

# Extent of deforestation in Brazilian Amazon

Using satellite imagery

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## Aim of The Research

- To determine the extent of deforestation
- To determine the causes of deforestation

## Introduction

- A dense tropical rainforest located on the basins of amazon
- Have more than 50% of earth's total rainforests
- Produces 20% of World's oxygen



# Background

- Assess the deforestation extent from 2014 to 2022
- The study area is a farmland
- It was found that deforestation is mostly caused by human activities
- Grazing, poor farming practices, over cultivation of the land
- Climate reasons play a part too but less significant

# Methodology

- The area of study a square in the Southern Amazon Rainforest with corners 07° 34' 14"S, 061° 48' 29"W and 08° 08' 02"S, 061° 13' 21"W.
- A sparsely populated region with no large cities nearby.
- Local deforestation in a sawtooth type pattern, with a road in the middle.
- Imagery from LANDSAT 8 and 9 is used to monitor the area, year by year.
- The images were sorted by time and picked for their proximity to the dry season. Only images with less than 10% cloud cover was selected.
- Avoids misidentification of clouds as treetop cover, and keeps vegetation consistent compared to if different months of the year were chosen.
- There are some limitation but it should not affect the overall quantitative analysis

# Image of the Area of Interest

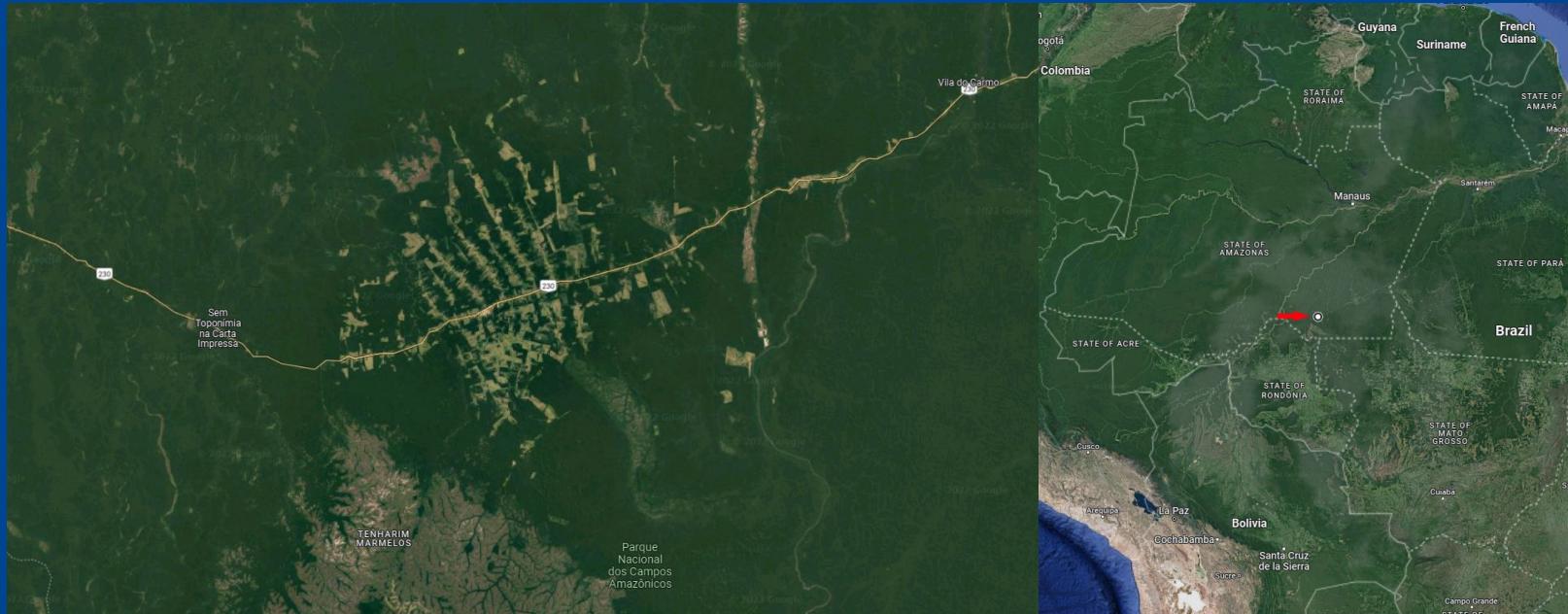


Figure 1 (a). An image of the area today from LANDSAT 9, and (b). the location on a more zoomed out view of the world from Google Earth

