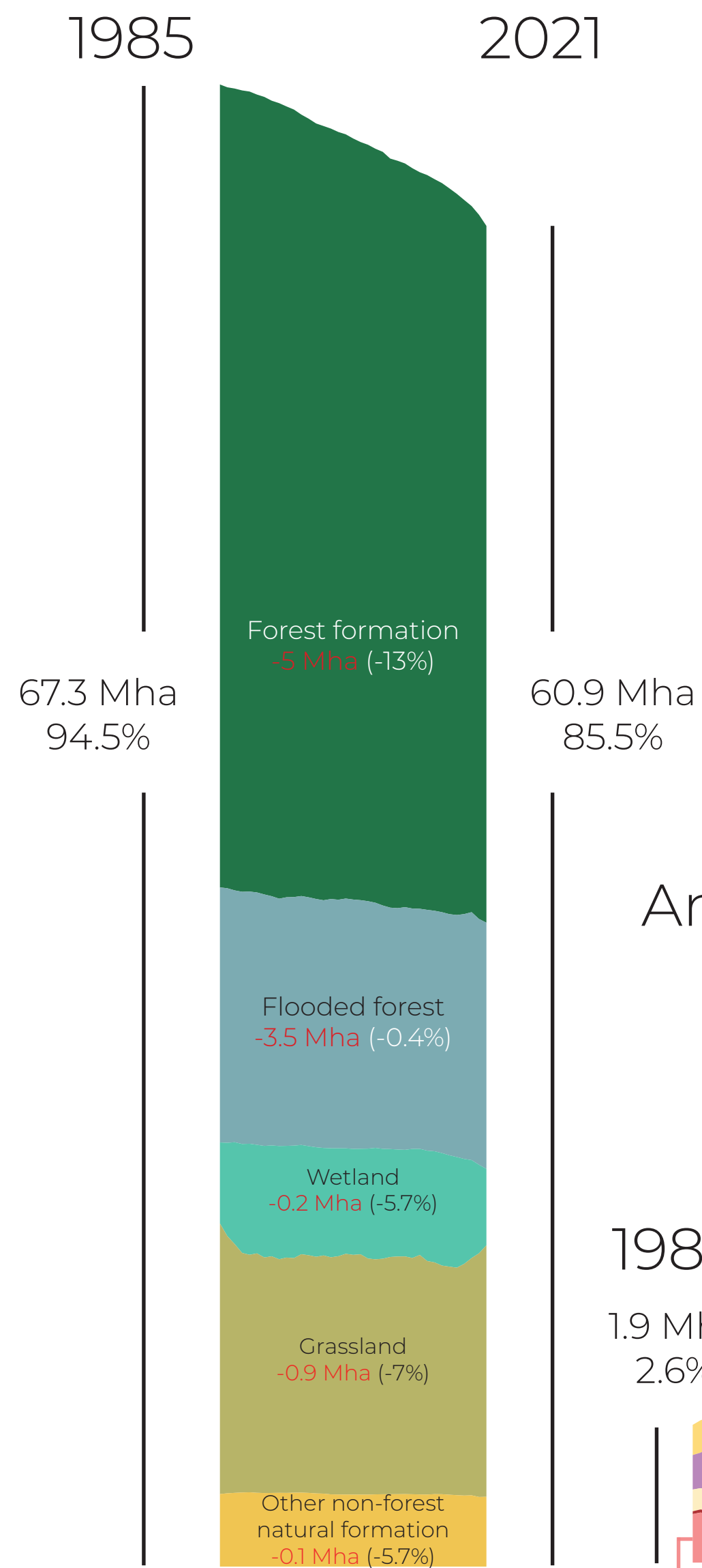
BOLIVIAN TUCUMANO
3% loss (less than **0.1 Mha**)
of its natural
vegetation



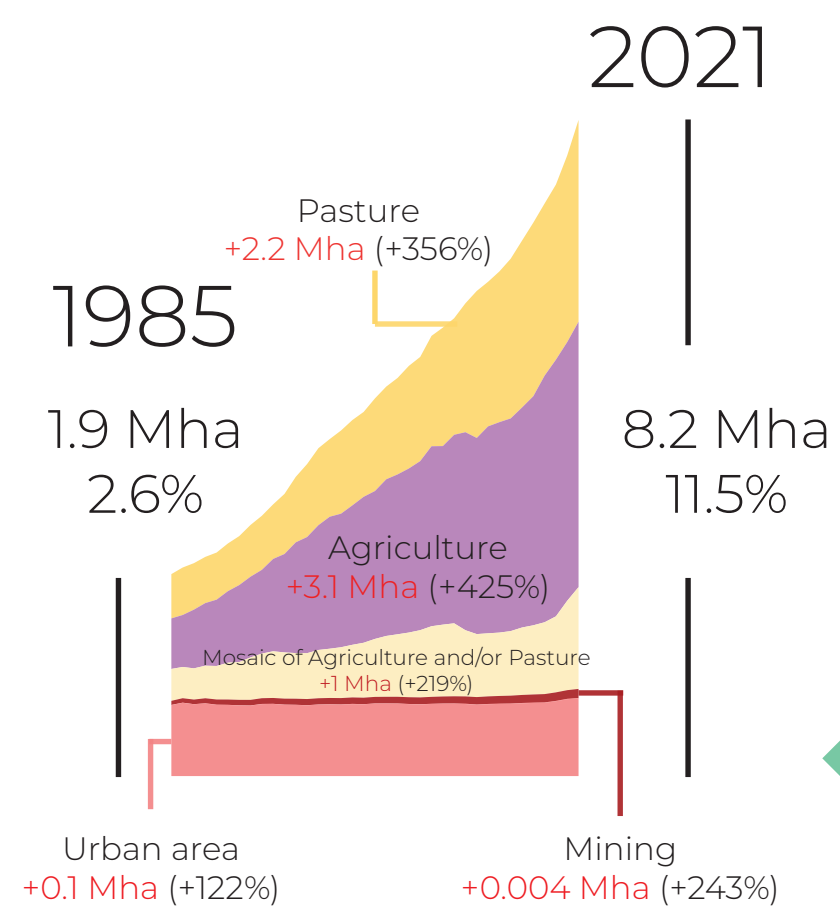
Amoró National Park, Edmond Sanchez - FAN

BOLIVIA

Natural vegetation



Anthropic Use

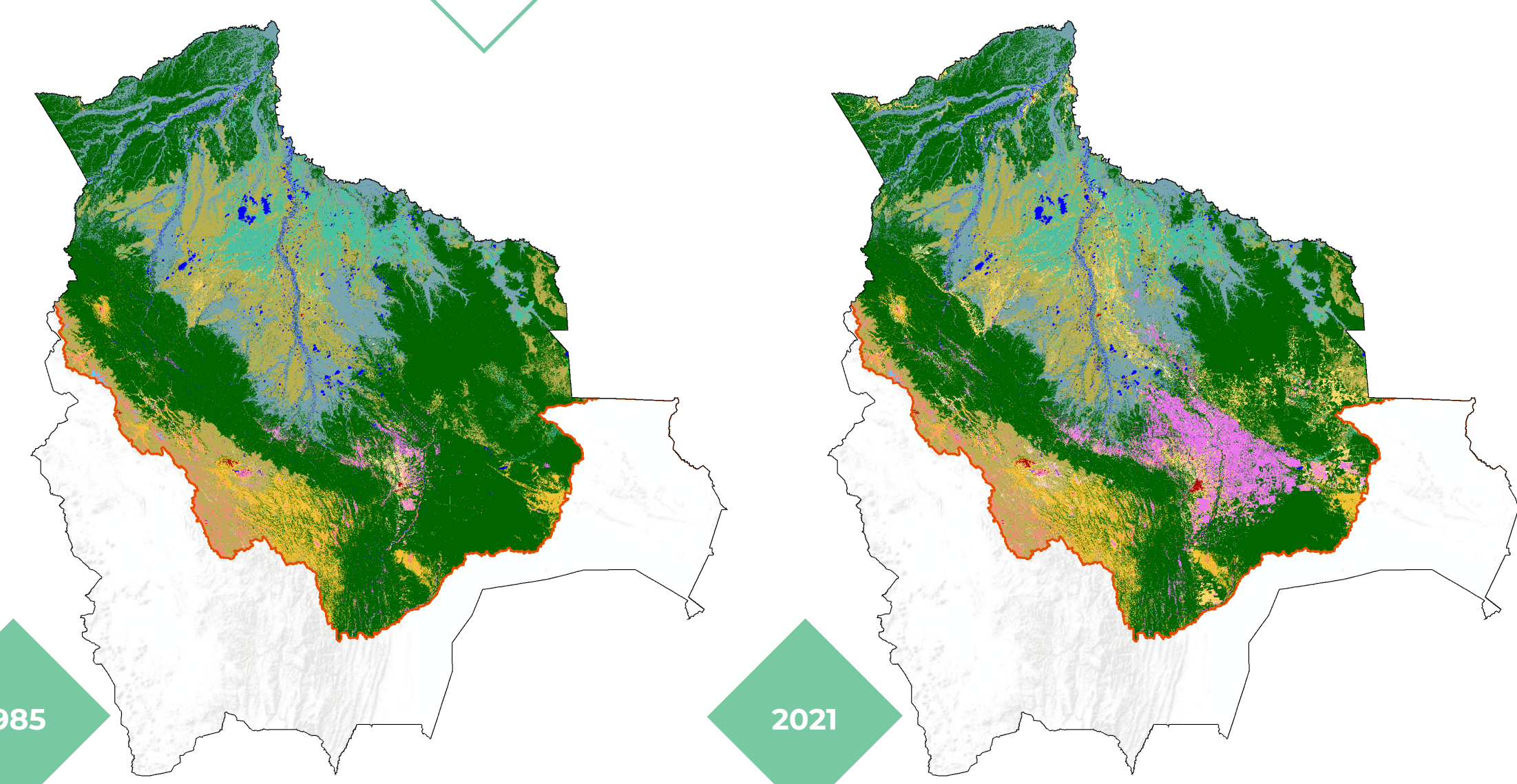


The Bolivian Amazon Basin covers **71 MHa**, of which **85.5%** are covered by natural vegetation and **12%** by anthropic uses.

Glaciers shrank by **47%** in the same period

Between 1985 and 2021, it lost **11%** of its forests; while agricultural use and silviculture expanded by **349%**

Urban areas infrastructure areas grew **122%** in 37 years



*Percentages calculated considering the total area of the Bolivian Amazon (71 Mha)

