

PROGYSAT: PROJET DE COOPÉRATION RÉGIONALE POUR L'OBSERVATION DES GUYANES PAR SATELLITE

PUBLIC POLICIES AND THEIR IMPACTS ON FOREST PROTECTION

TEAM:

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OBJECTIVES - AXIS 7

- **GENERAL:**

- Quantify and qualify the impact of human action on the Amazon forest mass
- (and make it applicable on a geospace platform)

- **SPECIFICS:**

- Analyze the effects of public policies on forest protection
- Define indicators that estimate the impact of public policies on forest protection

PRODUCTS - AXIS 7

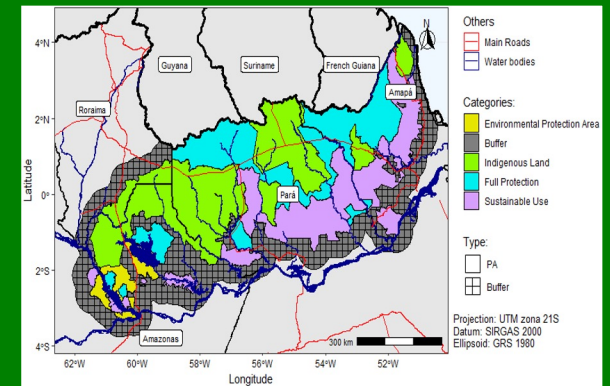
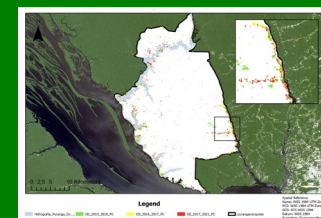
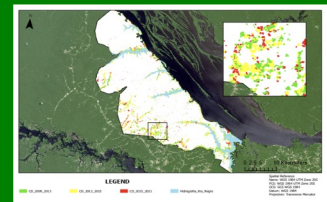
**1 - METHODOLOGY
(SCRIPTS): (SEMI)
AUTOMATED**

**2 -
INDICATORS**

**3- MAPS
(CARTOGRAPHY)**

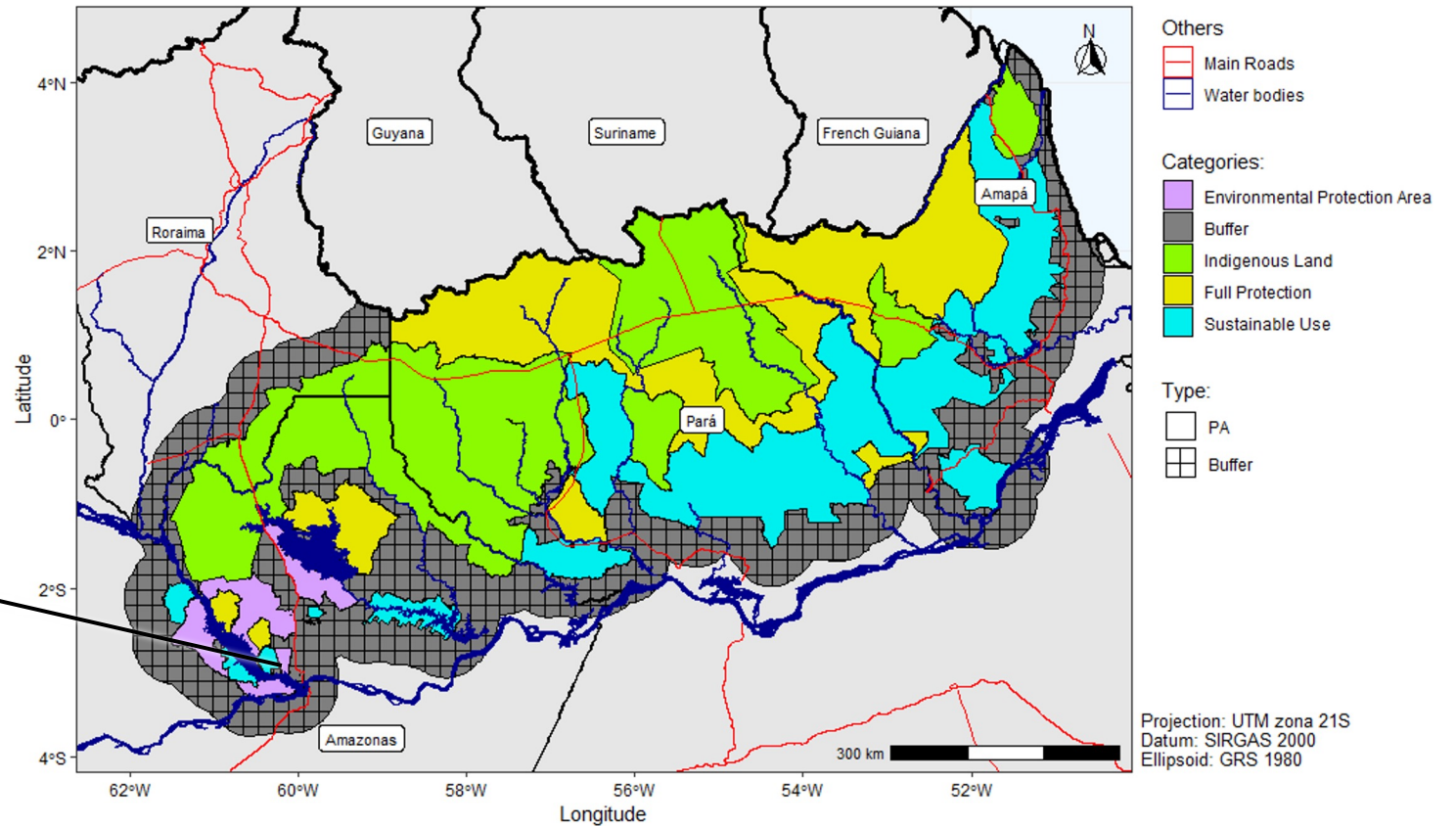
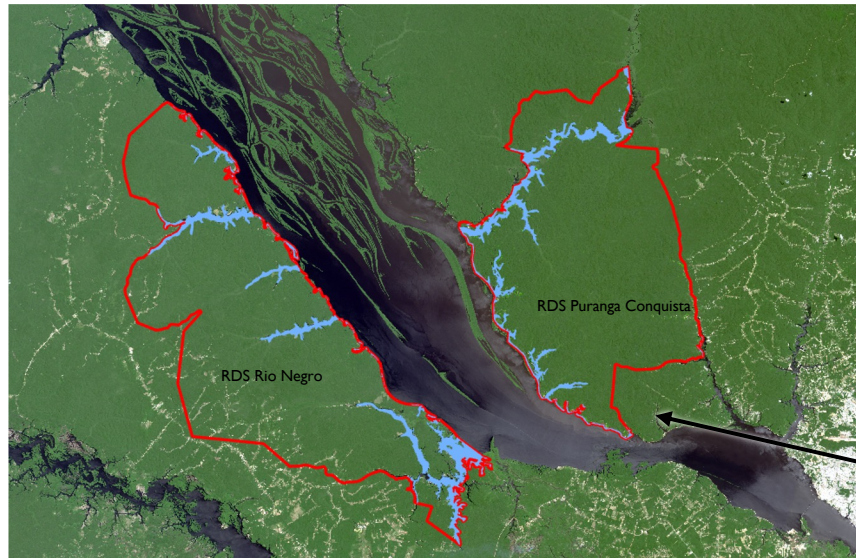
	REGIONAL SCALE
Deforestation	Indicator
Fragmentation	Indicator
Connectivity	Indicator