N



### Legend

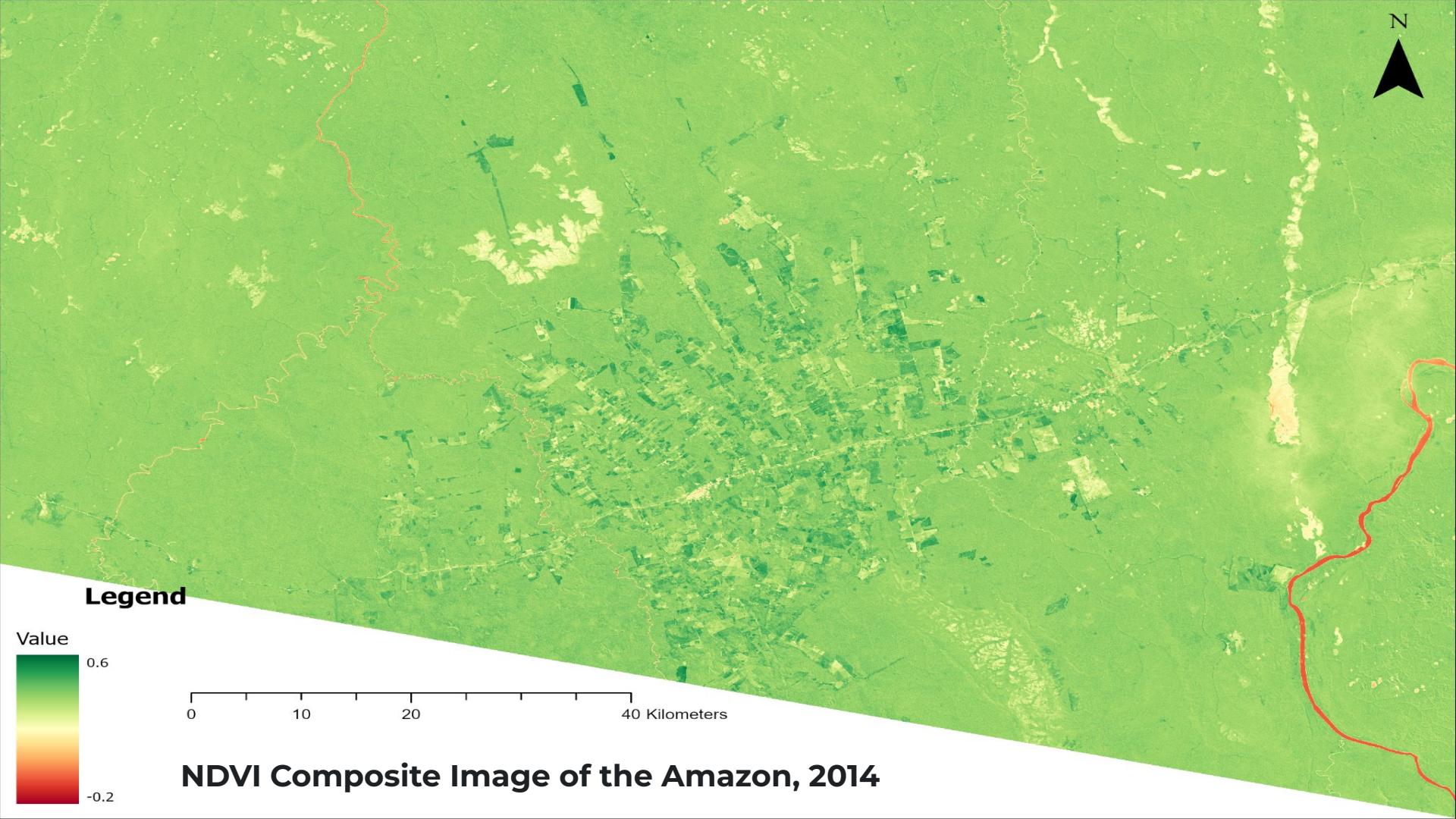
Value

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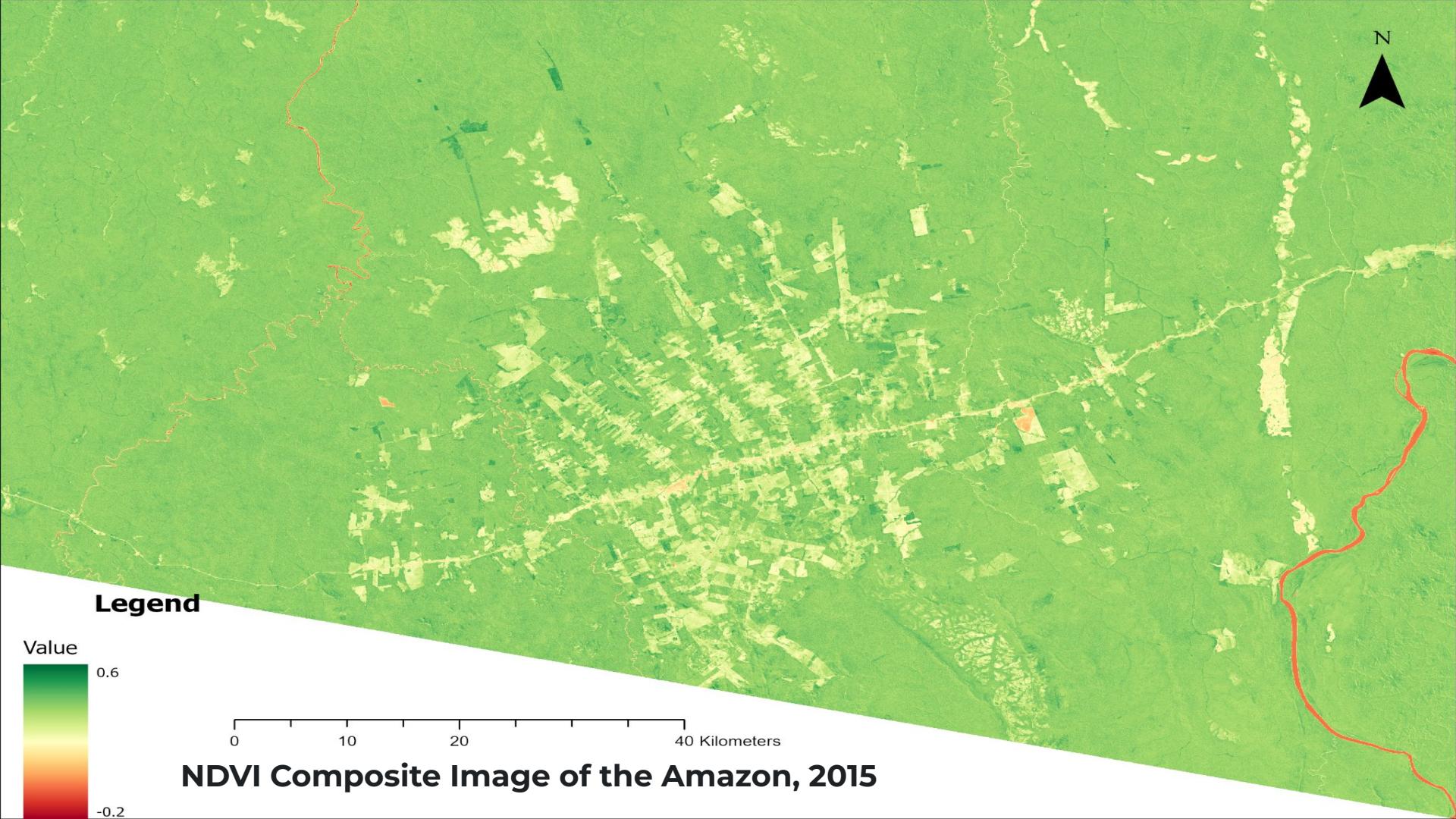
0 10 20 40 Kilometers

-0.2

**NDVI Composite Image of the Amazon, 2014**



N  
↗



**Legend**

Value

0.6

0 10 20 40 Kilometers

**NDVI Composite Image of the Amazon, 2015**

-0.2

N



### Legend

Value



0.6

-0.2

0 10 20 40 Kilometers

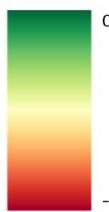
**NDVI Composite Image of the Amazon, 2016**