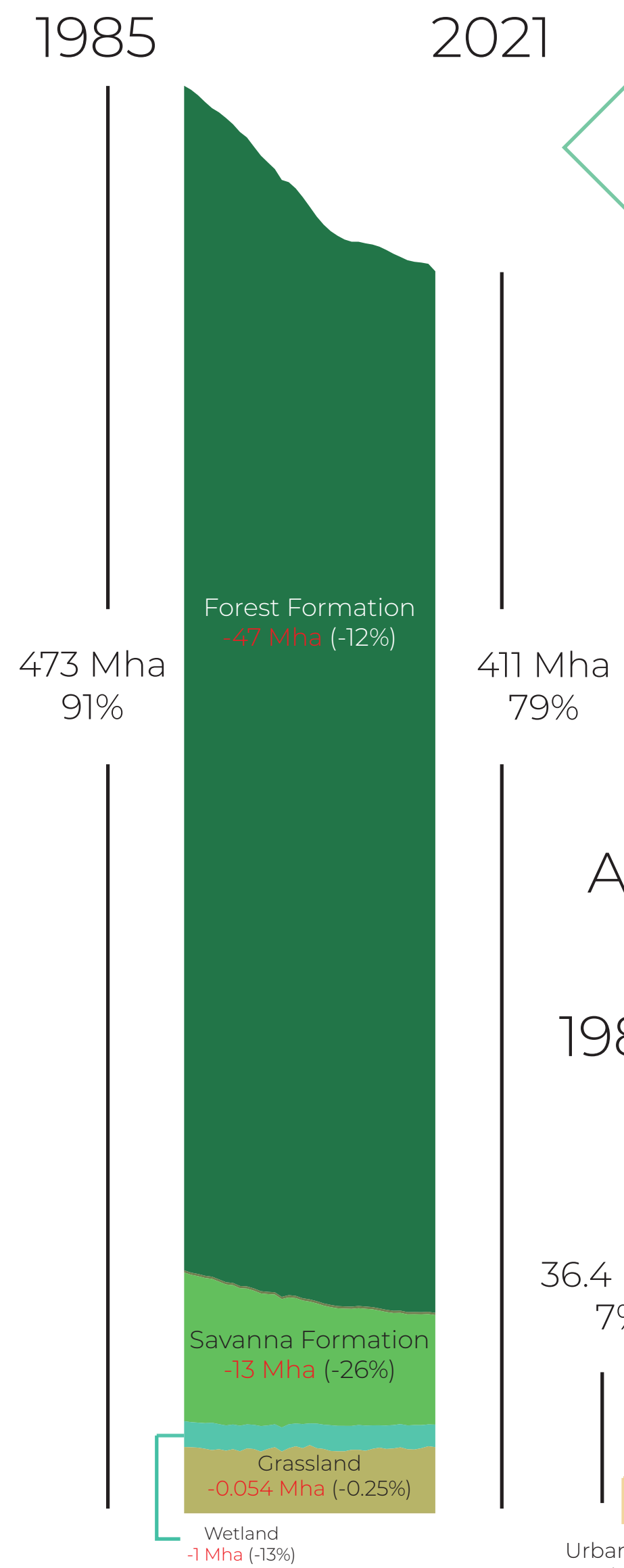
* Mha: Millions of hectares

Amazonia de Manaus, James Martins

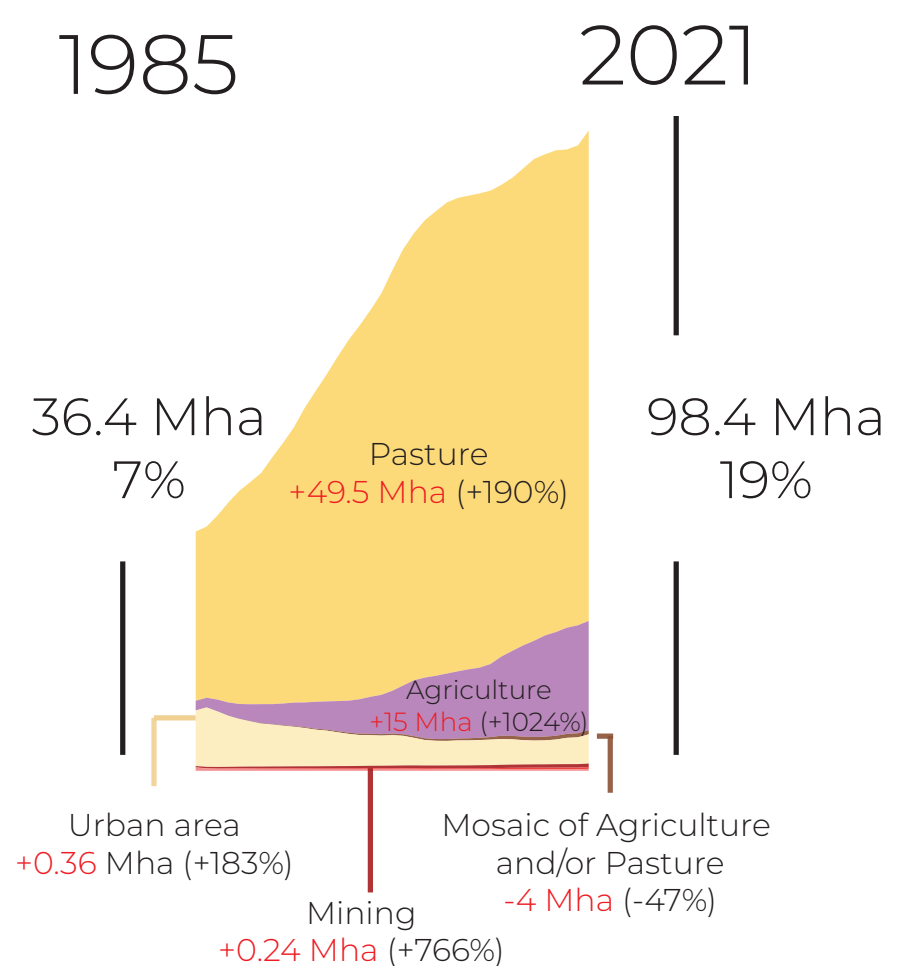


BRAZIL

Natural vegetation



Anthropic use



The study area in Brazil is covered by **81%** Amazon Biome, partially the Cerrado (**18%**) and Pantanal (**1%**)

In 37 years the urban infrastructure area expanded in **183%**

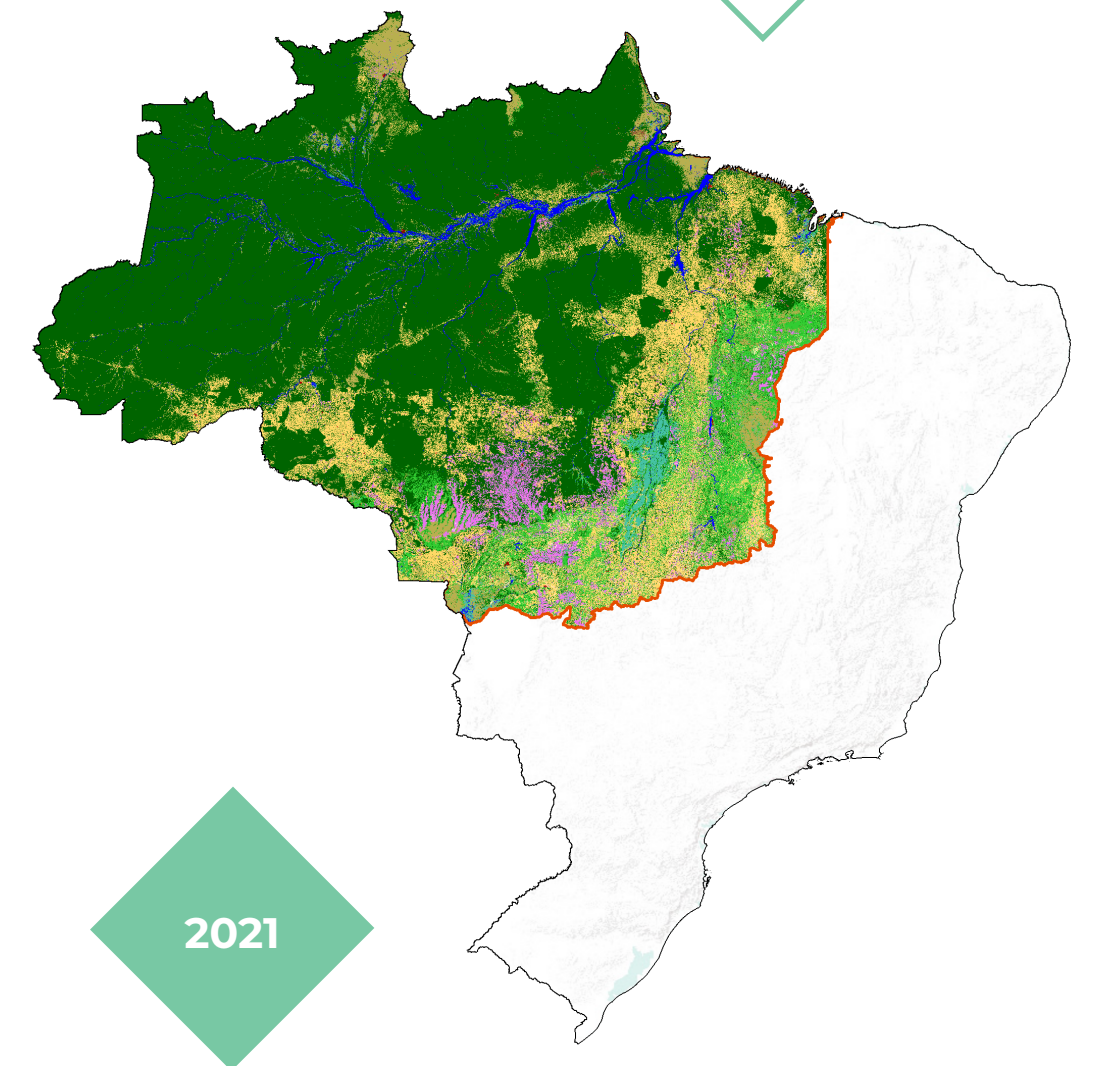
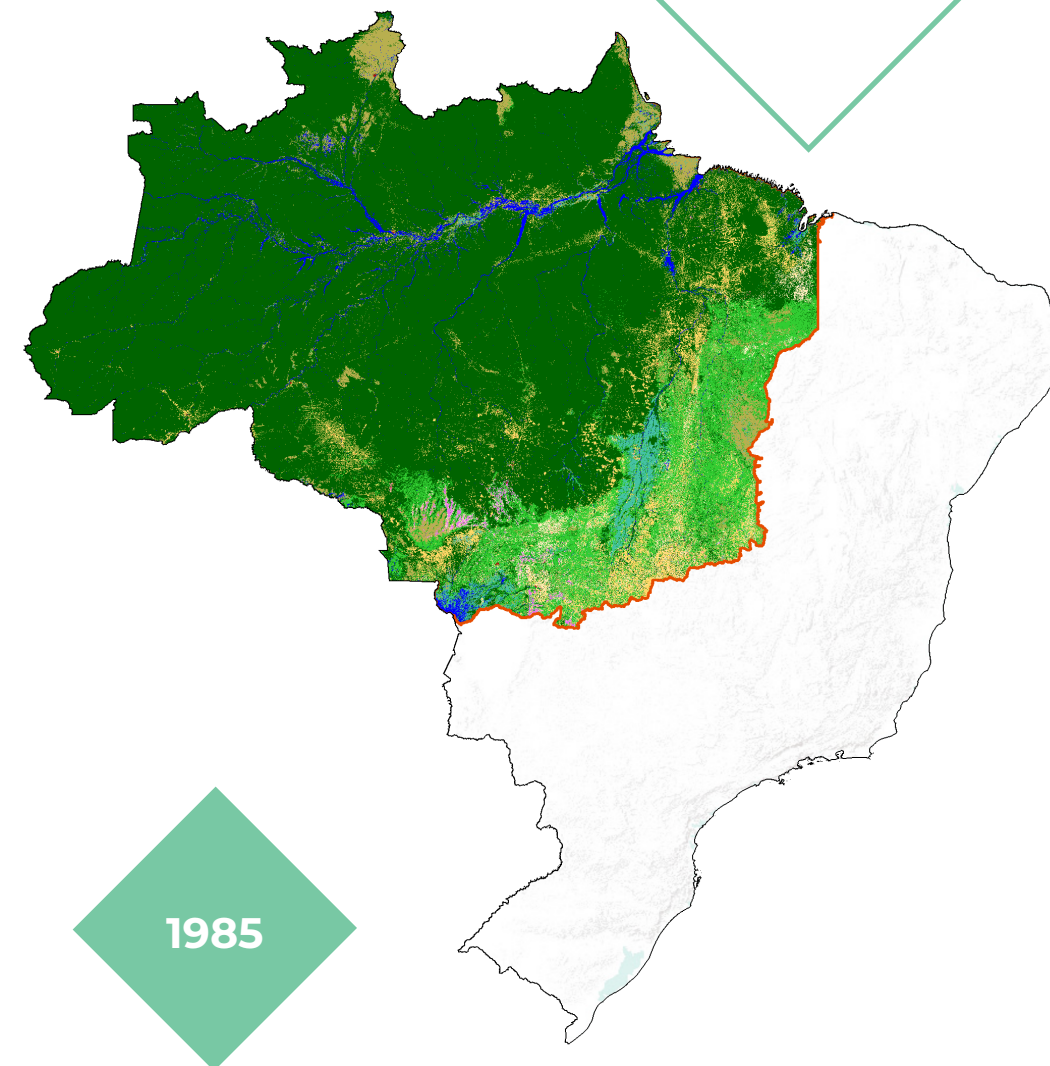
Mining increased from **31 thousand Ha** to **270 thousand Ha** between 1985 and 2021, a **766%** increase in 37 years.

This area covered **522 Mha**: **79%** are natural vegetation and **19%** anthropogenic uses until 2021

Between 1985-2021 lost **14%** of its forest and the farming uses expanded in **170%**

Farming and silviculture cover **97%** until 2021

60 Mha of forest lost in 37 years



Percentage calculated considering the total area of the Brazilian Amazon (522Mha)