	LOCAL SCALE
BOLSA FLORESTA PROGRAM	Indicators



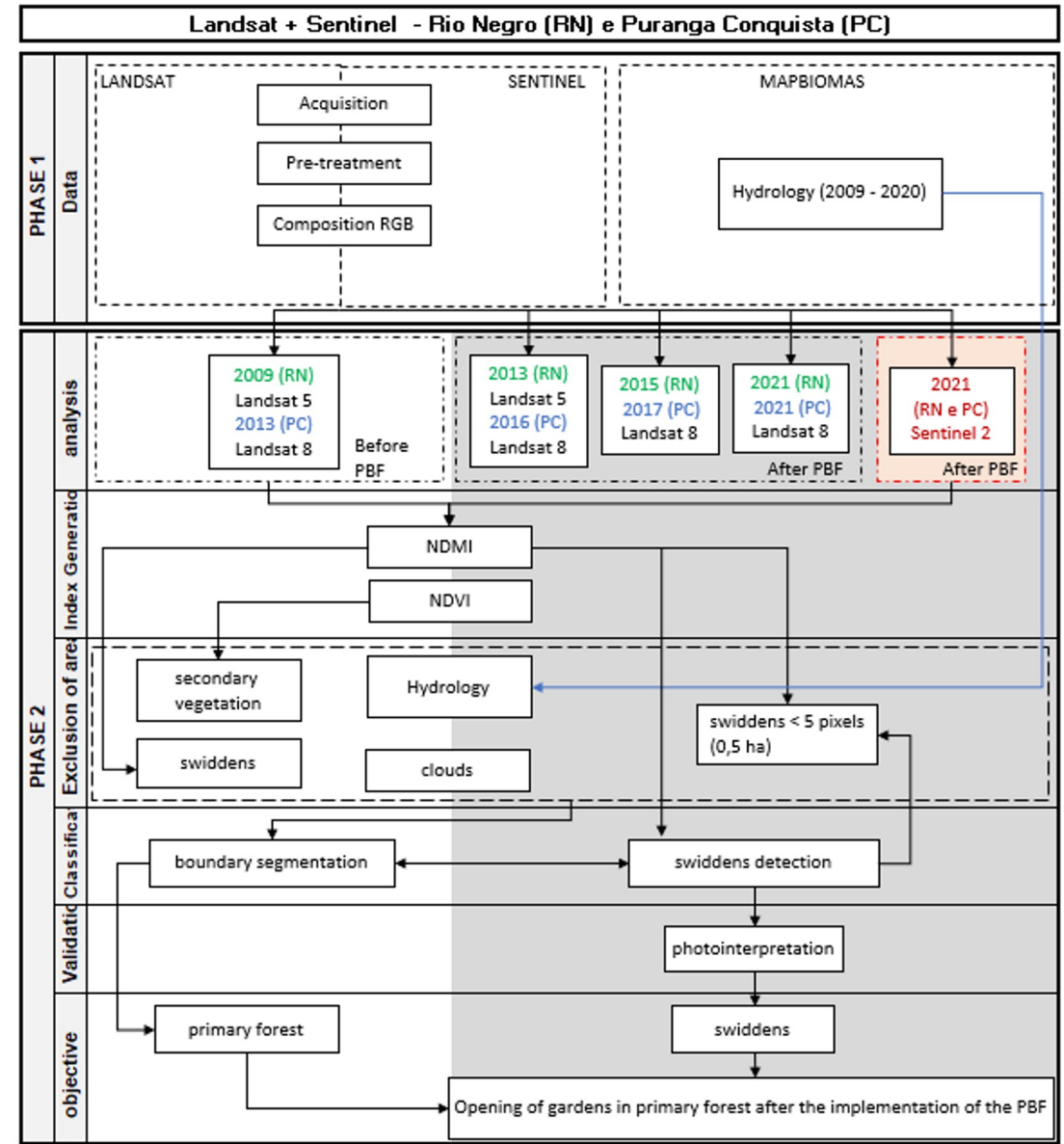
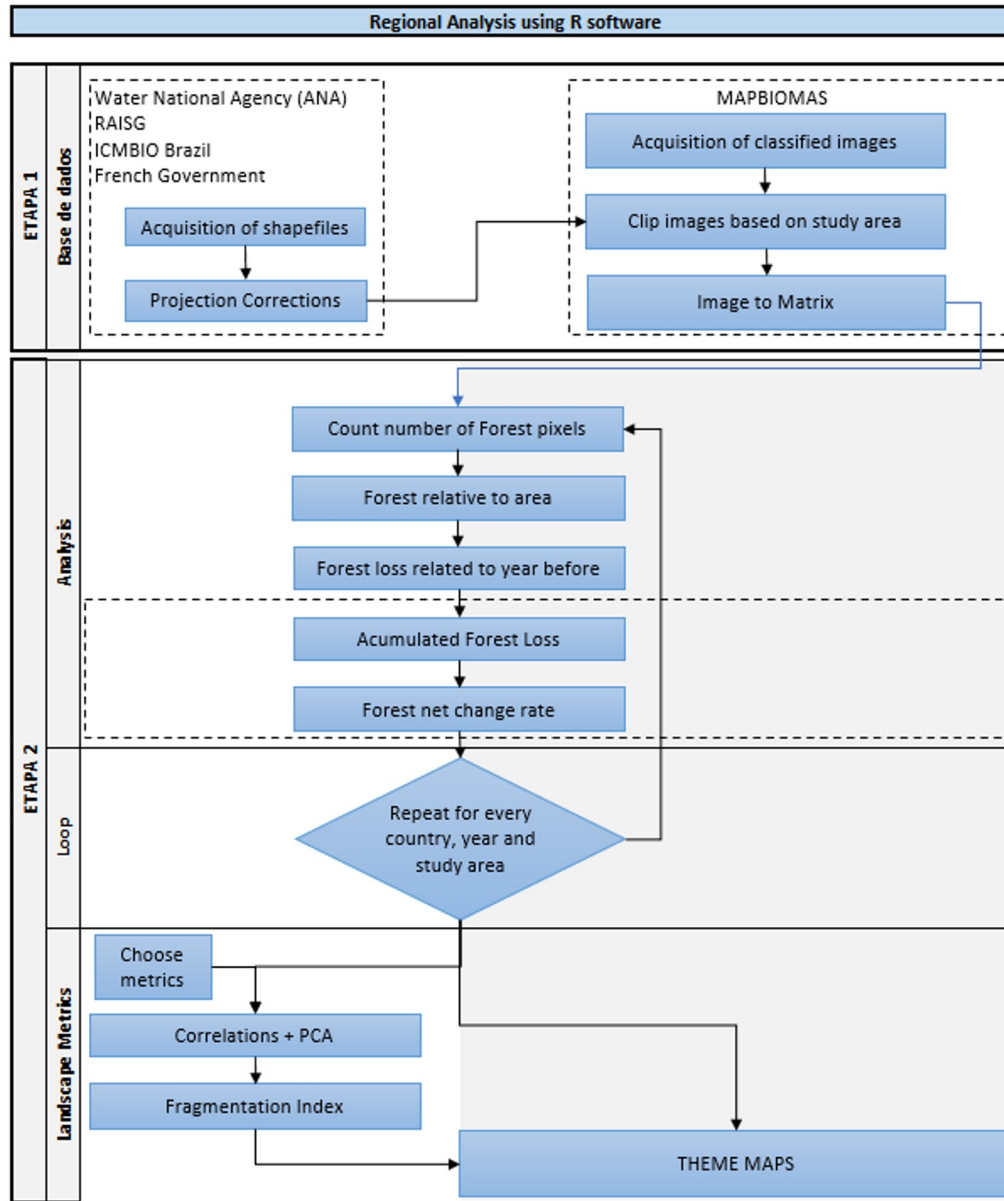
PROPOSED ANALYSIS - LOCAL AND REGIONAL SCALE

- REGIONAL: 39 Protected Areas located in the northern part of the Amazon River basin.
 - Area: 393,332 km² (+ 50 km of Influence zone, with area: 184,501 km²)