N



### Legend

Value



0.6

-0.2

0 10 20 40 Kilometers

**NDVI Composite Image of the Amazon, 2017**

N



### Legend

Value



0.6

0 10 20 40 Kilometers

**NDVI Composite Image of the Amazon, 2018**

N



### Legend

Value



0.6

0 10 20 40 Kilometers

**NDVI Composite Image of the Amazon, 2019**

N



### Legend

Value



0.6

0 10 20 40 Kilometers

**NDVI Composite Image of the Amazon, 2020**

N



### Legend

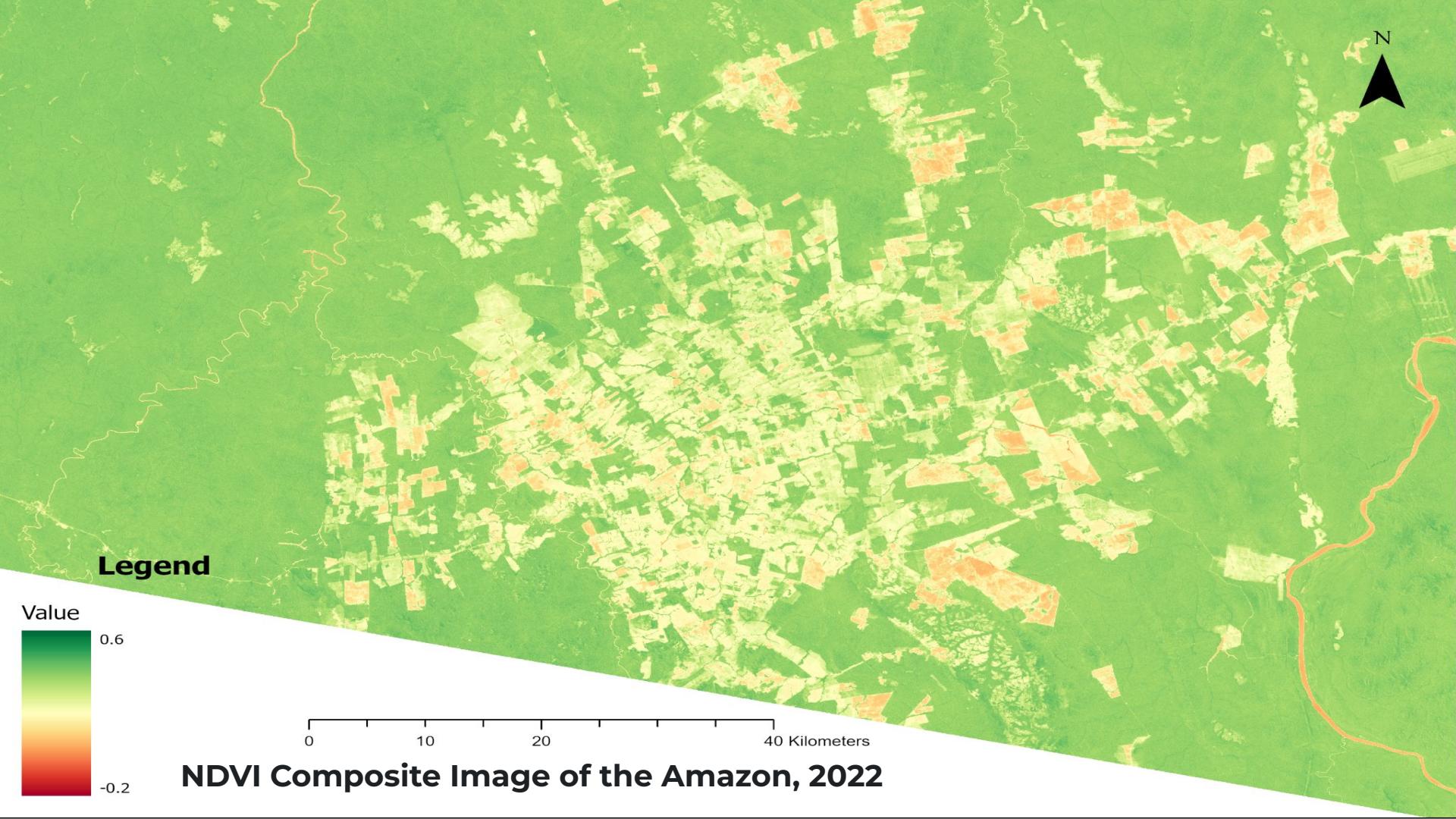
Value

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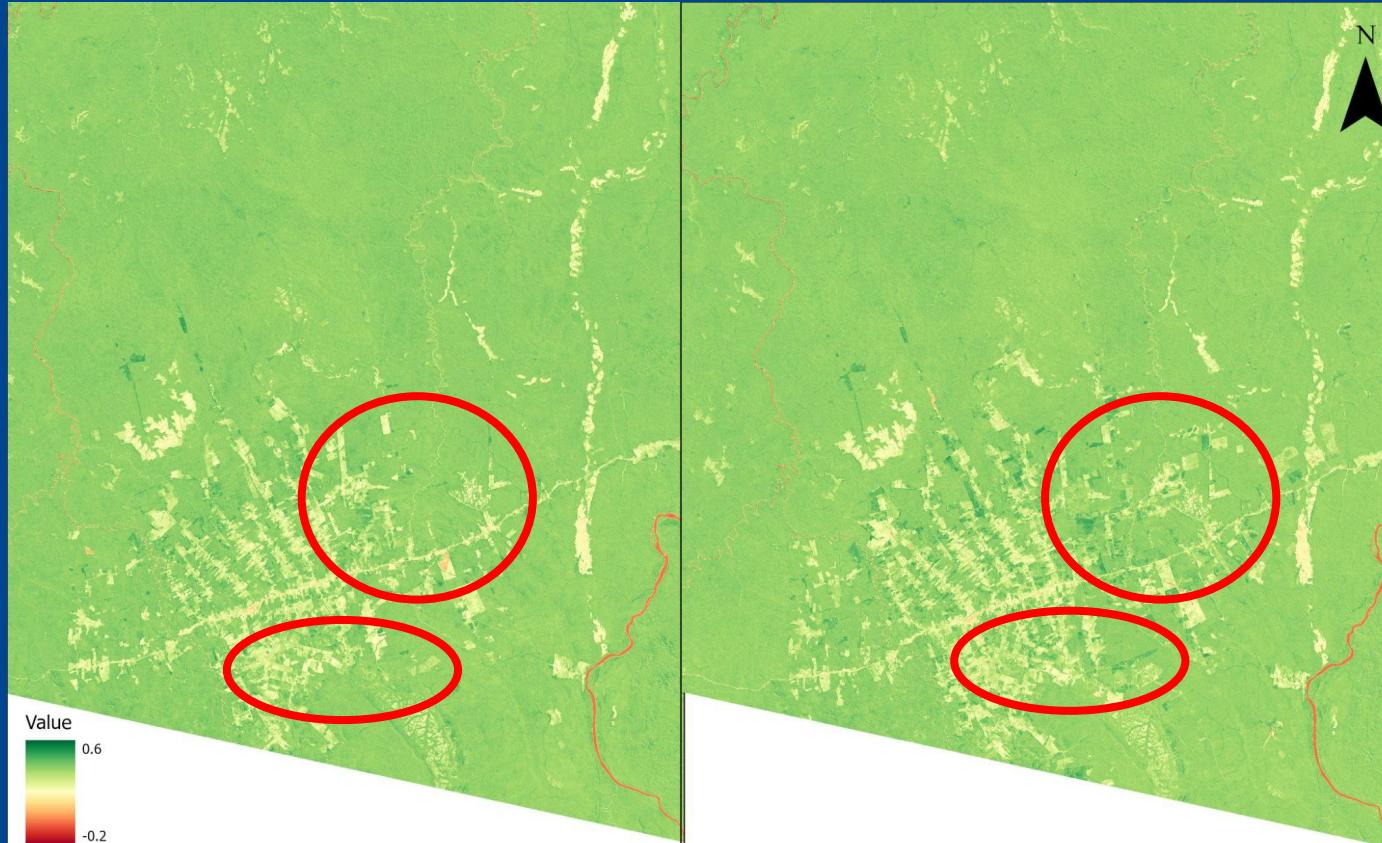
-0.2