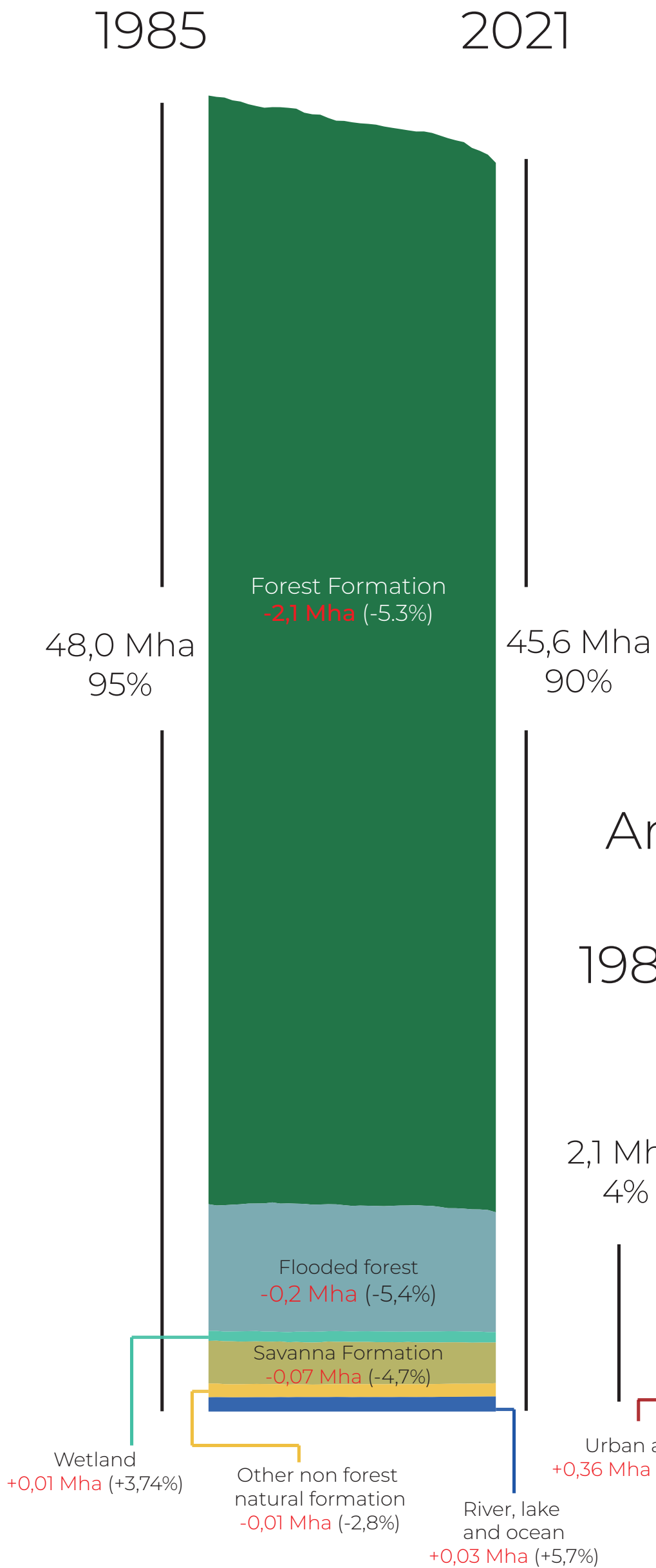
* Mha: Millions of hectares

COLOMBIA

Aparorís River, Caia Amazonas Foundation



Natural vegetation



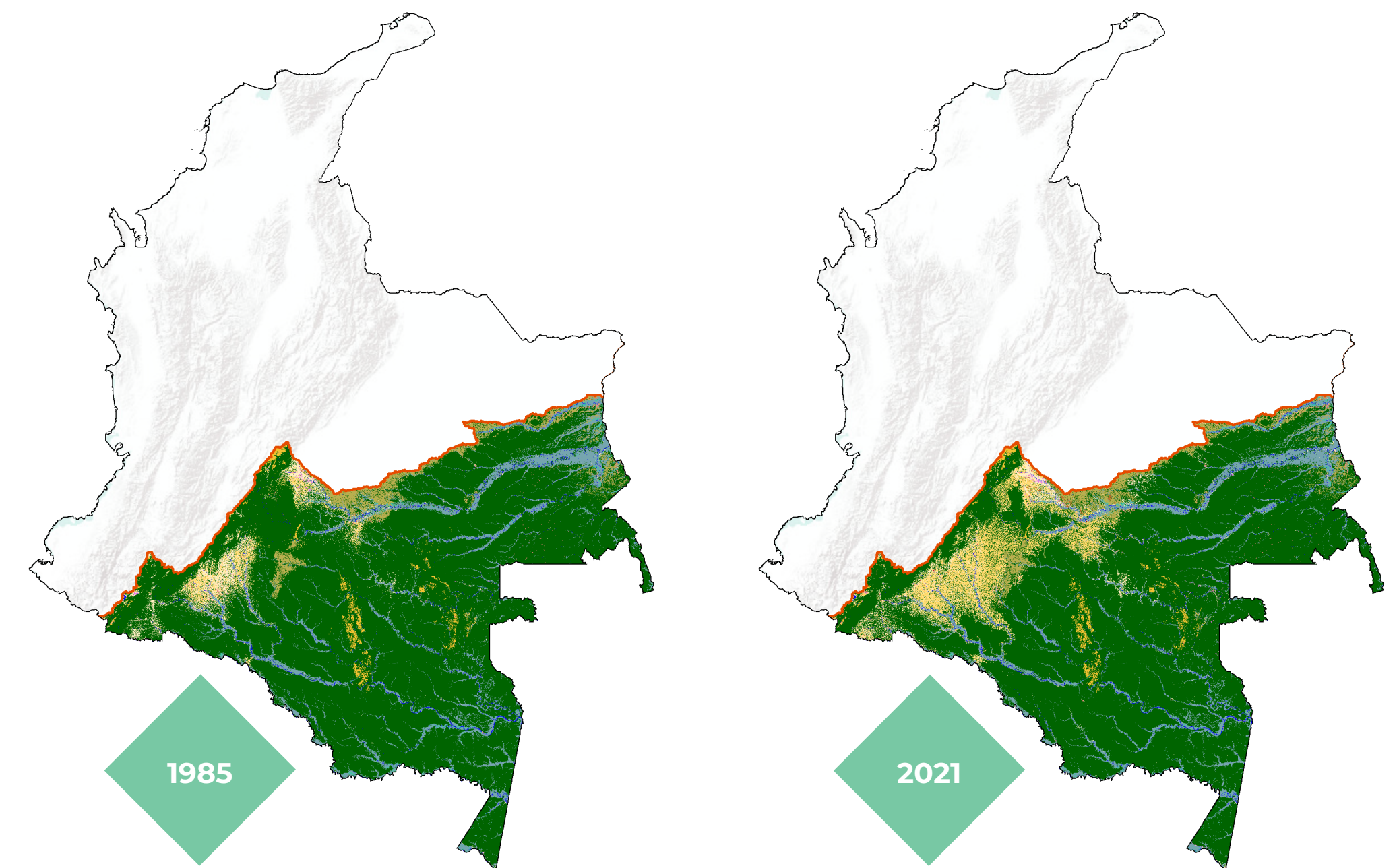
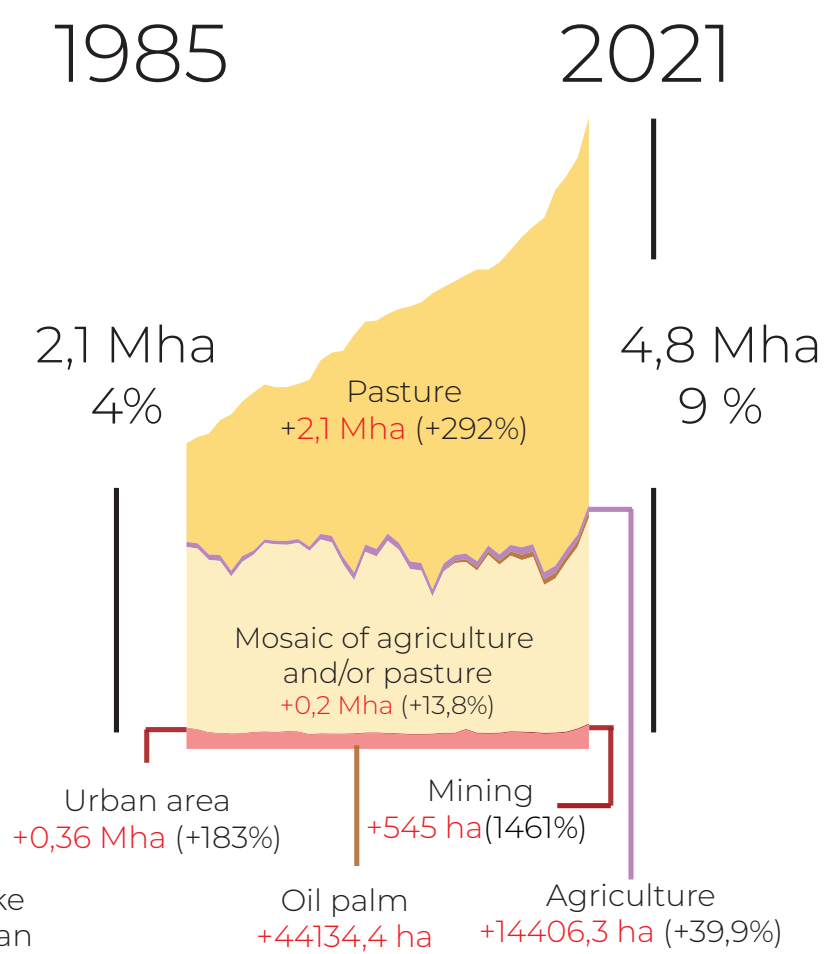
The Colombian Amazon covers **50,3 Mha**, **89%** is natural vegetation and **9%** anthropic uses

Between **1985** and **2021**, it lost **5%** of it forests; agricultural use and forestry increased by **113%**

Mining had an increase of **1461%** until 2021. Urban areas grew as well and had an increase of **168%** in the last **37 years**

It is equivalent to **44%** of the total area of the country and **6%** of the RAISG limit

Anthropic use



*Percentage calculated considering the total area of the Colombian Amazon (50 Mha)

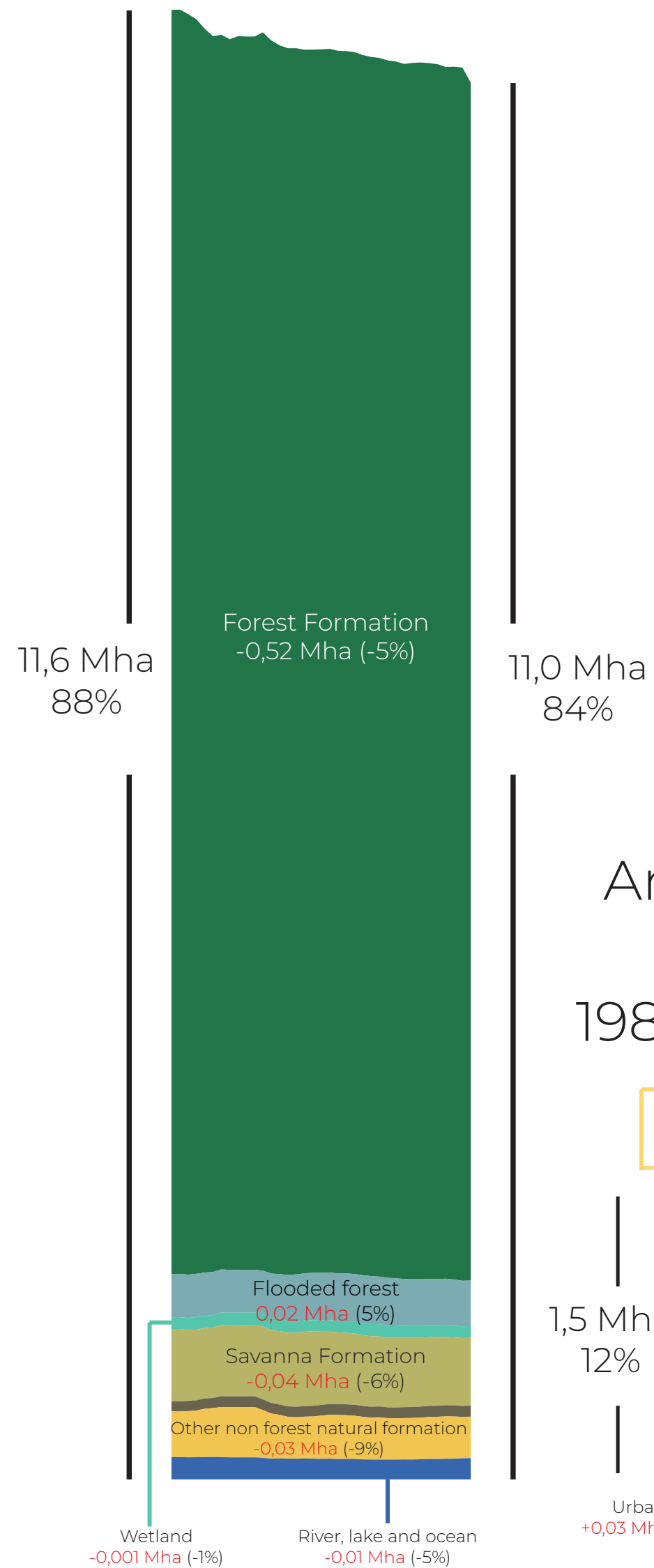
* Mha: Millions of hectares

ECUADOR

Natural vegetation

1985

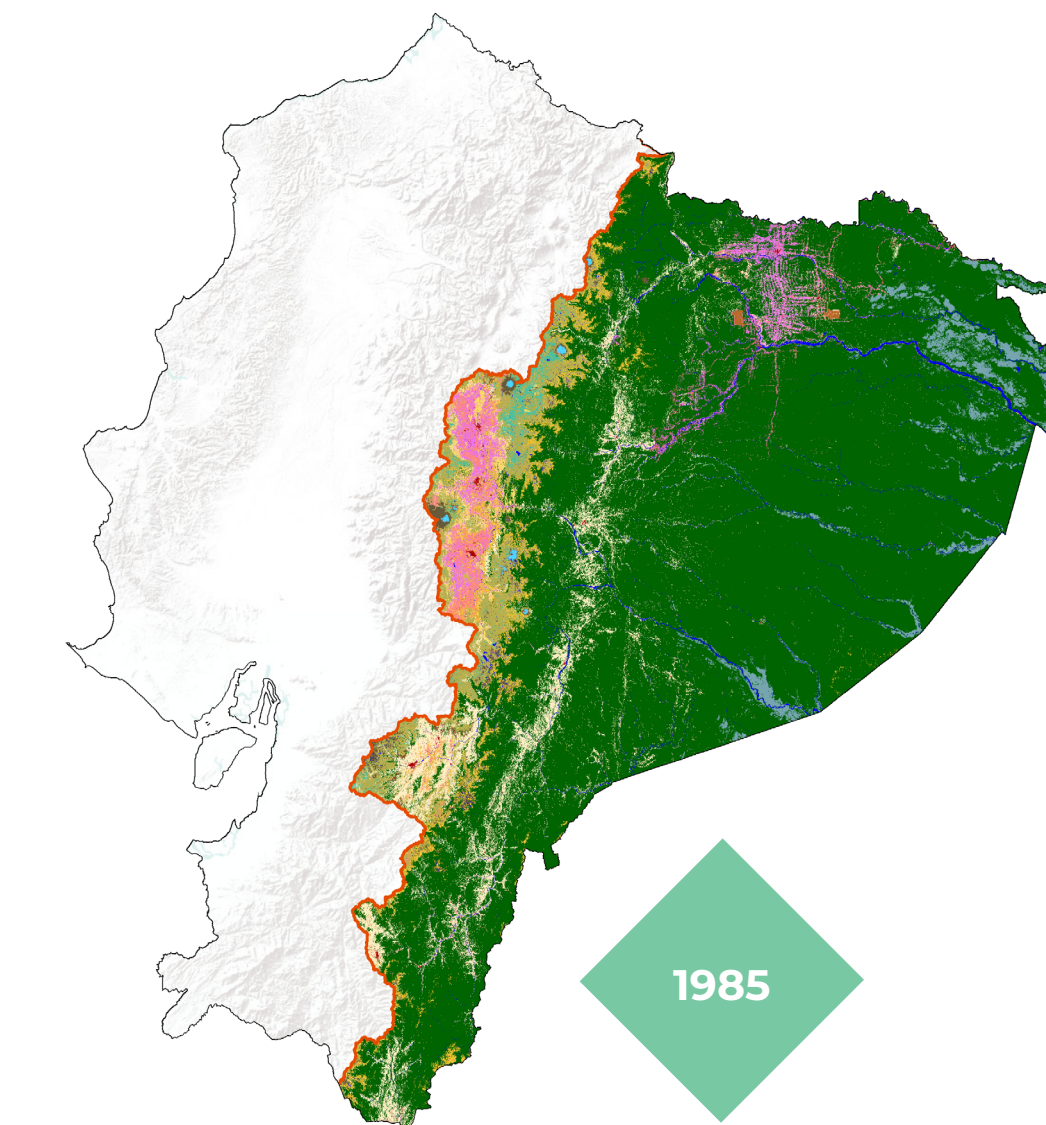
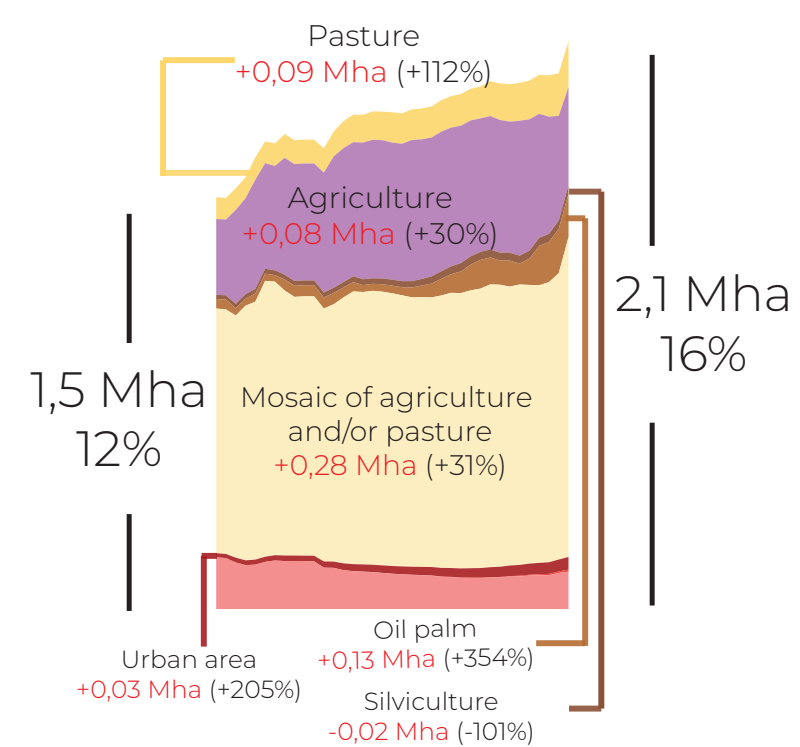
2021