- LOCAL: Protected Areas where the Public Policy called “*Bolsa Floresta Program*” was implemented

METHODOLOGY (REGIONAL E LOCAL SCALES)

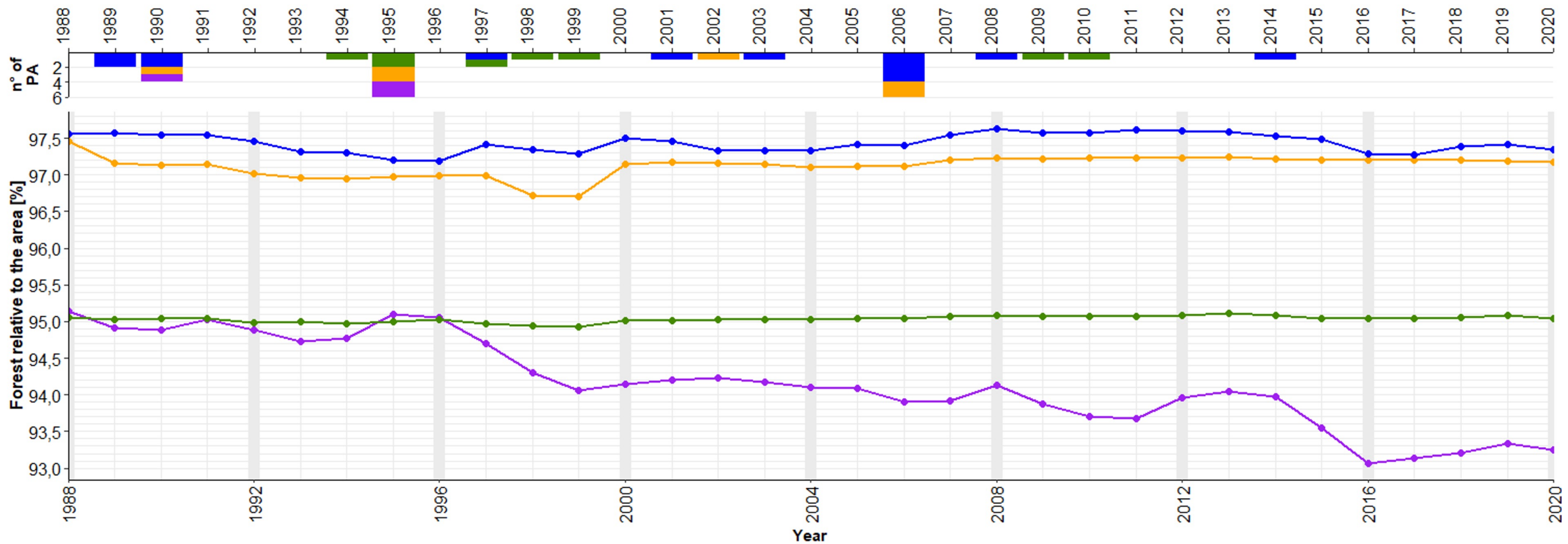


PRELIMINARY RESULTS: REGIONAL AND LOCAL SCALES

REGIONAL SCALE: DIAGNOSIS IN BRAZIL

- Protected areas (PA) are one of the most effective public conservation policies in the Brazilian Amazon.

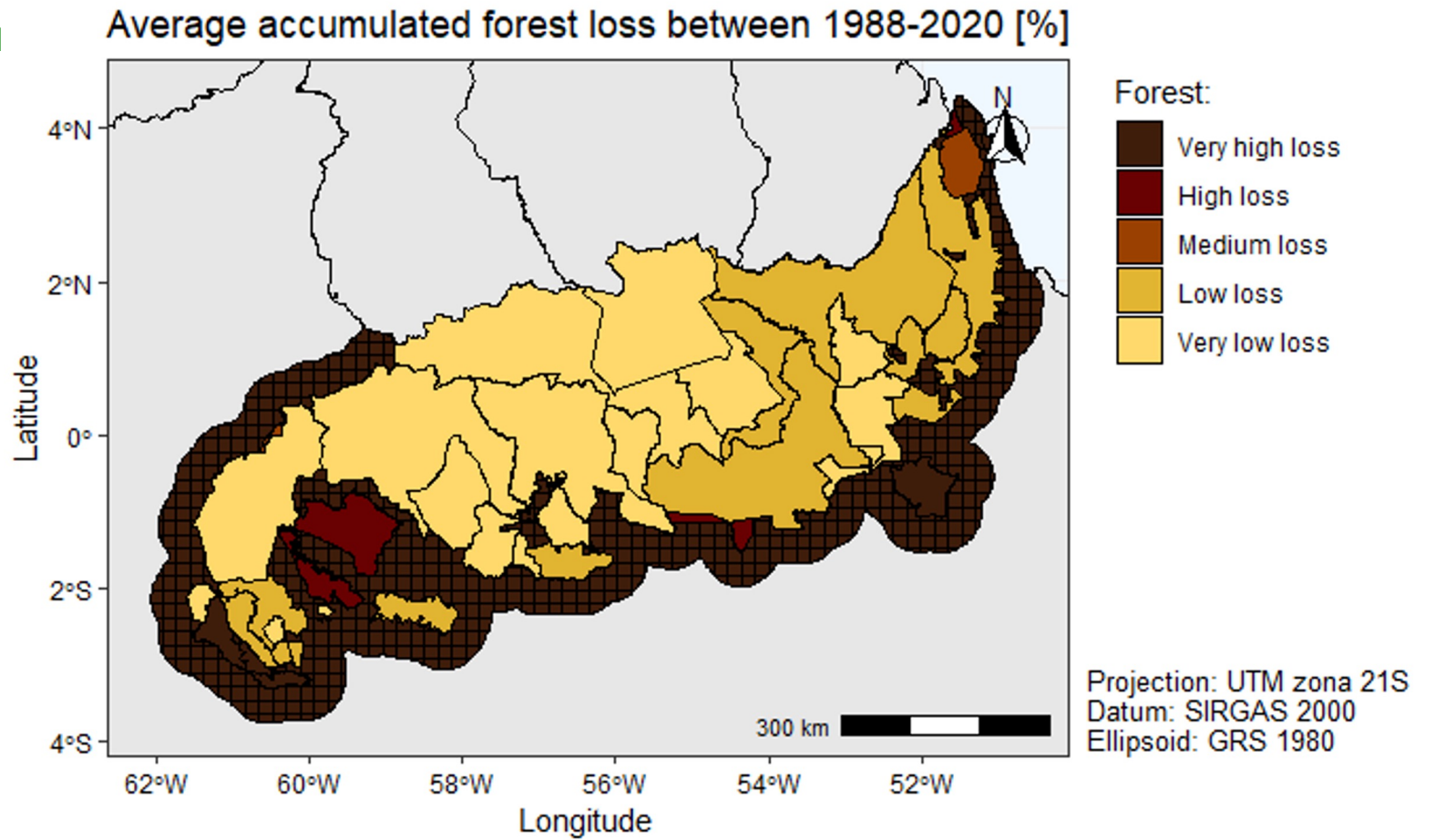
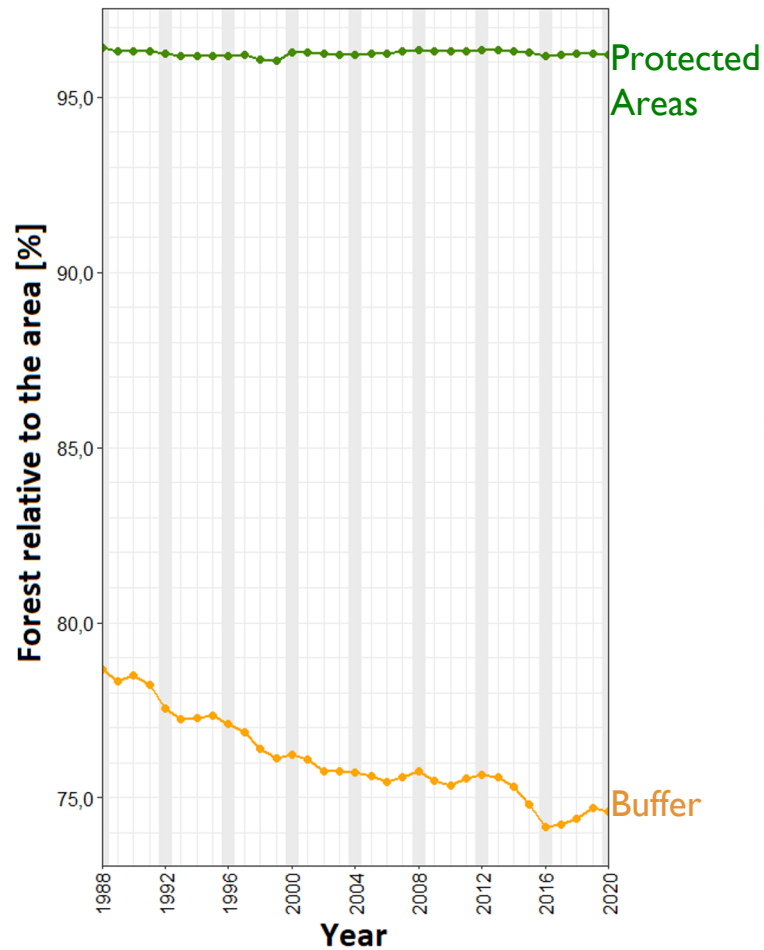
Type of PA: ■ *Environmental Protection Area ■ Full Protection ■ Indigenous Land ■ Sustainable Use



