

Introduction

For this project, I wanted to study trends in deforestation and their causes around the world. I began with a dataset that had information about the forest area in each country for three decades from 1990 to 2020 (Our World in Data). After visualizing changes in forest areas around the world at a high level, I wanted to better understand the causes behind rapid deforestation rates through an additional dataset focused on deforestation in Brazil (Our World in Data), the country that's lost the greatest amount of forest annually.

Visualization #1

See attached HTML file for full interactive functionality

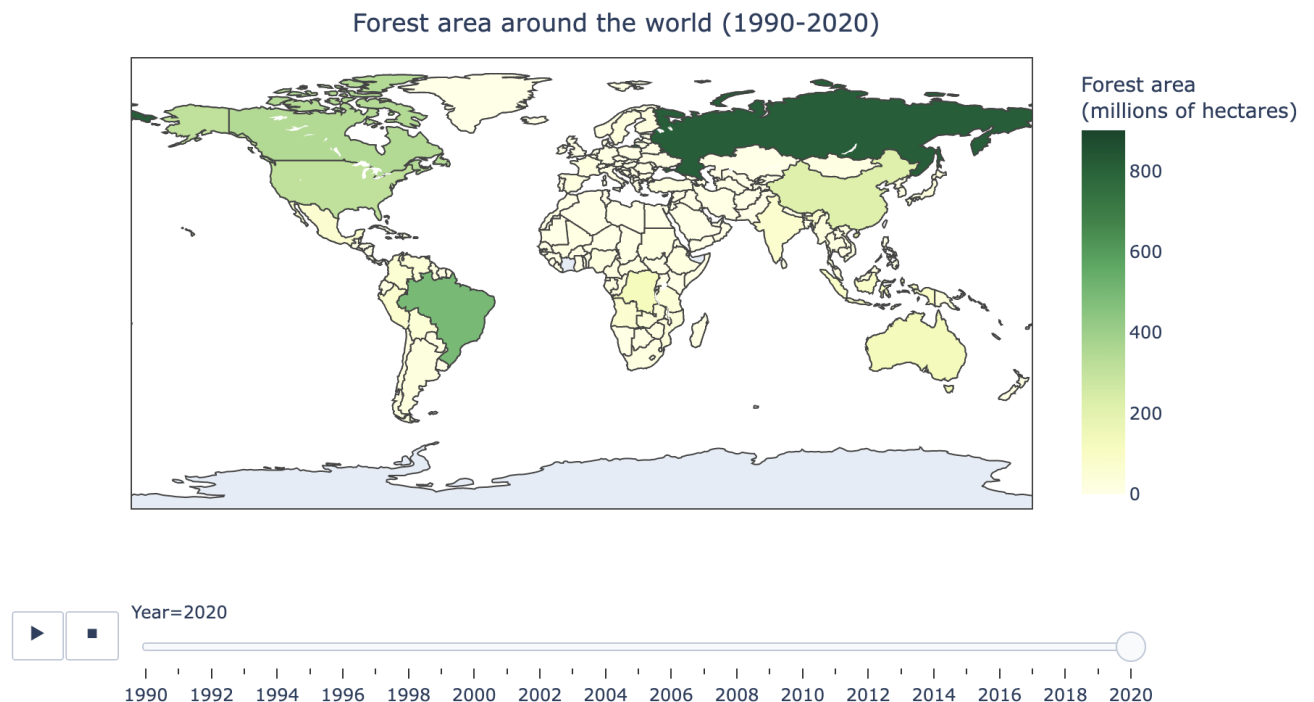


Figure 1. This interactive choropleth map visualizes the distribution of forest globally from year to year (1990-2020). The more hectares of forest a country contains, the darker green it appears on the map, and countries without data for a particular year are colored in gray. The slider can be

adjusted to display the data for any particular year in the range, and mousing over a country shows the total area of forest it contained in that given year.

Discussion: This interactive world map visualizes the distribution of forest (in hectares) around the world in every year from 1990 to 2020, with darker green representing countries with greater amounts of forested land. This visualization gives a broad overview of which countries have the most forest (like Russia, Brazil, and Canada) and which ones have the least, as well as how the specific amounts of forested land in each country have changed over time. For example, comparing 1990 and 2020 reveals that Brazil lost a significant amount of forest over the three decades, becoming paler green in color over time. The following visualizations aim to examine changes in forest area in various countries like Brazil in greater detail.