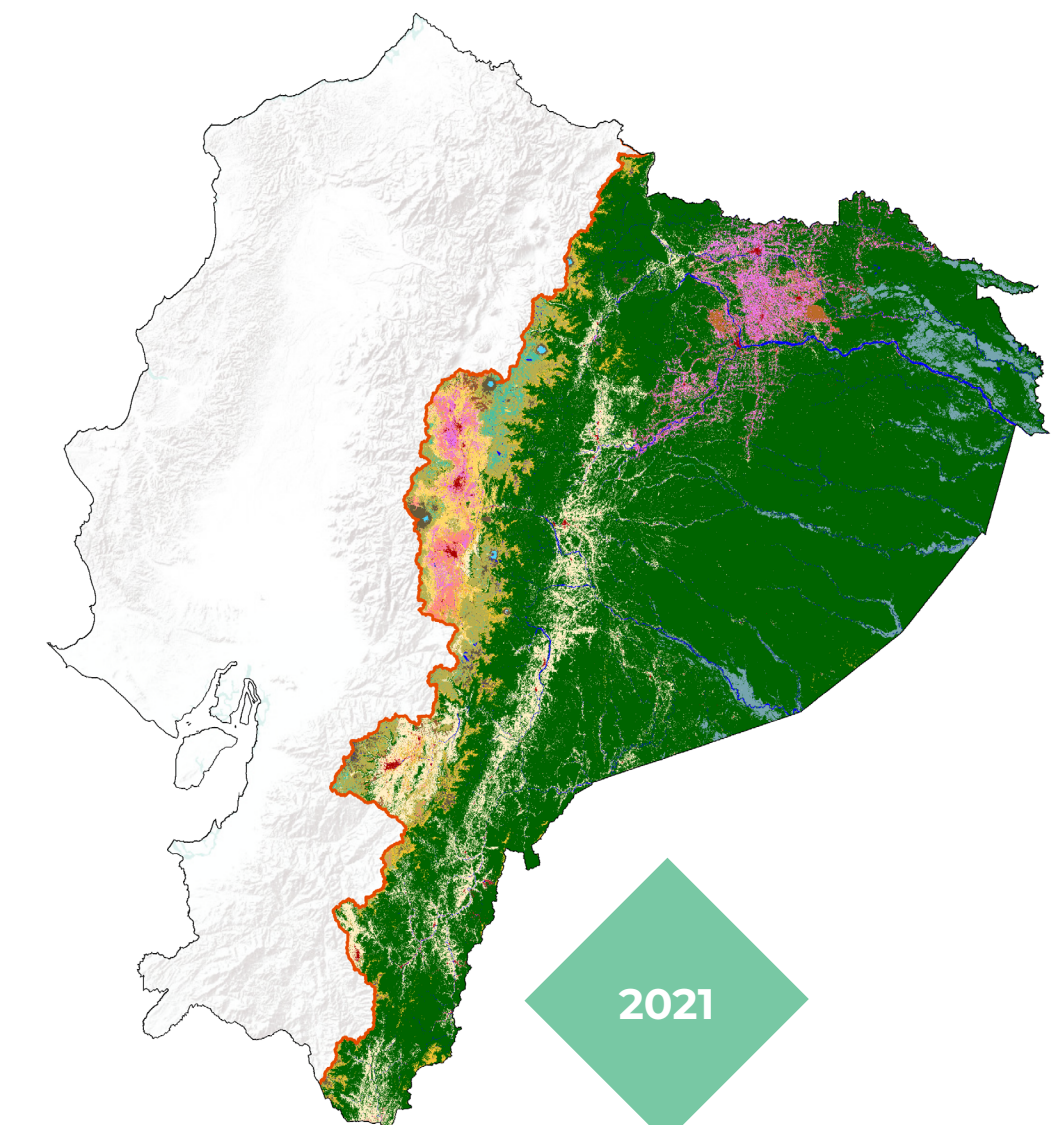
Anthropic use

1985

2021



1985



2021

The Amazon Basin in Ecuador covers **13 Mha**, **83%** is natural vegetation and **15%** are anthropic uses

The anthropic use and silviculture **expanded 45%** and the urban area **increased 205%**

Between 1985-2021 the net lost of forest was **0.5 Mha** that corresponds the **5%** of its forests since 1985

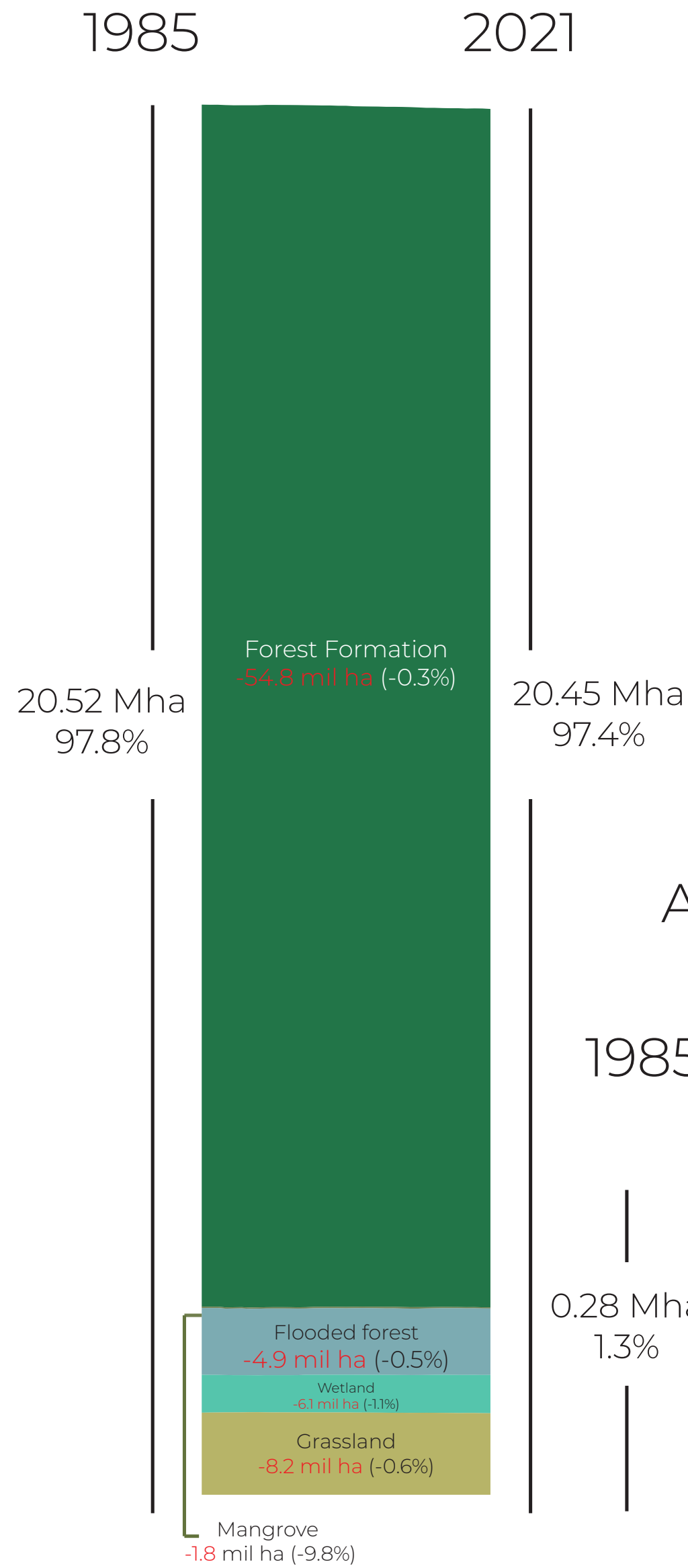
Mining exceeded **7 thousand Ha** until 2021

*Percentage calculated considering the total area of the Ecuadorian Amazon (13Mha)

* Mha: Millions of hectares
* ha: Hectares



Natural vegetation



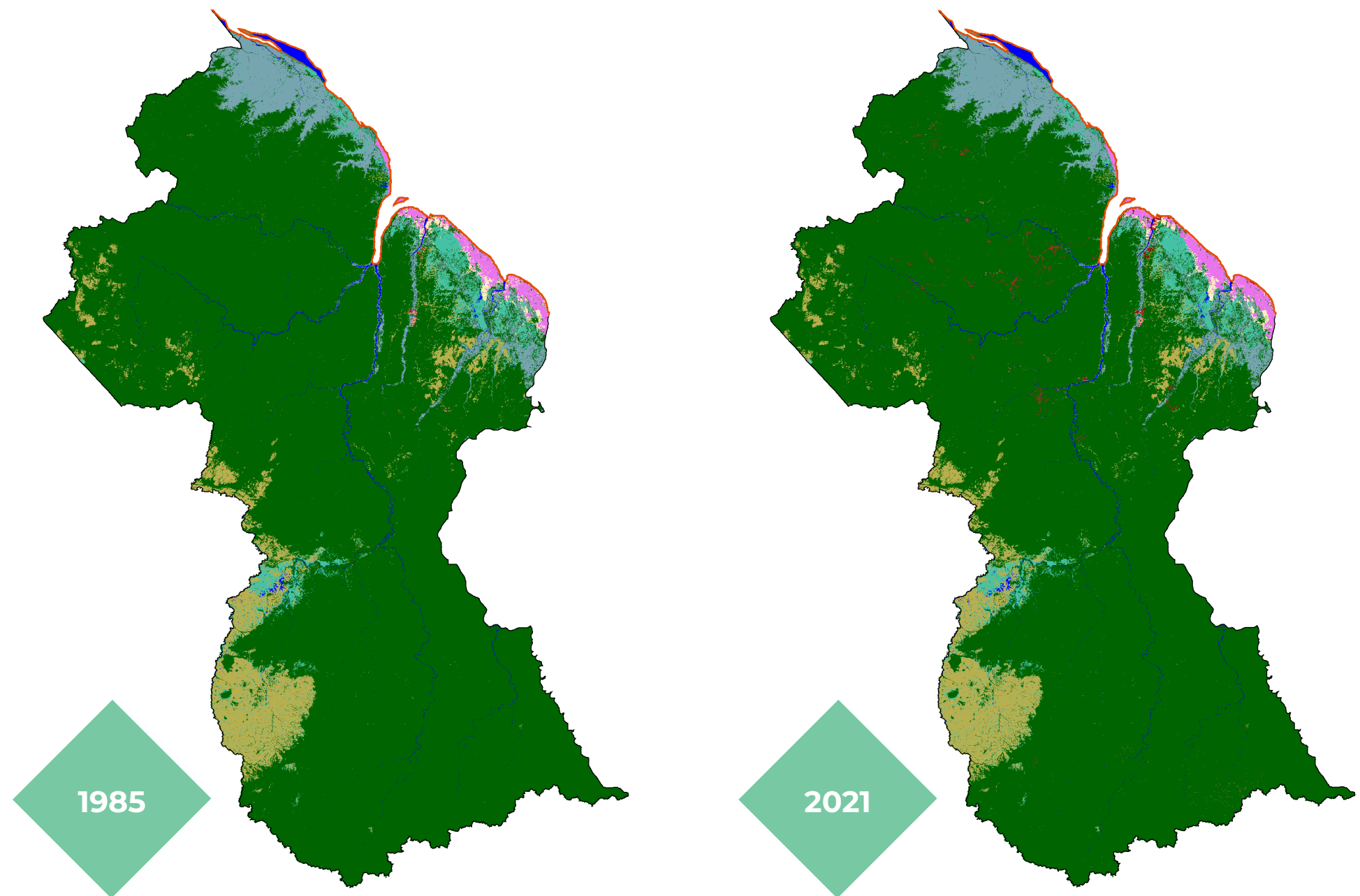
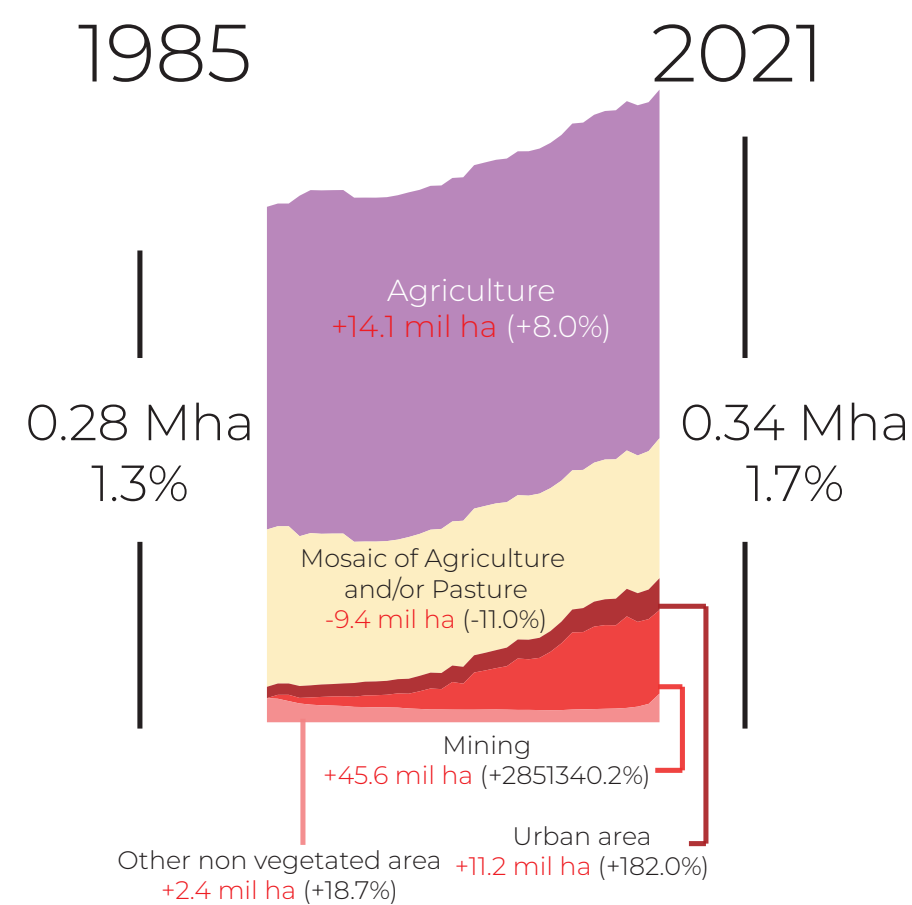
97% of the country is covered by natural vegetation and **2%** by anthropic uses to 2021