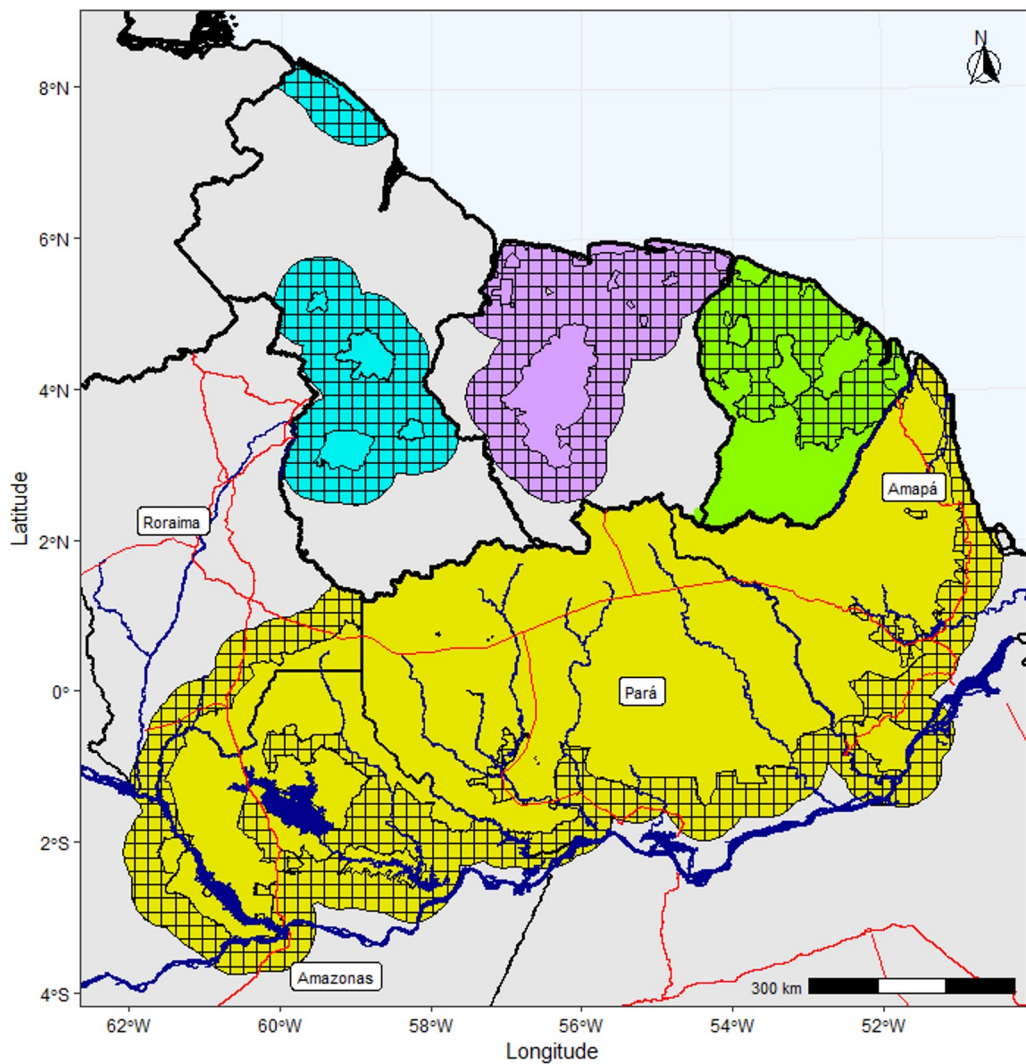
* Partially protected area - weak protection

REGIONAL SCALE: DIAGNOSIS IN BRAZIL

- Protected areas are one of the most effective public conservation policies in the Brazilian Amazon.