0 10 20 40 Kilometers

**NDVI Composite Image of the Amazon, 2021**

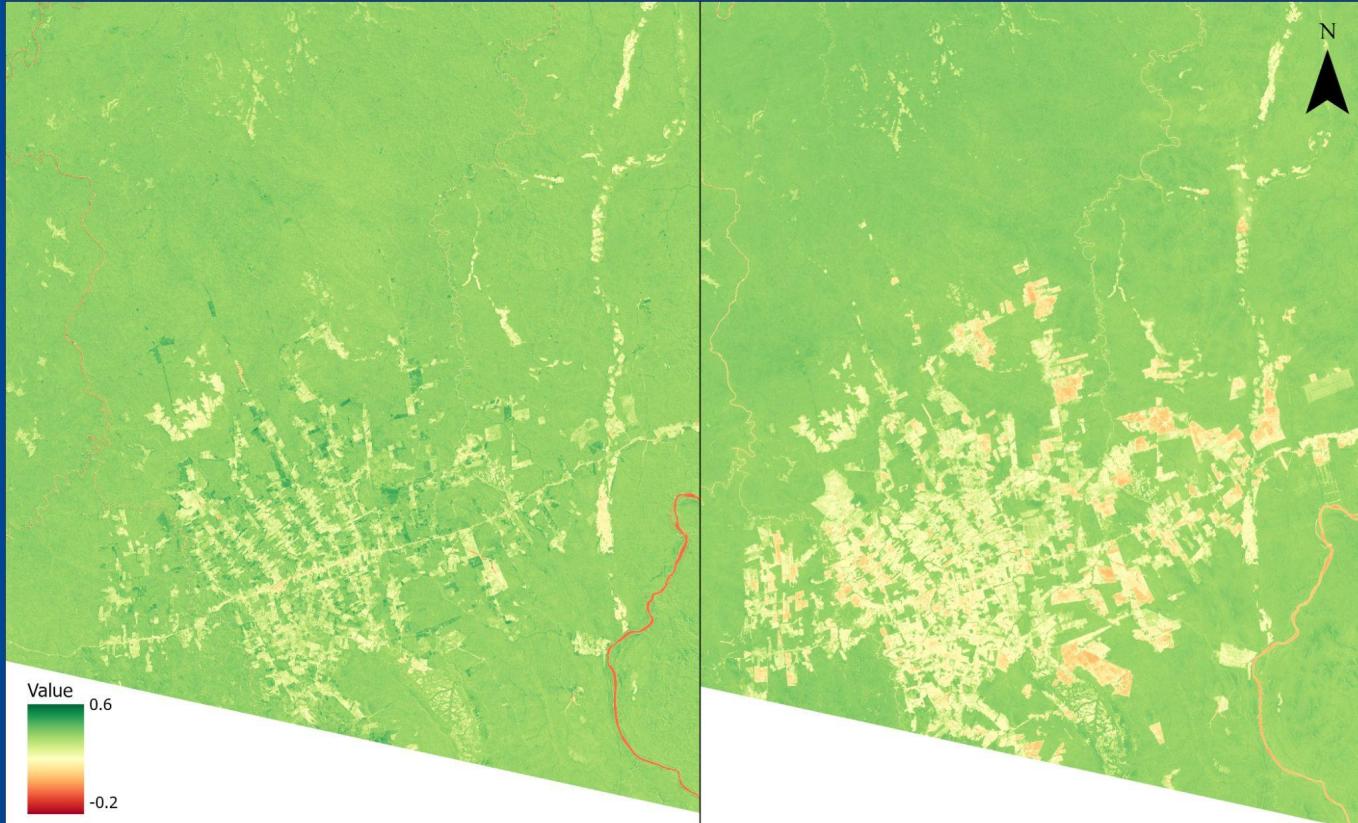


# 2015 vs 2018 NDVI images



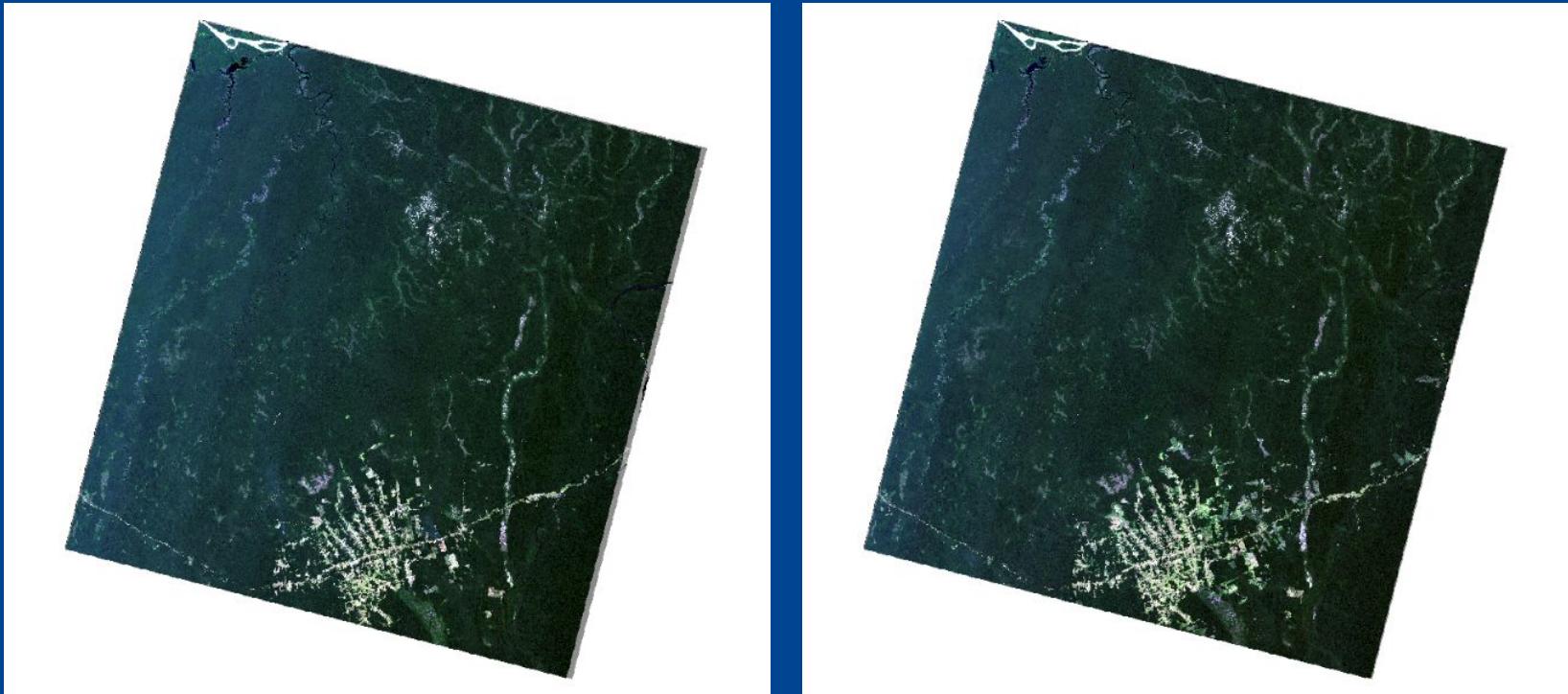
NDVI in 2015 (Left) vs 2018 (Right)