89% is covered by forests (18.7 Mha), which had a loss of 61 thousand ha in the last 37 years

Between 1985 and 2021, agricultural use expanded by **2%**

Urban infrastructure increased by **182%** and mining areas grew by **45 thousand ha** in 37 years

Anthropic use



GUYANA

*Percentages calculated considering the total area of Guiana (21 Mha)

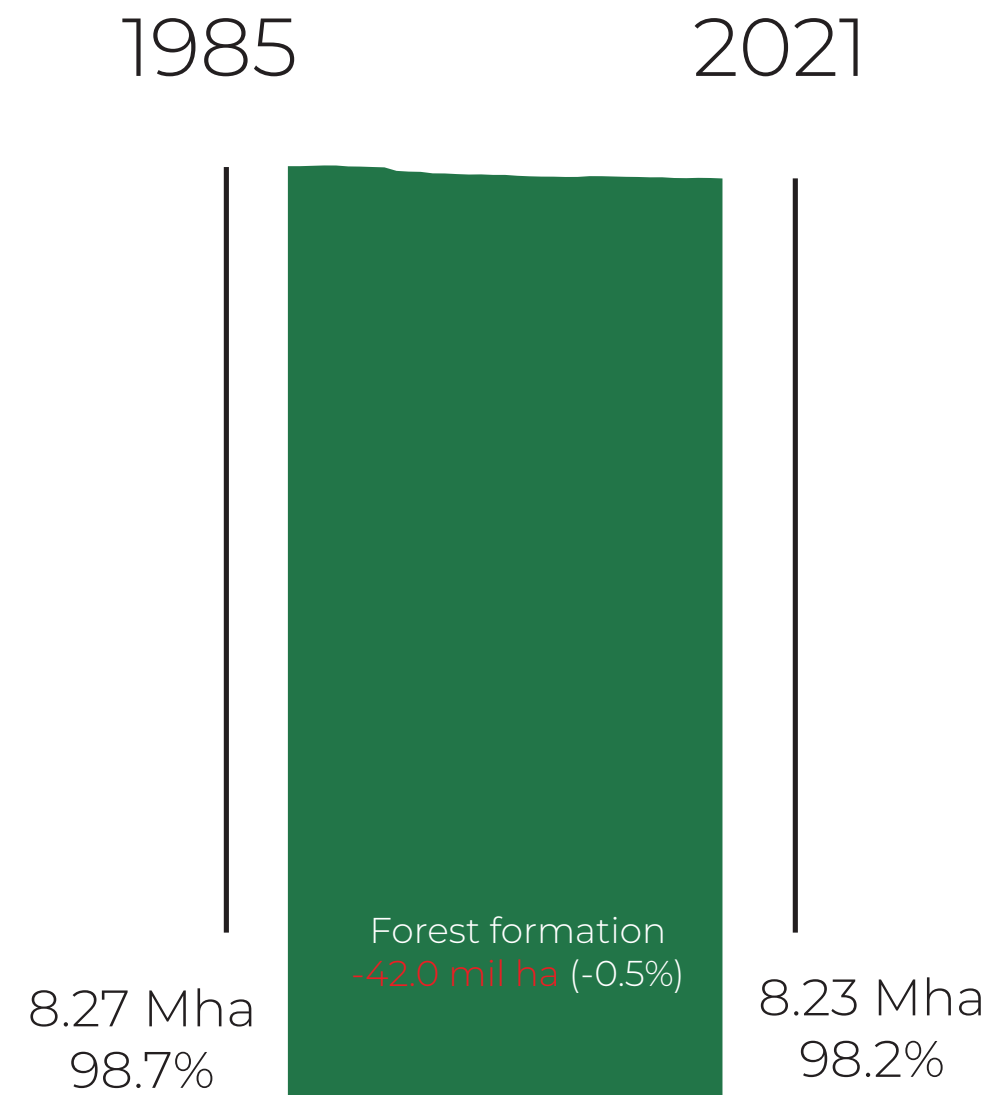
* Mha: Millions of hectares
* ha: * Mha: Hectares



Guiana Amazon Park - Melanie Dinaire

FRENCH GUIANA

Natural vegetation



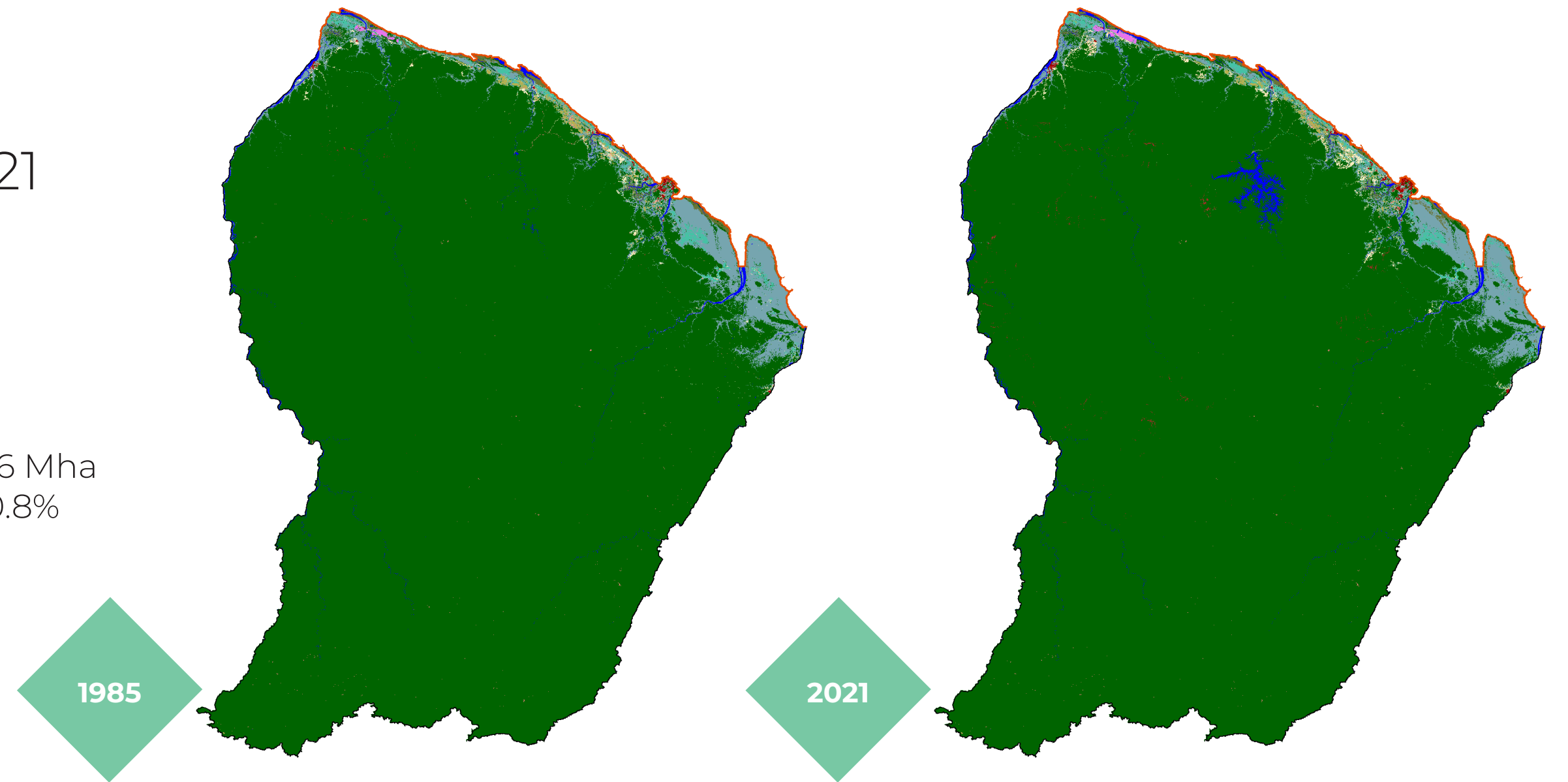
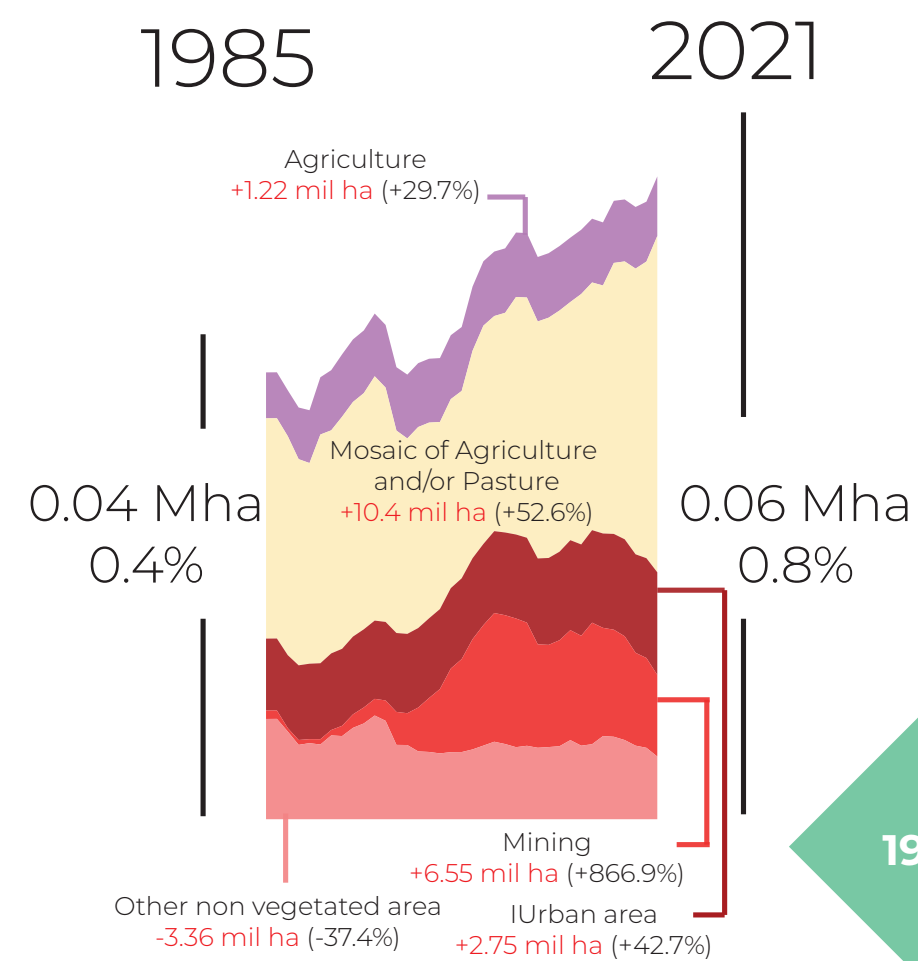
The country is **99%** covered by natural vegetation and **1%** by anthropic uses in 2021