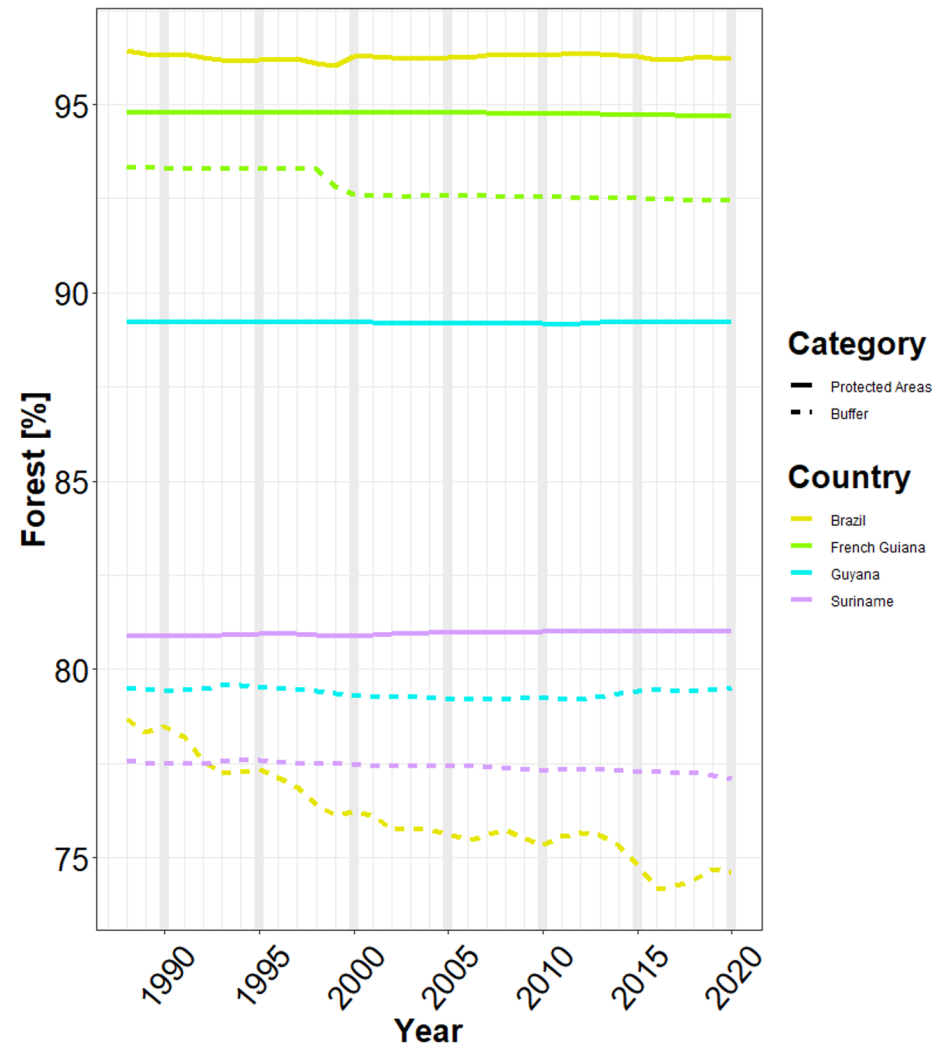


REGIONAL SCALE: DIAGNOSIS 4 COUNTRIES



Projeção: UTM zona 21S
Datum: SIRGAS 2000
Elipsoide: GRS 1980

Amount of Forest relative to the total area
Collection 3



INCT - Odisseia

REGIONAL SCALE: PUBLIC POLICY

Maintenance of forest extension inside protected areas
Endogenous policies from **2005**

- **Territorial planning and land regularization**
 - Macro-ZEE da Legal Amazon
 - PNGATTI (Demarcation and management of Indigenous Lands)
 - SNUC (Protected Areas and Land concession)
 - Forest Code (CAR)
- **Institutional development**
 - Creation of ICMBIO and SFB
- **Social inclusion**
 - Rural retirement (also for women)
 - “*Bolsa Família*”
- **Productive inclusion**
 - PAA, PNAE, ATER indigenous and extractive
- **Environmental conservation**
 - “*Bolsa Verde*”, ARPA

REGIONAL SCALE: PUBLIC POLICY

Embracing Structural Policies:

PAS, PRONAF, PNPCT, PBSM, PNPS, PNAPO, PLANAFE

Policy implementation mechanisms



Commissions, Committees, Monitoring tables
Collective decisions and spaces for public participation
Focus: articulation and juxtaposition of public actions
PNPS (“National Plan for Social Participation”)

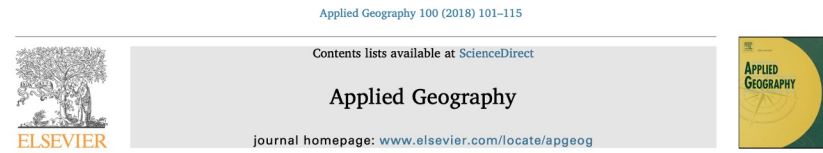


Repeal of the PNPS
Disruption of participation, articulation and juxtaposition of actions
Setback in the ability to face deforestation

New cycle for reduction in forest extension inside protected areas from **2019**

REGIONAL SCALE: FRAGMENTATION

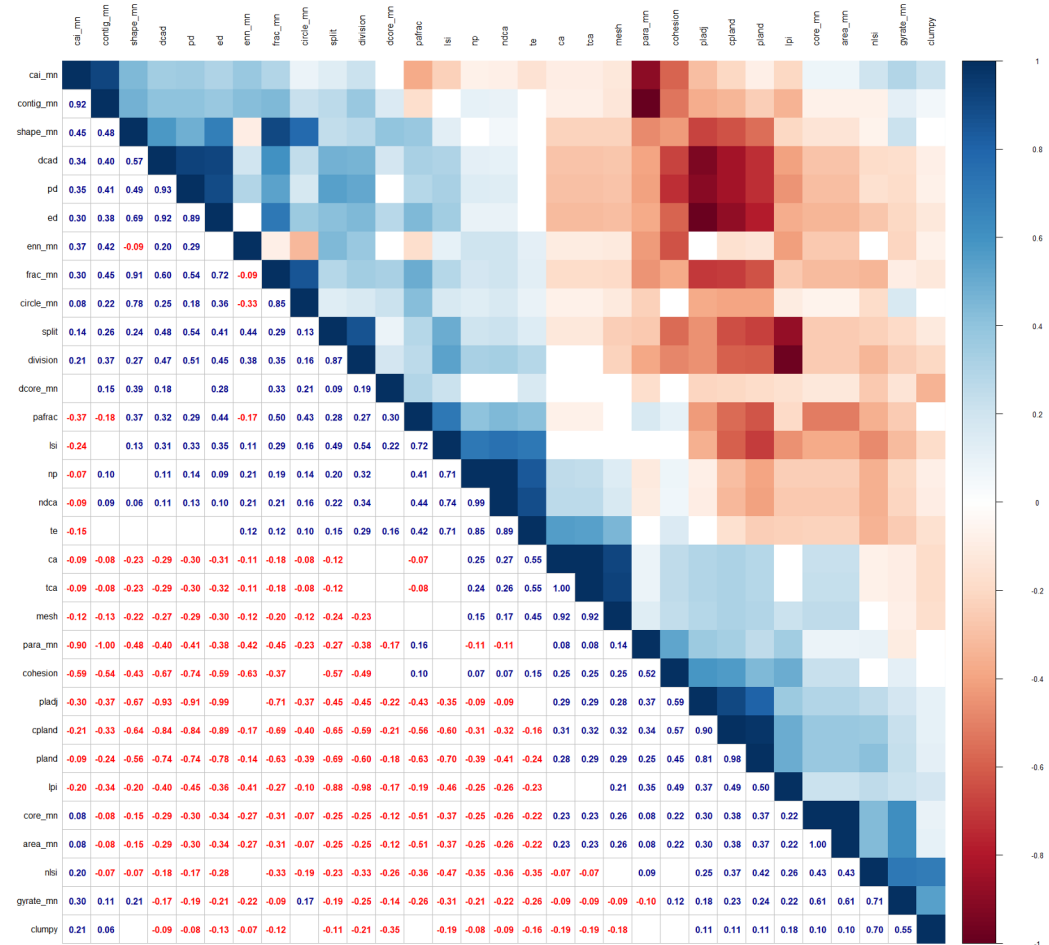
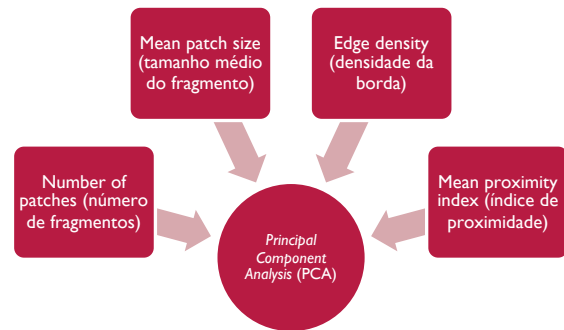
- Analysis of deforestation, fragmentation and connectivity within the massif of protected areas and in its area of influence -> Identify areas and zones with greater susceptibility to fragmentation.