# 2018 vs 2022 NDVI images



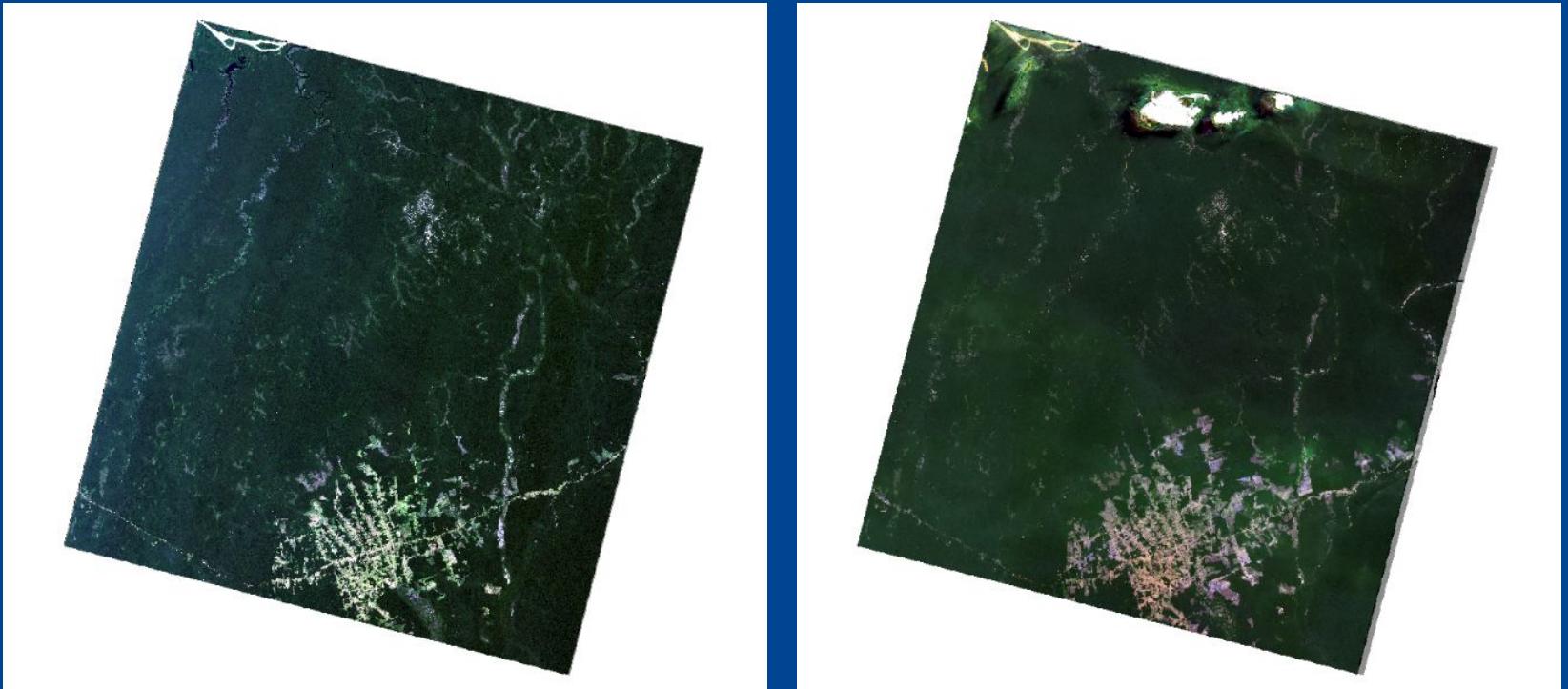
NDVI in 2018 (Left) vs 2022 (Right)

# RGB True colour composite image



RGB True Colour composite in 2015 (Left) vs 2018 (Right)

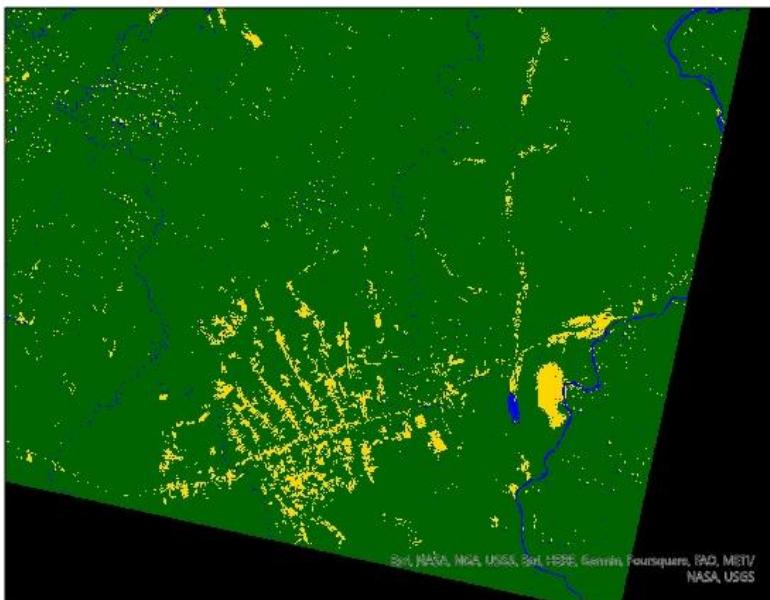
# RGB True colour composite image



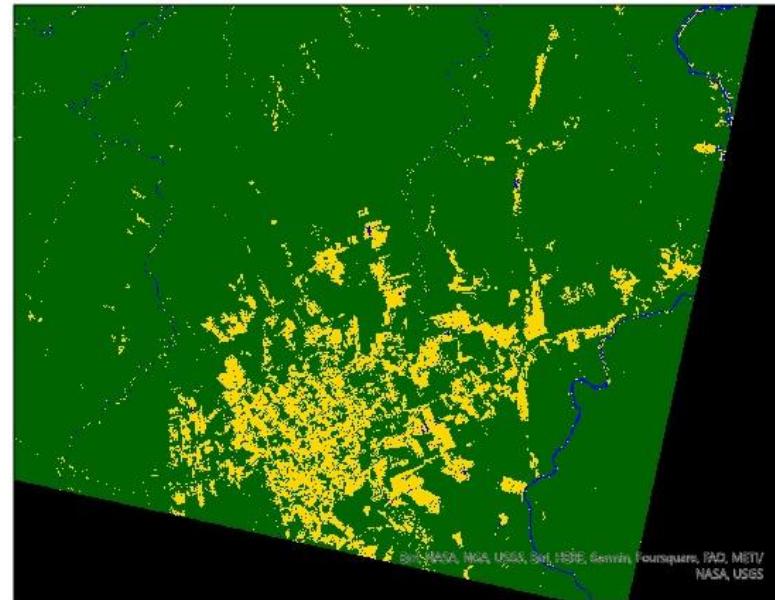
RGB True Colour composite in 2018 (Left) vs 2022 (Right)

# Supervised classification

Supervised Classification for 2014

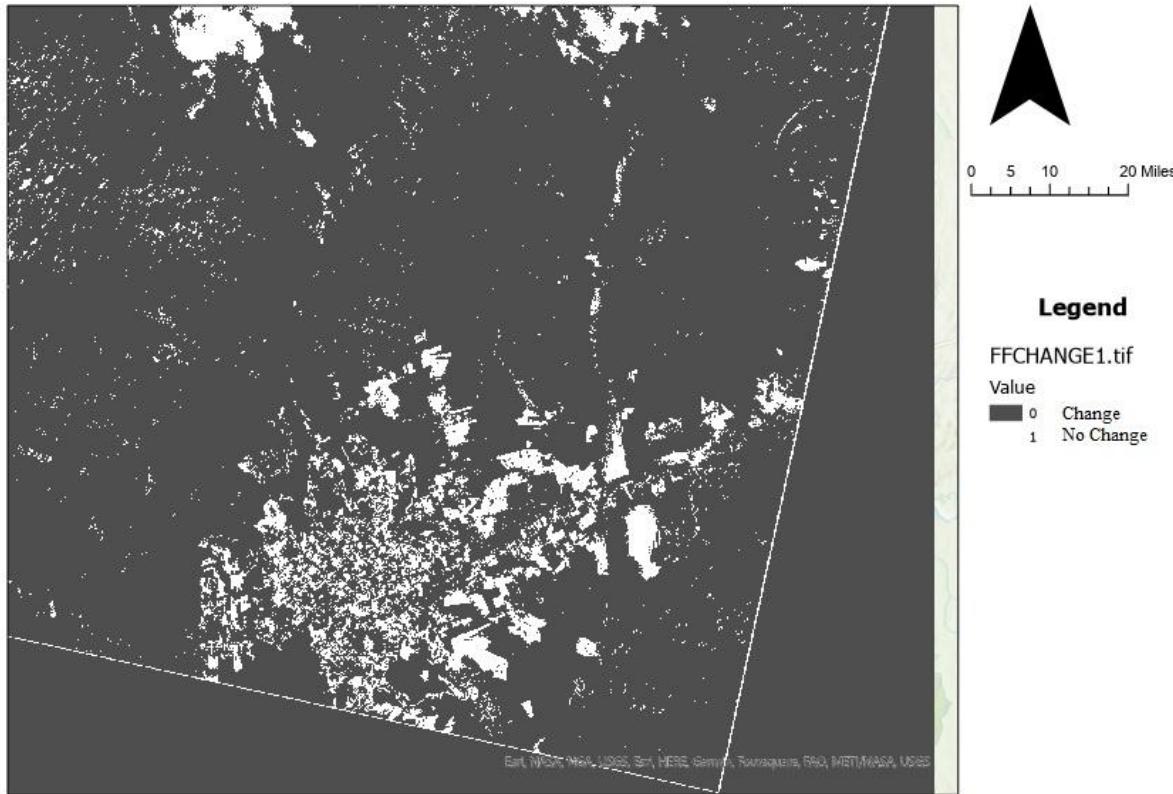


Supervised Classification for 2022



- █ Water
- █ Vegetation
- █ Bare Soil

## Change Map for the year 2014 and 2022



- The white area shows the change in land cover
- The white areas were vegetation in 2014

# Discussion

From RGB images:

**Deforestation rate** increases a lot faster from 2018 to 2022

NDVI:

**Extent of vegetation cover** loss increases, deforestation area increases more in 2022

Change Map:

**Bare soil coverage** increased significantly from 2014 to 2022

# Conclusion and Questions

- Land Cover in Amazon Forest have been gradually changing.
- The vegetation land cover have been decreasing.
- Not sure if deforestation is reversible at this point