Between 1985-2021 farming uses expanded in **49%**

97% is covered by forest (8,16 Mha), and lost 48 thousand ha in the last 37 years

Urban aread increased **43%** and mining increased **867%** in the last 37 years

Anthropic use



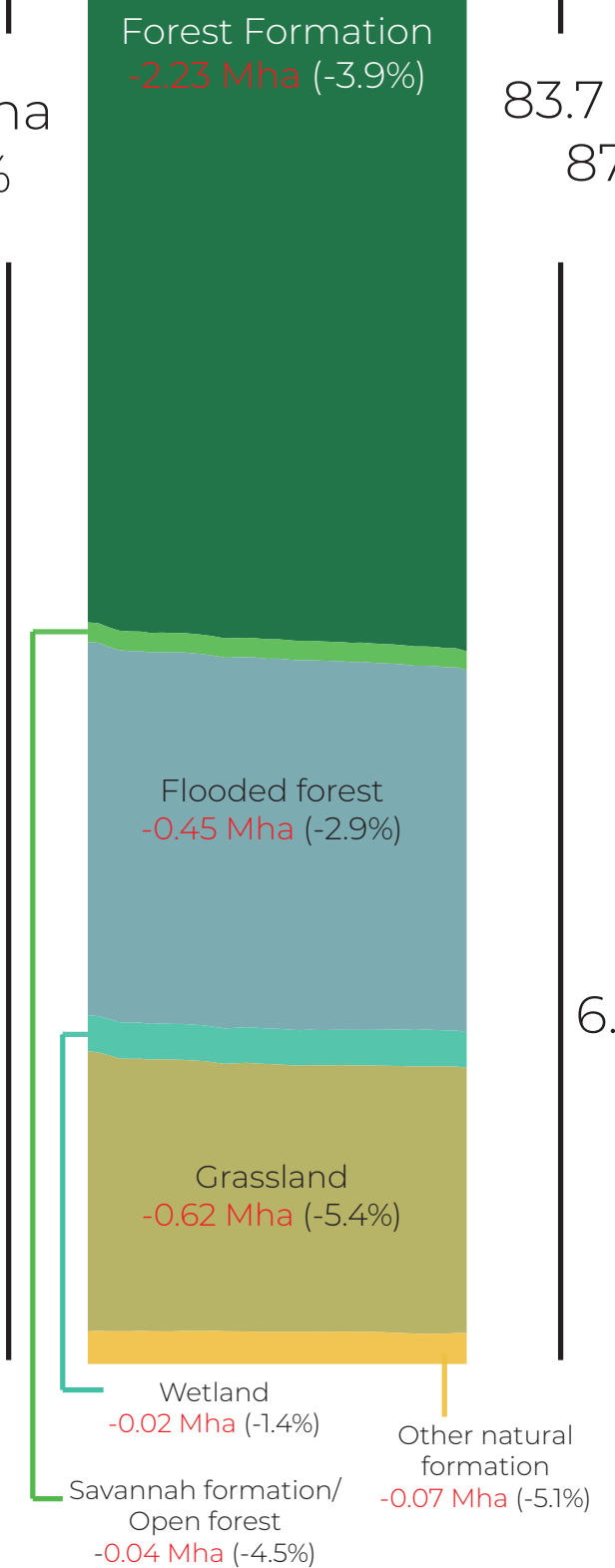
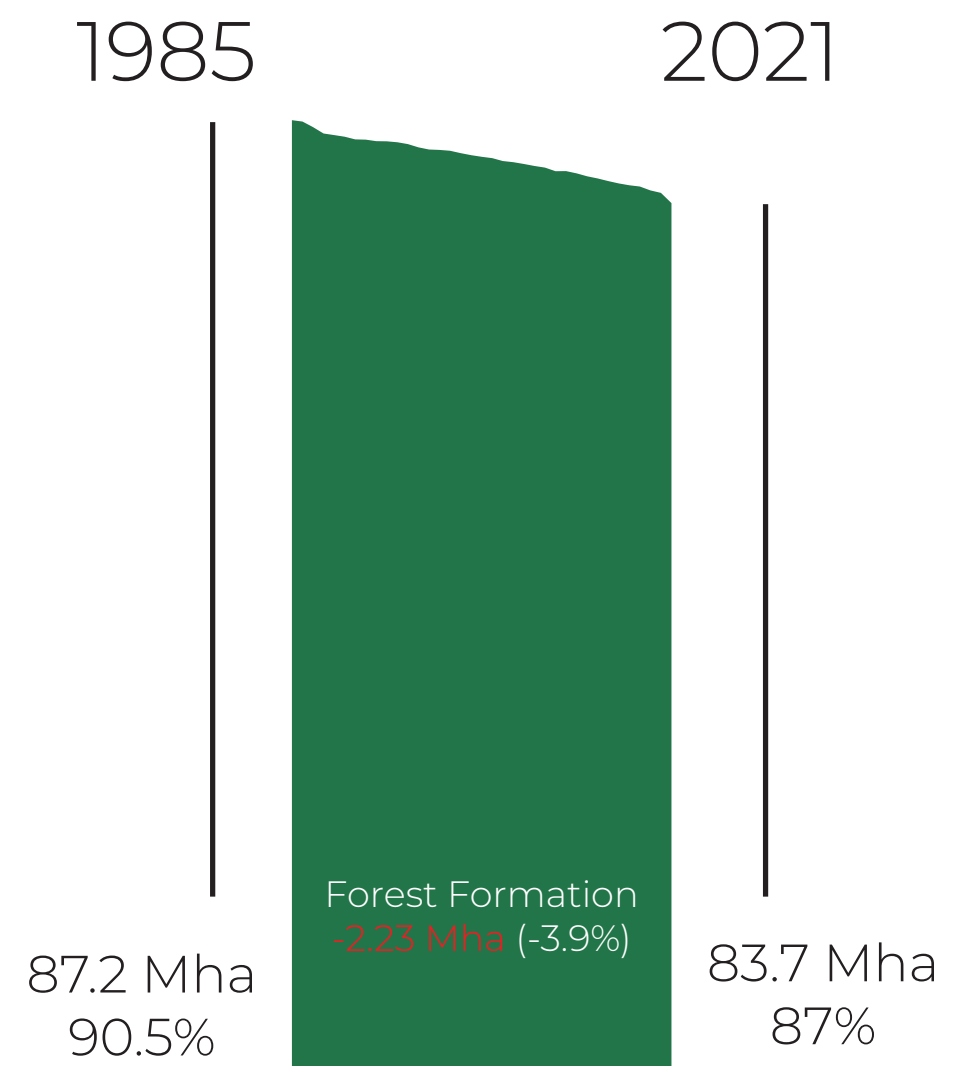
*Percentages calculated considering the total area of French Guiana (8.4 Mha)

* Mha: Millions of hectares
* ha: Hectares

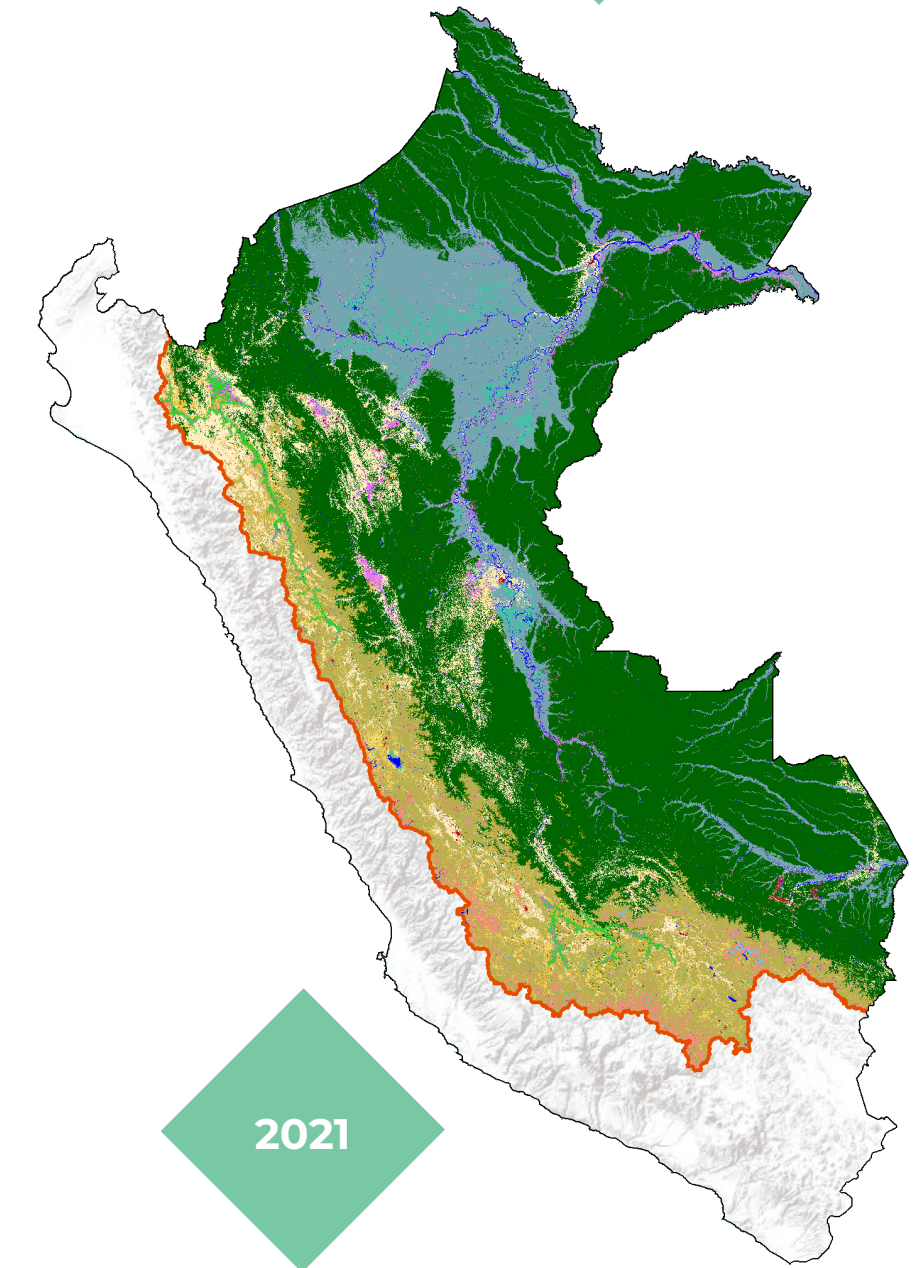
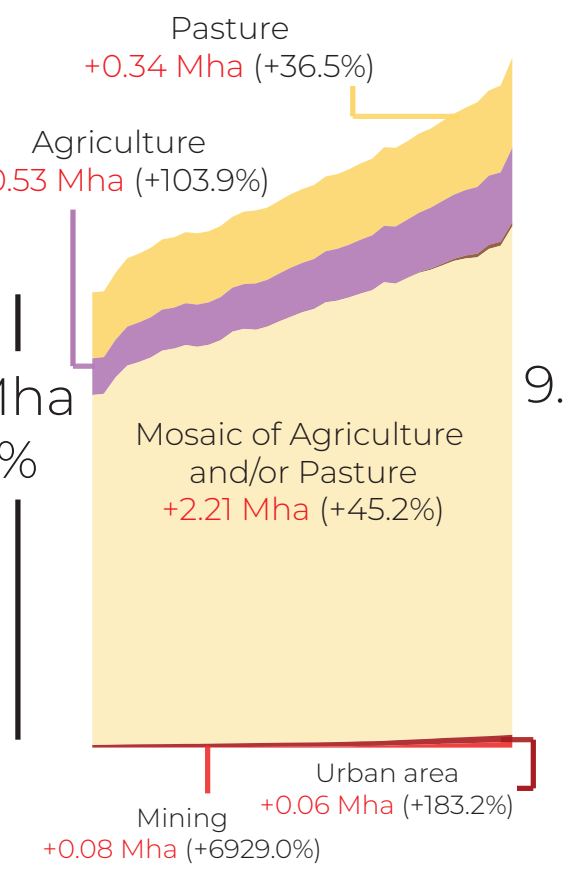
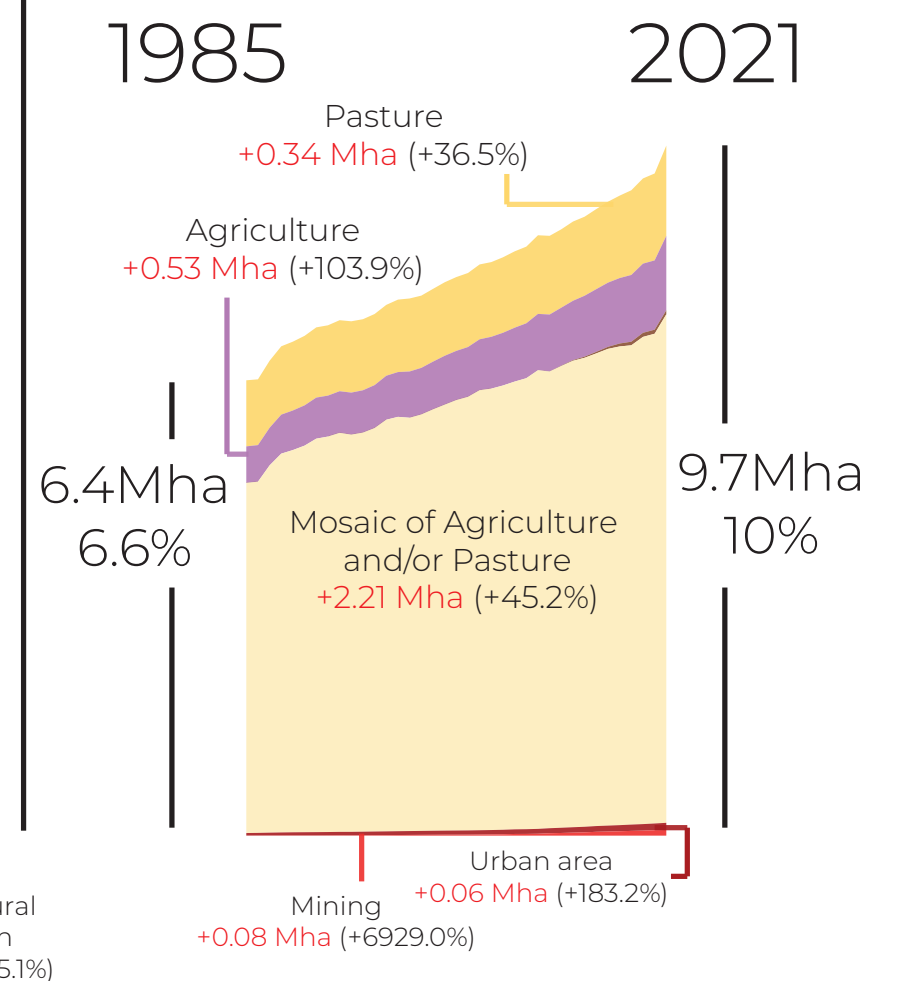


PERU

Natural vegetation



Anthropic use



The Peruvian Amazon covers 96.3Mha, **87%** is natural vegetation and **10%** anthropic uses in 2021

Between 1985 and 2021, it lost **4%** of its forests and **47%** of its glaciers

Agricultural use increased by **50%** and urban area **183%**

In 2021 Mining area was **70.3 times** the one in 1985

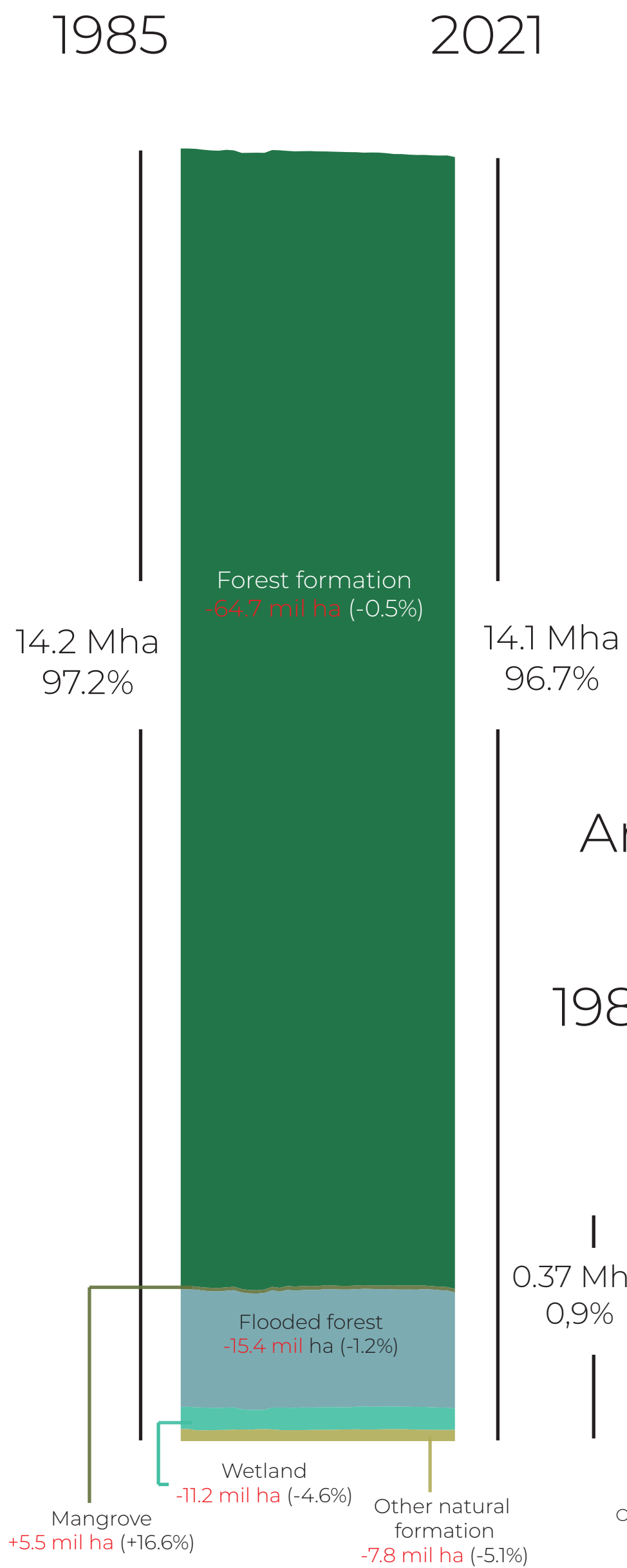
*Percentages calculated considering the total area of the Peruvian Amazon (96 Mha)

* Mha: Million hectares

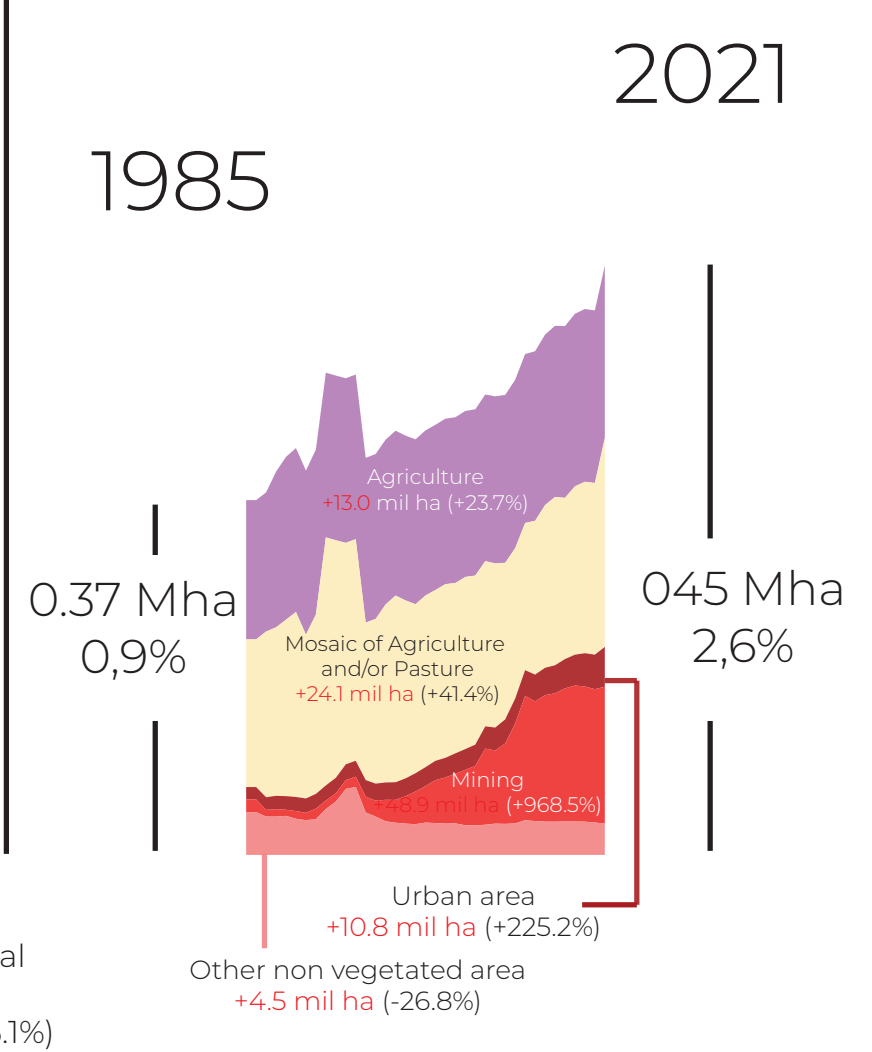


SURINAME

Natural vegetation



Anthrogenic use

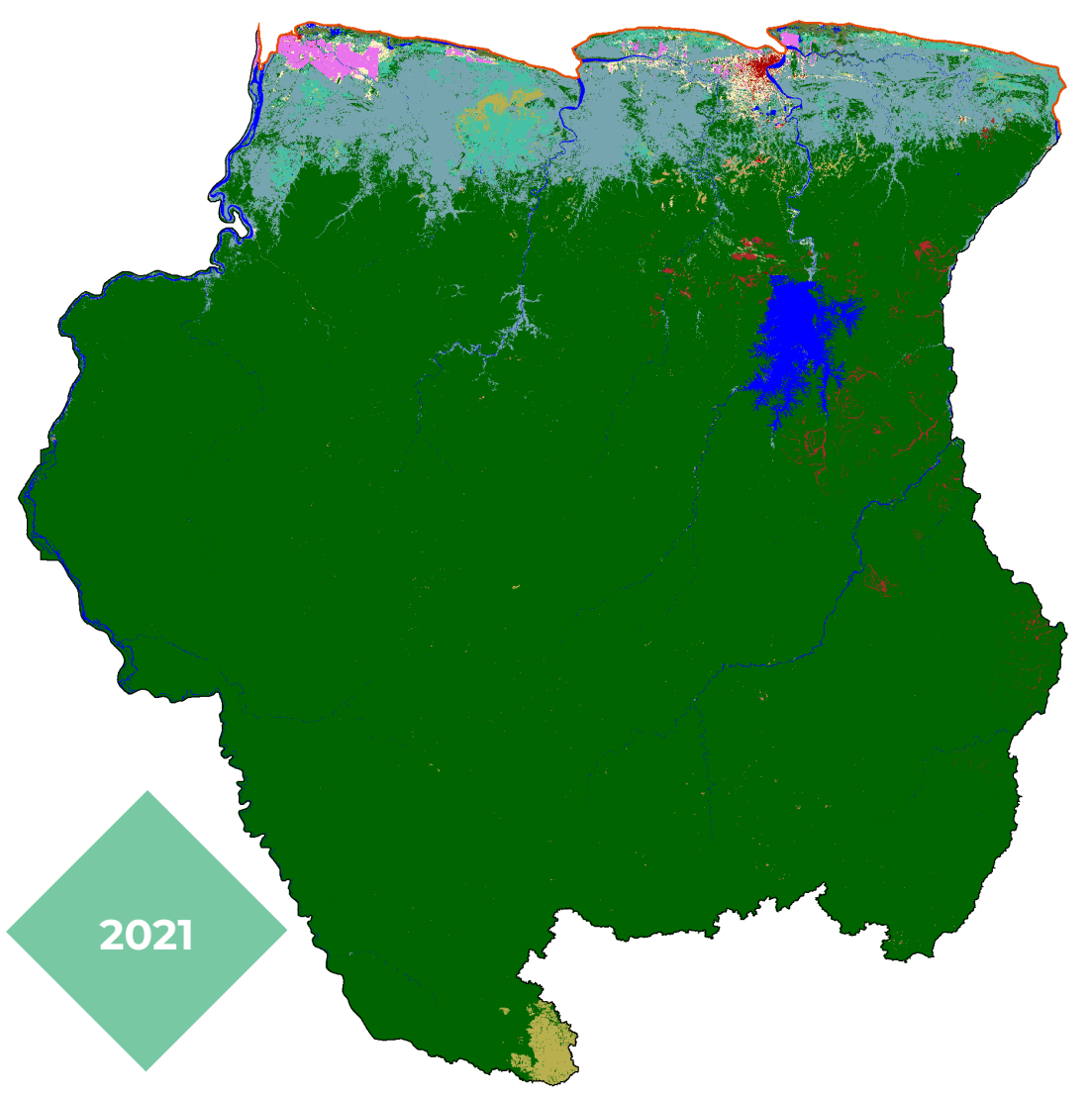
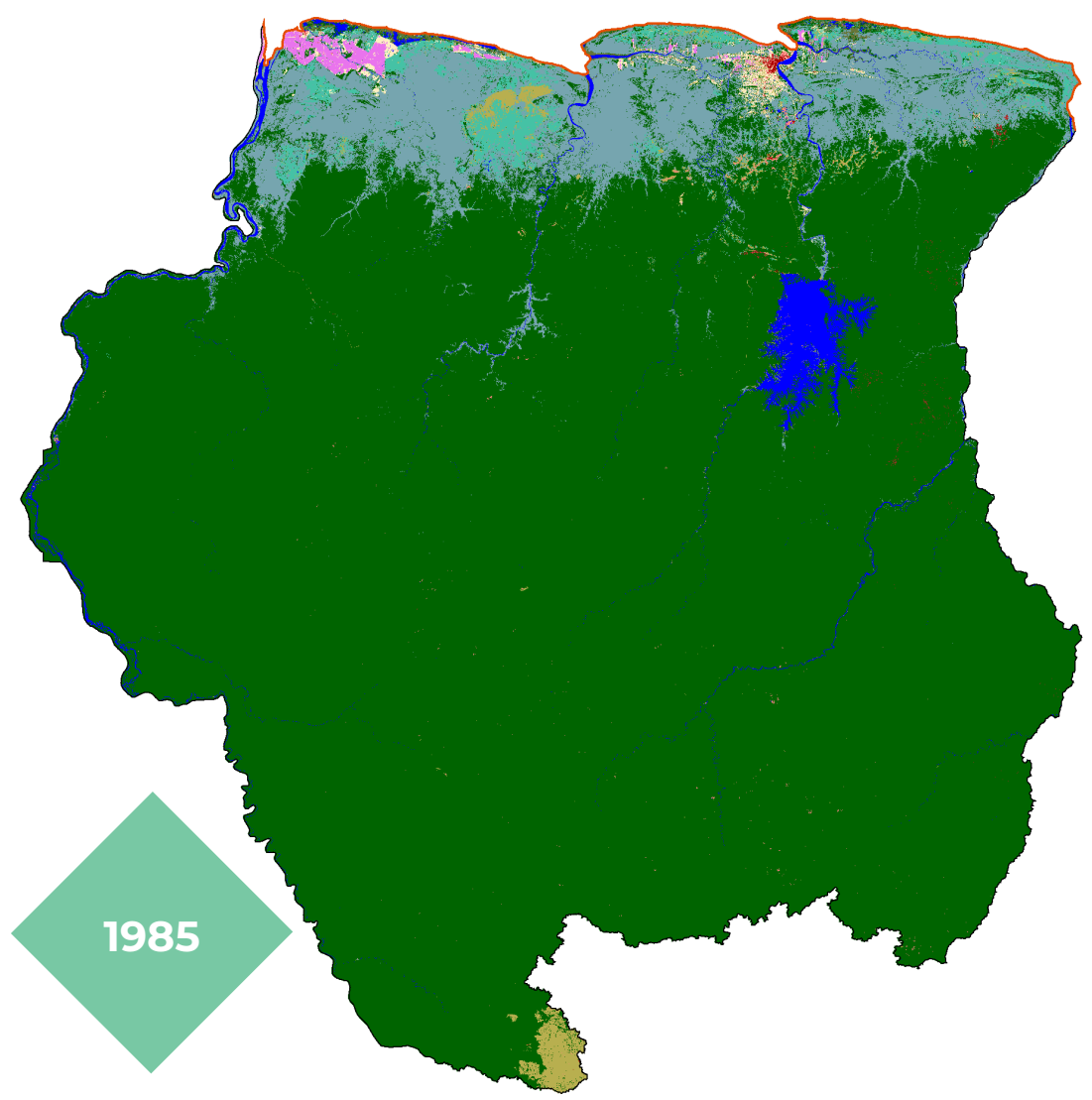


97% the country is covered by natural vegetation and **3%** by other anthropic uses in 2021

33% increased of farming 1985 and 2021

94% is covered by forest (13.7Mha), which have lost 85 thousand ha in the last 37 years

The urban area increased **225%** (over 10 thousand ha) and mining in **969%**, from 5 thousand ha to 53 thousand ha in 37 years)



*Percentages calculated considering the total area of Suriname (14.6 Mha).