Deforestation pattern dynamics in protected areas of the Brazilian Legal Amazon using remote sensing data

Ana I.R. Cabral^{a,*}, Carlos Saito^{b,c}, Henrique Pereira^d, Anne Elisabeth Laques^e

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REGIONAL SCALE: FRAGMENTATION

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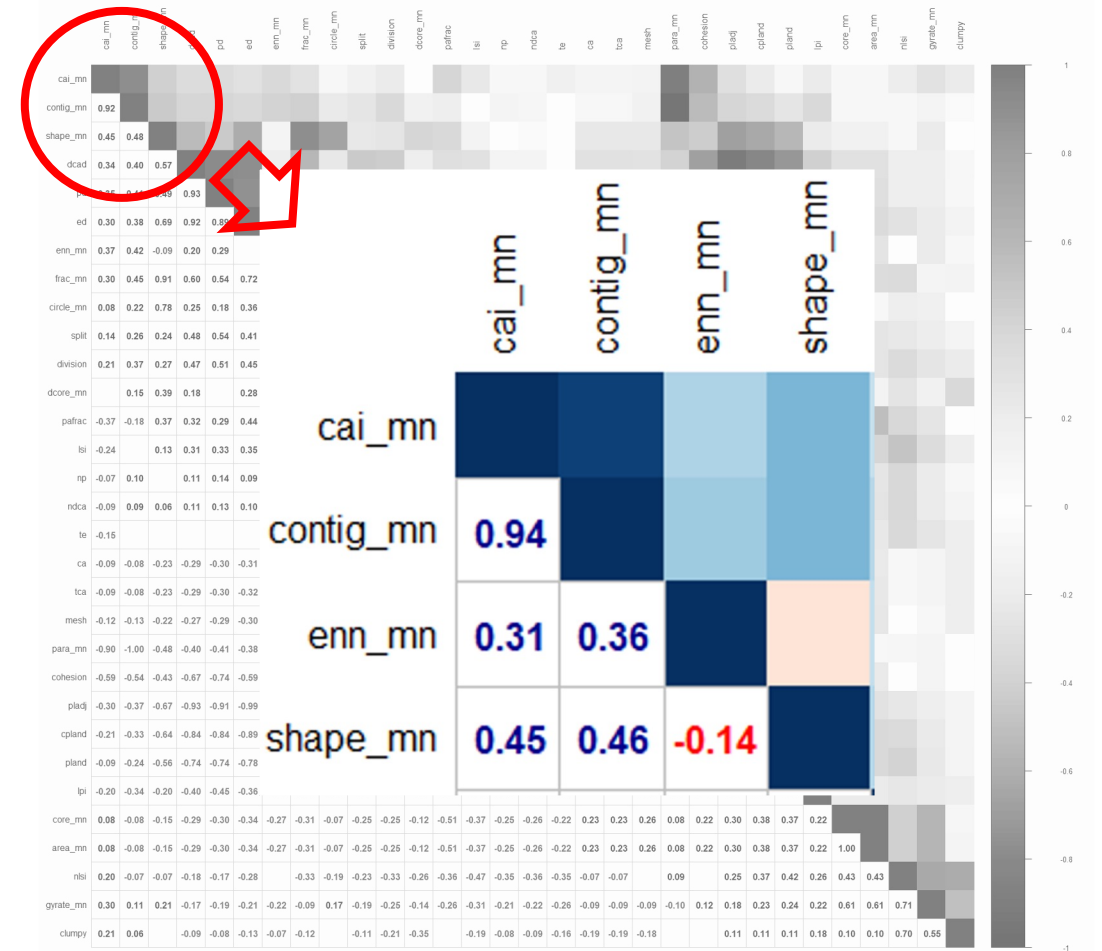
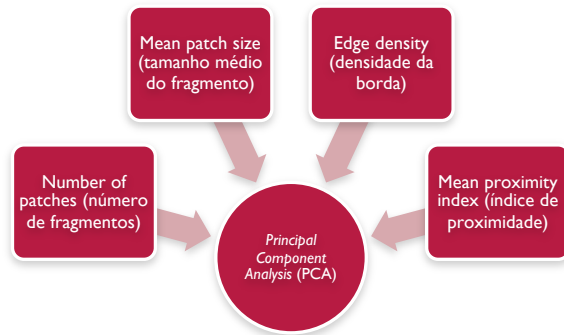
Applied Geography

journal homepage: www.elsevier.com/locate/apgeog

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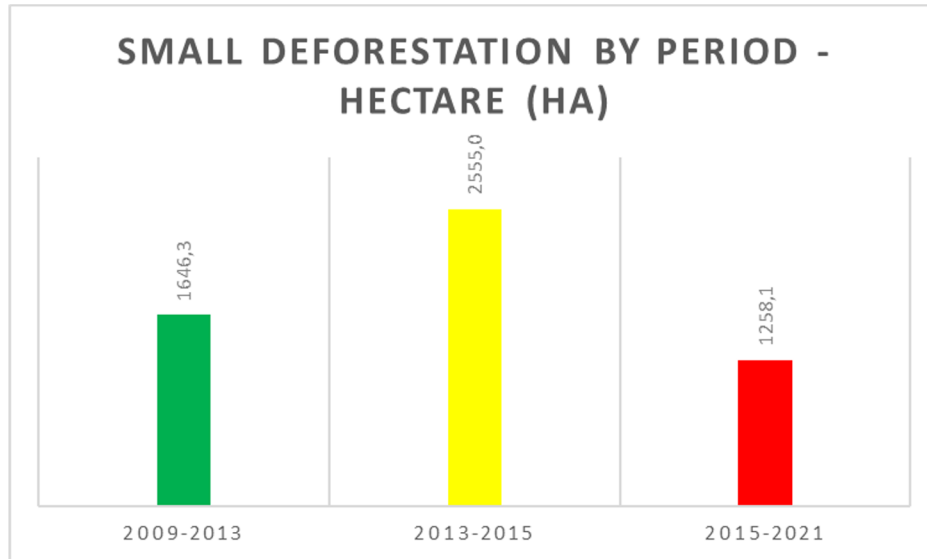
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LOCAL SCALE: RESULTS

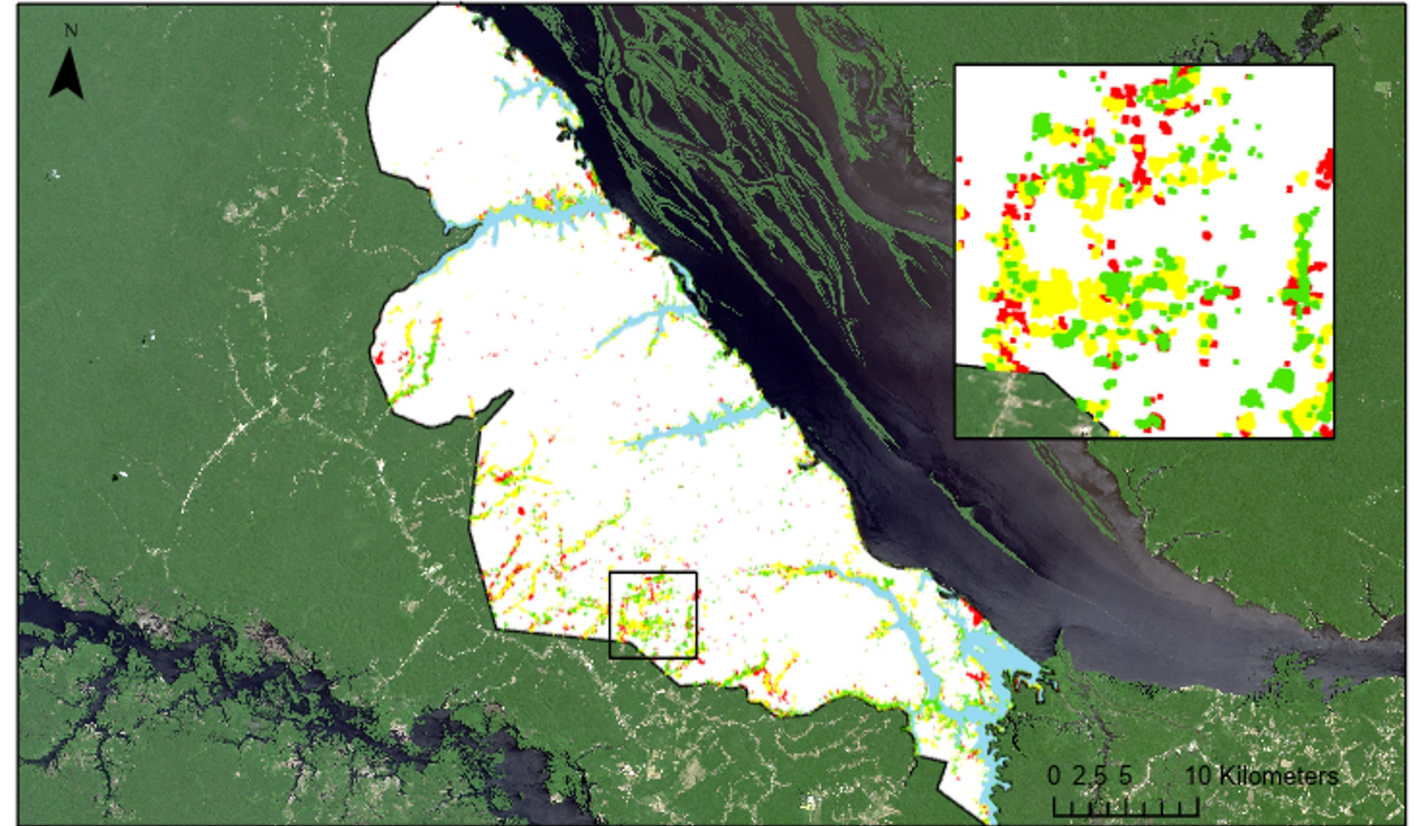
- In the RDS of Rio Negro, we found that areas are being opened mostly in areas close to access roads. However, there are small openings near the banks of the Rio Negro.