Visualization #2

Share of global deforestation from 1990-2020,
out of 290.4 million hectares

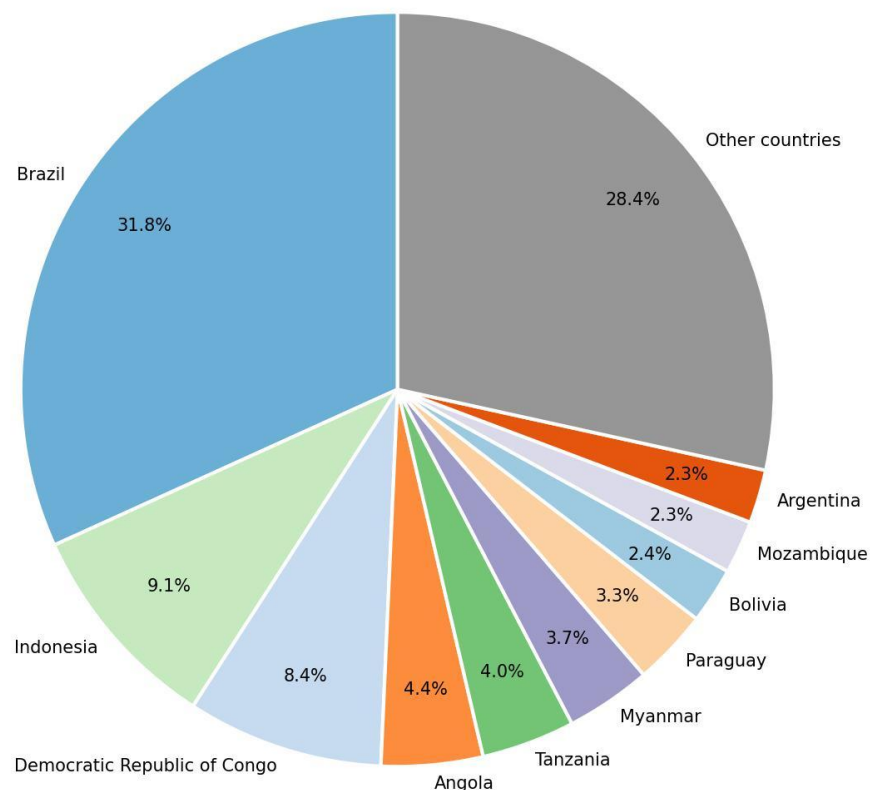


Figure 2. This pie chart highlights the top ten countries experiencing the greatest share of deforestation relative to global deforestation (a total loss of 290.4 million hectares of forest) from 1990-2020, and the remaining countries are grouped together and colored in gray. Brazil

experienced the greatest amount of deforestation, followed by Indonesia and the Democratic Republic of Congo.

Discussion: With deforestation becoming an ever greater concern worldwide, which countries have lost the most forest over the past three decades? Although the first visualization could show the overall distribution of forest around the world, the actual breakdown of losses in forested areas isn't immediately clear. The visualization above aims to answer this question by showing the ten countries with the greatest shares of deforestation relative to all the deforestation that occurred globally (290.4 million hectares of deforestation). This pie chart reveals that Brazil has lost the greatest area of forest over this time period (31.8%, or 92,278,400 hectares), which is greater than all other countries outside of the top 10 experiencing deforestation combined. Geographically, Brazil is home to the majority of the Amazon rainforest, which currently faces major threats from human activity, so this could account for why Brazil's share of deforestation is so large.