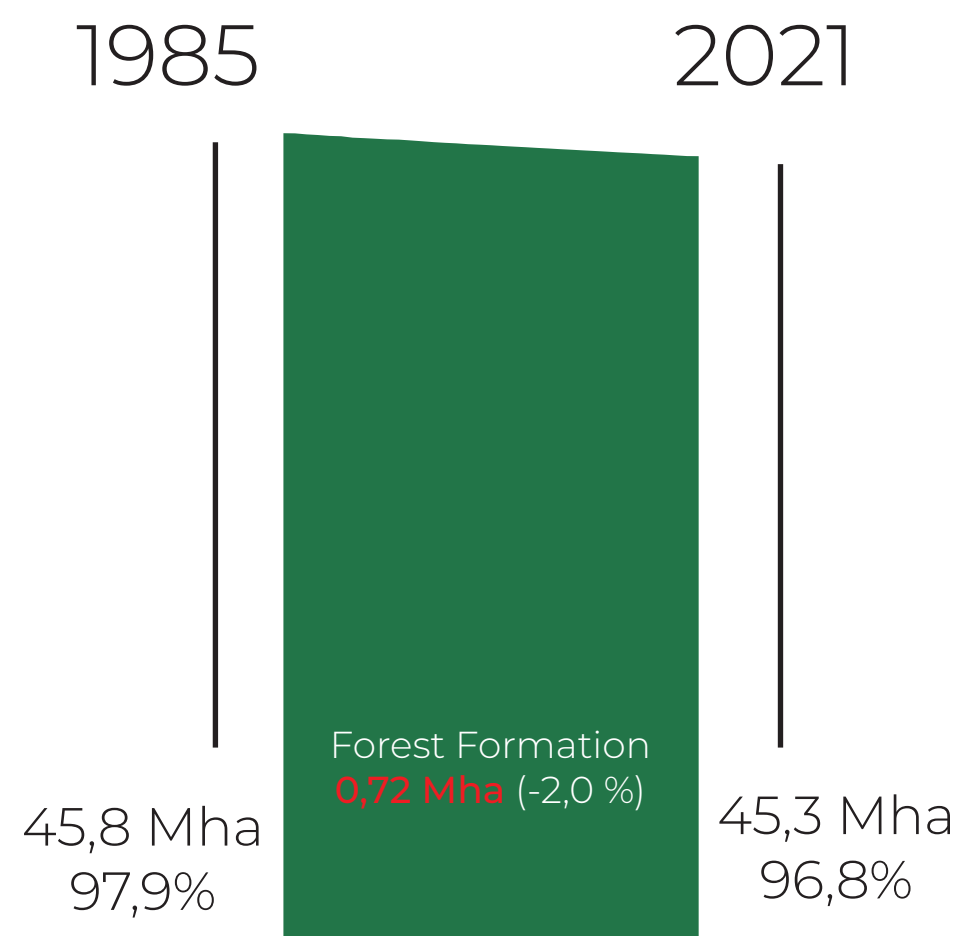
* Mha: Million hectares
* ha: Hectares



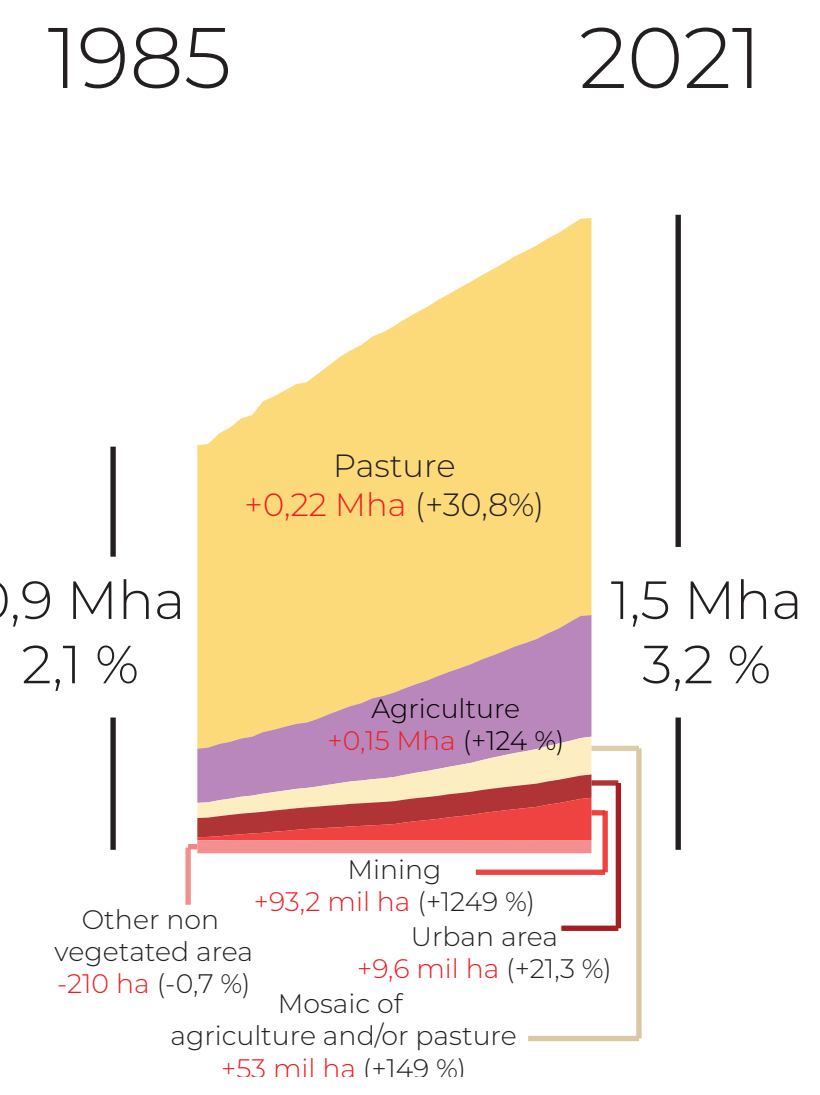
Nacional Canaima Park, Rodrigo Lazo

VENEZUELA

Natural vegetation



Anthropic use

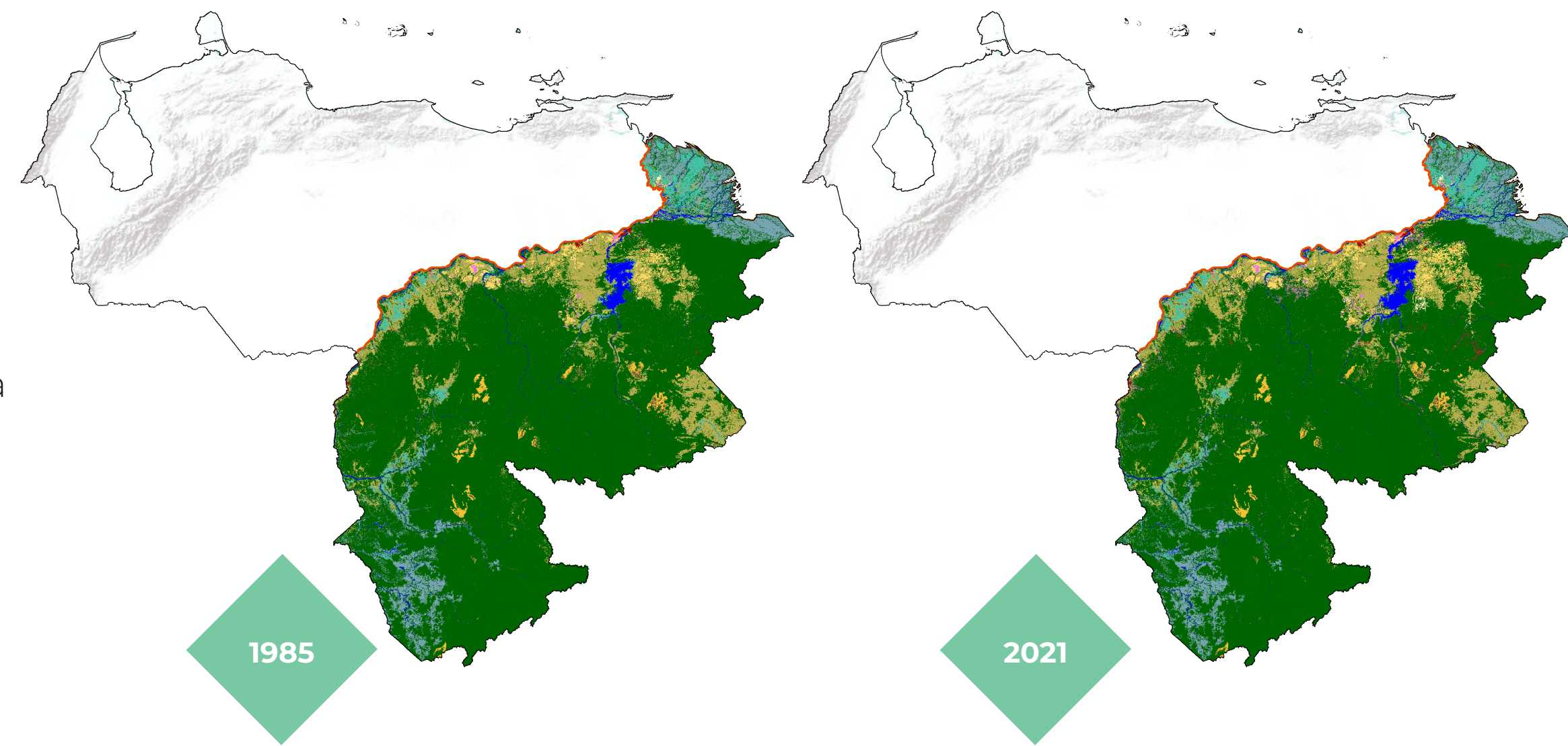


46.9 Mha (94%) is natural vegetation and 3% is anthropic uses

The agriculture expanded **400 thousand ha** in 37 years

Forest lost 2% and **Agriculture expanded to 49%**

Mining increased 7 thousand ha to **101 thousand ha in 2021**



*Percentage calculated considering the total area of the Venezuelan Amazon (46.9 Mha)

* Mha: Millions of hectares
* ha: hectares
* mil ha: Thousands of hectares



Initiative



In collaboration with:



The **Amazon Georeferenced Socio-environmental Information Network** (RAISG) is a consortium of civil society organizations from the Amazonian countries oriented to the socio-environmental sustainability of the Amazon, with the support of international cooperation. The RAISG generates and disseminates knowledge, statistical data and information geospatial socio-environmental maps of the Amazon, prepared with common protocols for all the countries of the region, focused on a comprehensive vision of the region. the network is made up of the following countries: Bolivia, Brazil, Colombia, Ecuador, Guyana, French Guiana, Peru, Suriname and Venezuela.

For more information in <https://raisg.org/>



Gaia Amazonas



MAIN CHARACTERISTICS OF THE METHOD

Collaborative Work in network

researchers of universities, NGOs and technology companies of South America

Processing of Landsat images 4, 5, 7 and 8 of the last 37 years

(+ of 150 thousand images)

Annual information on 18 land cover and land use classes between 1985 and 2021

Resolution of 30m

cloud processing using artificial intelligence and algorithms

Google Earth Engine Platform

Collection 4.0: Mapping from 1985 to 2021. Methodology with Machine Learning - Random Forest. 156 layers of information (spectral bands, fractional and texture information, calculated indices and physical variables). New classes such as agriculture and pasture are mapped in this collection.

Collection published in December 2022.

The project has a public web platform for consultation (<http://amazonia.mapbiomas.org>) of maps and data; the possibility of generating statistics on land use and its changes in different spatial units (basin, country, department, municipality, protected areas, indigenous territories, among others).

REFERENCE:

MapBiomas Amazonia (2002). Collection 4.0 of annual maps of land cover and land use in the Amazon. Accessed on [DATE], through the link: [LINK]

For more information: amazonia.mapbiomas.org