Before PBF - 1st period after PBF

1st period after PBF - 2nd period after PBF

2nd period after PBF - 3rd period after PBF



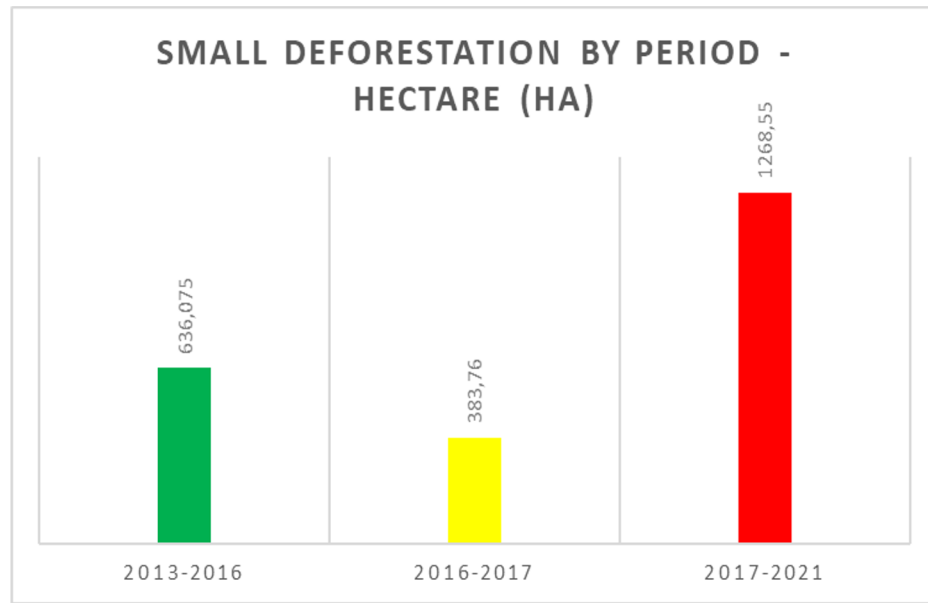
LEGEND

■ CD_2009_2013
 ■ CD_2013_2015
 ■ CD_2015_2021
 ■ Hidrografia_Rio_Negro

Spatial Reference
 Name: WGS 1984 UTM Zone 20S
 PCS: WGS 1984 UTM Zone 20S
 GCS: GCS WGS 1984
 Datum: WGS 1984
 Projection: Transverse Mercator

LOCAL SCALE: RESULTS

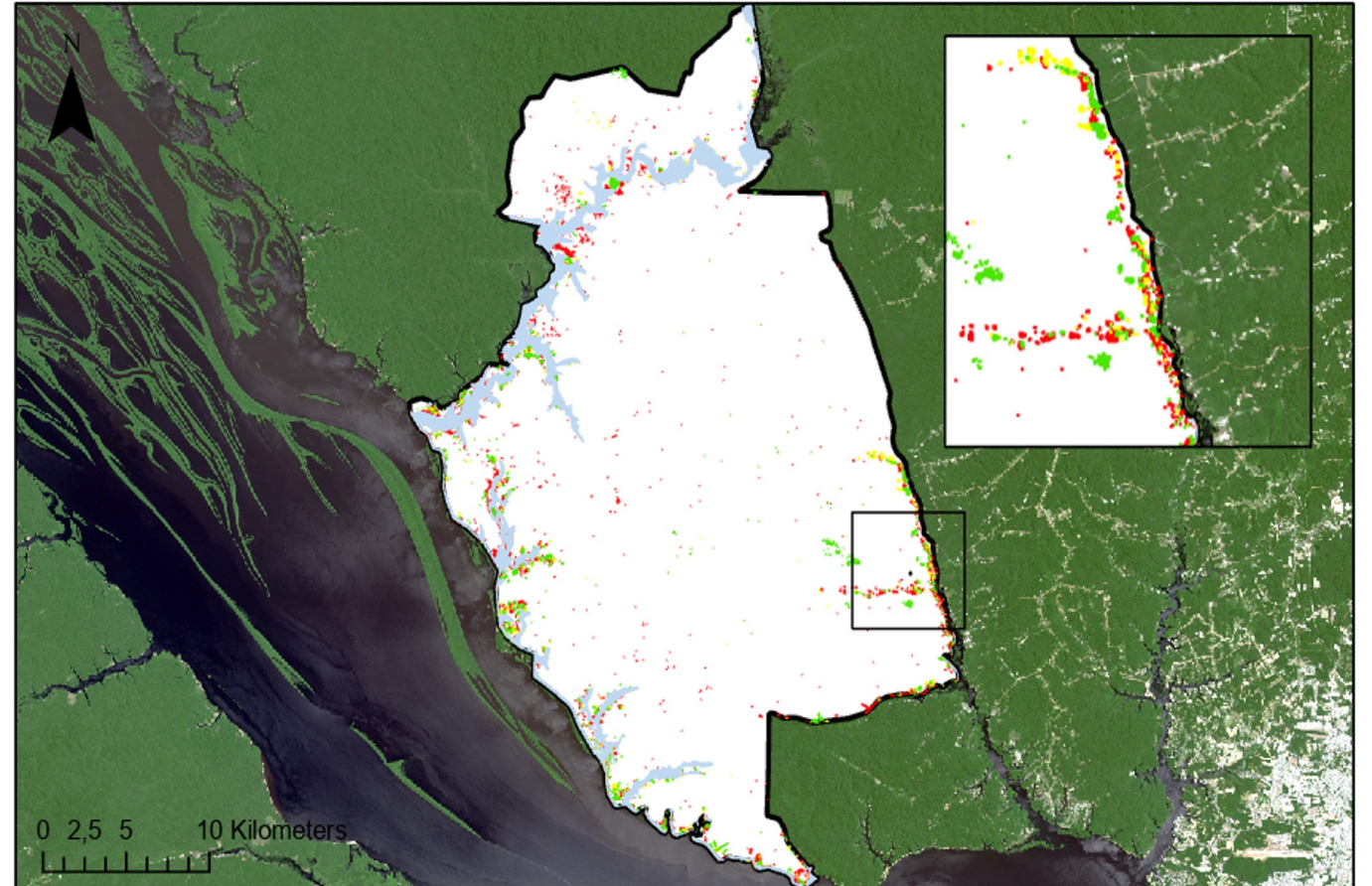
- In the RDS Puranga Conquista, the dynamics of deforestation occurred near the access roads to the capital Manaus.