Visualization #3

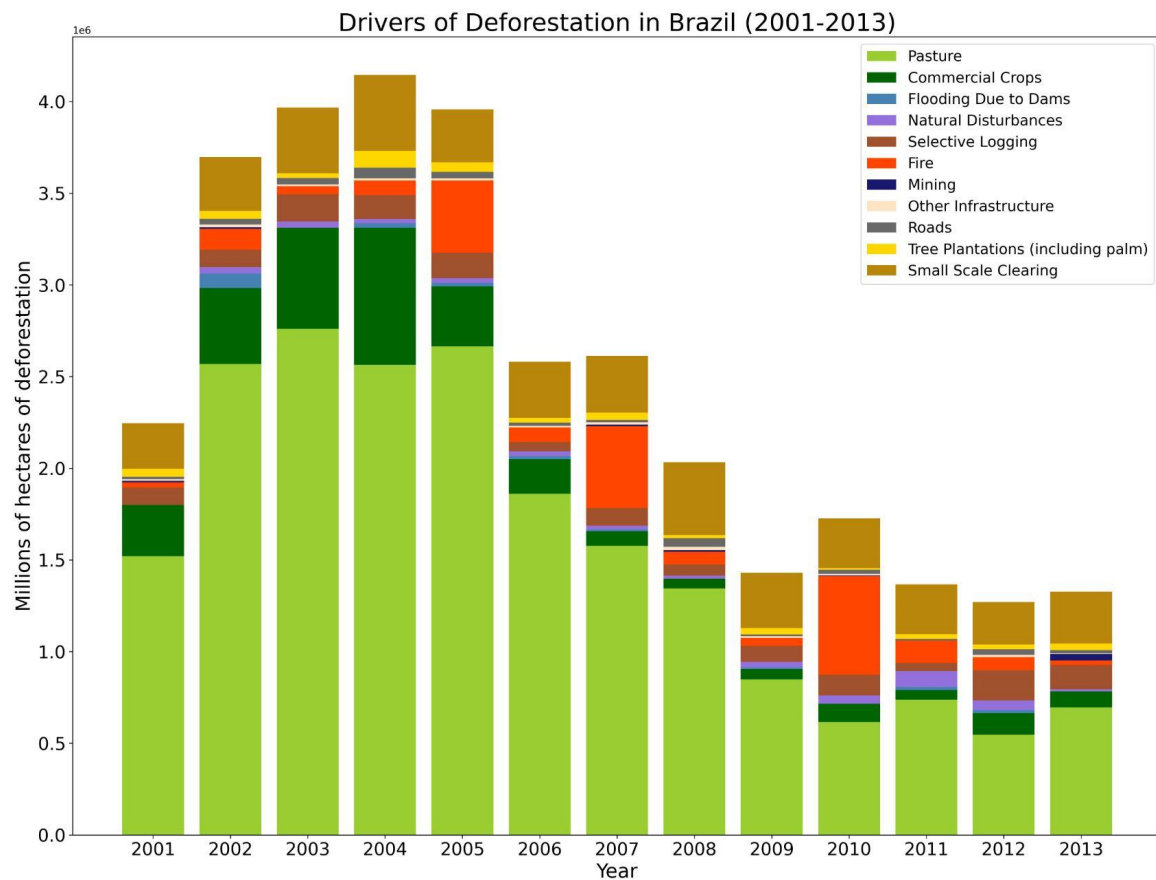


Figure 3. This stacked bar chart shows the greatest causes of deforestation in Brazil each year from 2001-2013, in terms of millions of hectares of deforestation. The greatest deforestation occurred through the use of forested land for pasture, for commercial agricultural crops, and for small scale clearings. The total amount of deforestation peaked in 2004, and has decreased since then.

Discussion: To better understand the significant amounts of deforestation in Brazil evident in the previous two visualizations, this graph highlights the human activities that are the greatest drivers of deforestation in Brazil. The top drivers are identified in terms of the area of deforestation in each year from 2001 to 2013. The greatest amount of deforestation is caused by clearing land for agricultural purposes, namely for raising livestock and for growing commercial crops. These findings can be explained by the fact that Brazil is one of the world's largest producers and exporters of beef, vegetable oil, and soy products (World Wildlife Fund). Thus, implementing new policies to better regulate these industries could make progress in addressing the root causes of deforestation going forward.

Visualization #4

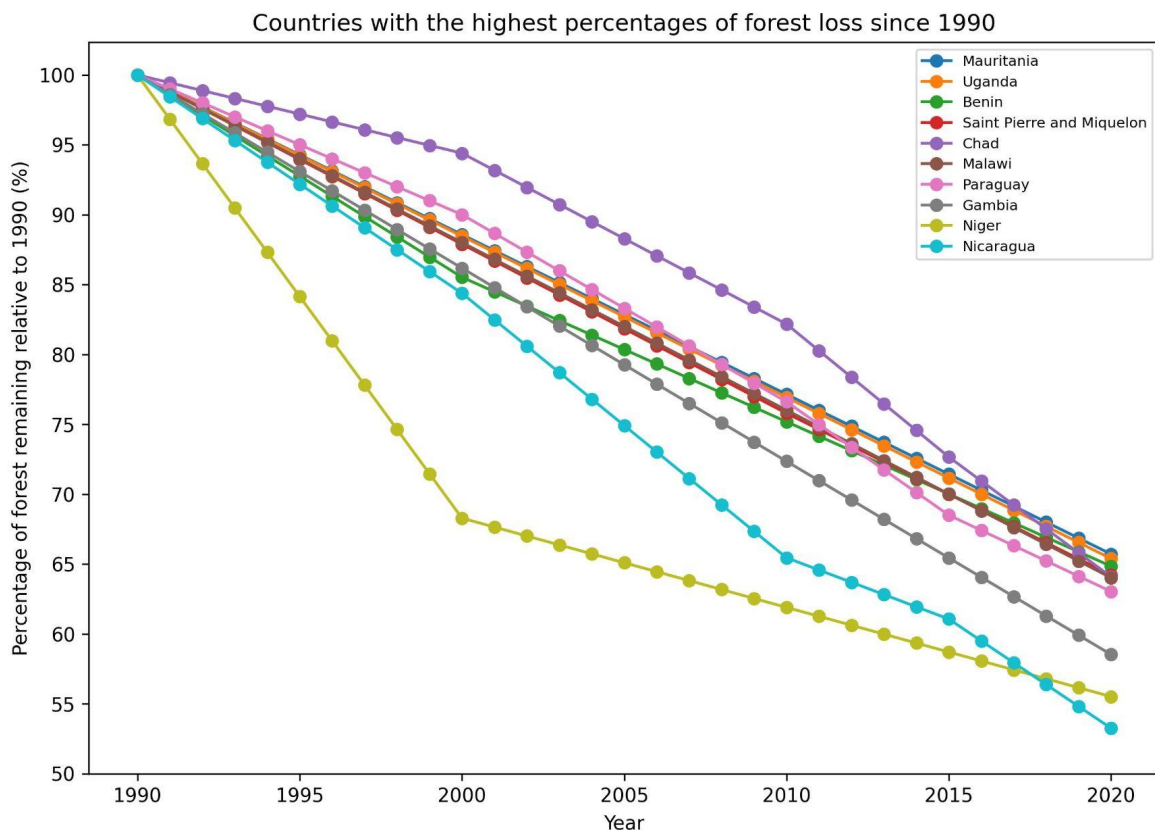


Figure 4. This scatterplot highlights the ten countries experiencing the highest amounts of deforestation relative to the area of forest they had in 1990. The percentages were calculated by

subtracting the current year's forest area from the area in 1990 and dividing by the 1990 area for each country. The plot shows that Nicaragua and Niger are losing their forested land at the fastest rate.

Discussion: So far, we've looked at the countries that have experienced the greatest amount of deforestation in terms of total area. However, this is not the same as countries with the highest deforestation rate (losing the greatest amount of forest relative to their forest area in previous decades). This last graph highlights the ten countries with the least forest remaining compared to what they had in 1990. Such an analysis draws attention to the smaller countries whose data might be overlooked next to larger countries like Brazil, which naturally contain much more forested land. However, this analysis is important because smaller countries like Nicaragua also have important biosphere reserves and experience human rights struggles for the indigenous communities that live in those reserves (OCCRP). Thus, recognizing their rapid deforestation rates is crucial for better forest management from both an ecological and human rights perspective.

Citations

Datasets

Author/Publisher: Our World in Data

Date Published: 2021

Dataset Title: Total forest area by country

Source: <https://ourworldindata.org/forest-area>.

Author/Publisher: Our World in Data

Date Published: 2021

Dataset Title: Drivers of forest loss in the Brazilian Amazon

Source: Originally accessed from the R Tidy Tuesday Github repository

(<https://github.com/rfordatascience/tidytuesday/tree/master/data/2021/2021-04-06>).

References

Organized Crime and Corruption Reporting Project. “Nicaragua's Forgotten Deforestation Crisis.” <https://www.occrp.org/en/investigations/nicaraguas-forgotten-deforestation-crisis>.

World Wildlife Fund. “WHAT ARE THE BIGGEST DRIVERS OF TROPICAL DEFORESTATION?”

<https://www.worldwildlife.org/magazine/issues/summer-2018/articles/what-are-the-biggest-drivers-of-tropical-deforestation>.