Before PBF - 1st period after PBF

1st period after PBF - 2nd period after PBF

2nd period after PBF - 3rd period after PBF

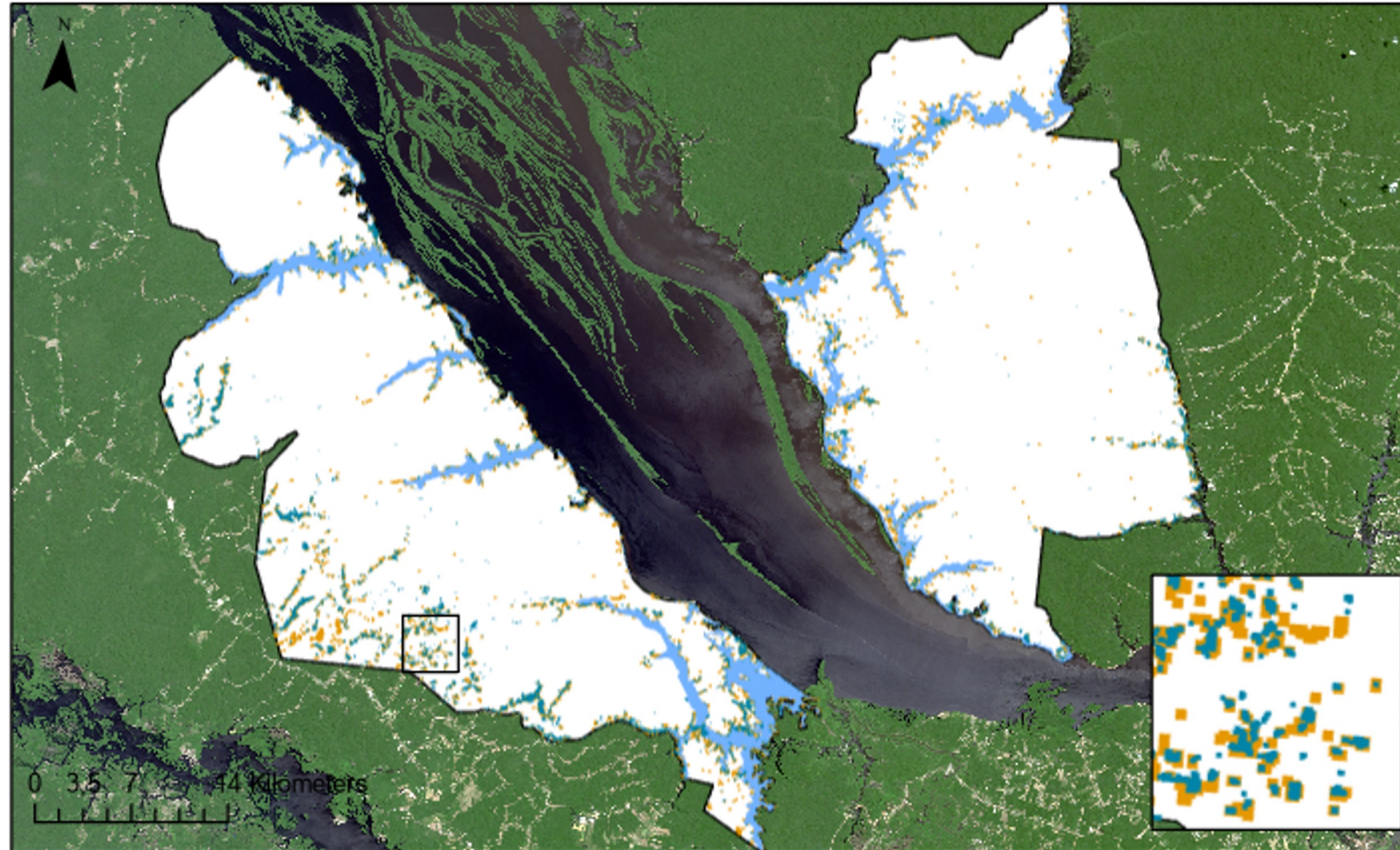


Legend

■ Hidrografia_Puranga_Co...
 ■ CD_2013_2016_FC
 ■ CD_2016_2017_FC
 ■ CD_2017_2021_FC
 purangaconquista

Spatial Reference
 Name: WGS 1984 UTM Zone 20S
 PCS: WGS 1984 UTM Zone 20S
 GCS: GCS WGS 1984
 Datum: WGS 1984
 Projection: Transverse Mercator

LOCAL SCALE: Sentinel image Analysis



- Hidrografia
- LandSat
- LandSat - Sentinel

Spatial Reference
 Name: WGS 1984 UTM Zone 20S
 PCS: WGS 1984 UTM Zone 20S
 GCS: GCS WGS 1984
 Datum: WGS 1984
 Projection: Transverse Mercator

LOCAL SCALE – PRODUCTS (AUTOMATED METHODOLOGY ON GOOGLE ENGINE)

- The methodology used can be reproduced with refinement of the results in geoprocessing software (Arcgis, Qgis...)
- The same methodology was automated in the cloud at GEE, but it presents more raw data that can improve the time demand for processing;
- **Need:** Script refinement (decreased command lines);
- **Suggestion:** Adaptation of the script to other languages.

LOCAL SCALE – PRODUCTS (AUTOMATED METHODOLOGY ON GOOGLE ENGINE)

Google Earth Engine

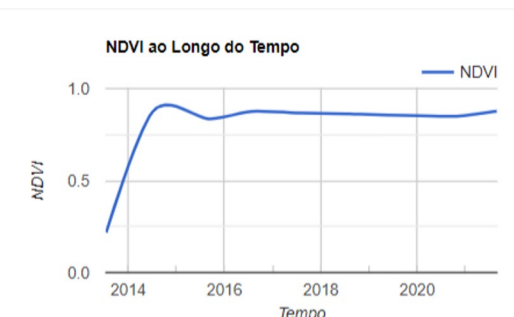
Search places and datasets...

Col_NDVI_Rio_Negro * Get Link Save Run Reset Apps Inspector Console Tasks

```

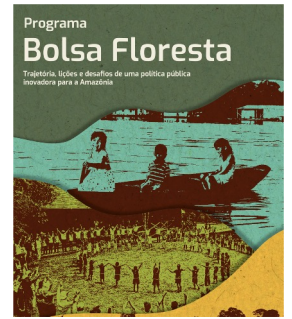
150 })
151 );
152
153 var limiar_1 = 0.07;
154 var limiar_2 = 0 // Threshold
155 var mudancas = difSimples.lte(-limiar_1).or(difSimples.gte(limiar_2)).selfMask();
156
157 Map.addLayer(mudancas.clip(roi), { palette: ['#ff0000'] }, 'Mudanças 2015/2021');
158
159 // =====
160
161 // Long Term Average (Média de Longo Termo)
162 var mltNDVI = colMediana.mean();
163
164 // Anomalias Absolutas
165 var anomalias = difSimples.lte(-1*mltNDVI);
  
```

NDVI ao Longo do Tempo



Map interface showing a satellite view of the Rio Negro region in Brazil. A red point is placed on the map, and a red area is visible on the map, likely representing the 'Mudanças 2015/2021' layer. The map includes labels for various locations such as União, São Luís, Conceição, Agroindustria, Paricatuba, Vila de Paricatuba, Col. do Limão, Atalhos do teclado, Dados cartográficos ©2022 Google, 10 km, Termos de Uso, and Informar erro no mapa.

LOCAL SCALE: PUBLIC POLICY



Policy implementation mechanisms



The Bolsa Floresta Program aims to compensate residents for not deforesting primary forest.



Rio Negro RDS



Decrease in the opening of small areas of primary forest (same result in the Uatumã RDS - previous study)

Indicates the effort of families to comply with the program.



Puranga Conquista RDS



Increase only in the last analyzed period

Indicates that families make an initial effort, but in the last 5 years (either due to need and/or lack of supervision, families increased the open areas in primary forest).

Thank you!

Research grant support:

