

Amazon Rainforest Decrease

Data Visualization Final Assignment



Group Rainforest Decrease
Final Assignment

Module 8 - Data Visualization
University of Twente
Module ID: 201600234

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Introduction

For the final project of Data Visualization, we decided to make visualizations about the decrease of the Amazon Rainforest. Due to the enhanced global warming, this is a timely and relevant topic. We will specifically focus on Brazil, as about 60% of the Amazon Rainforest is located over there.

Together we made fifteen visualizations, divided over five subtopics:

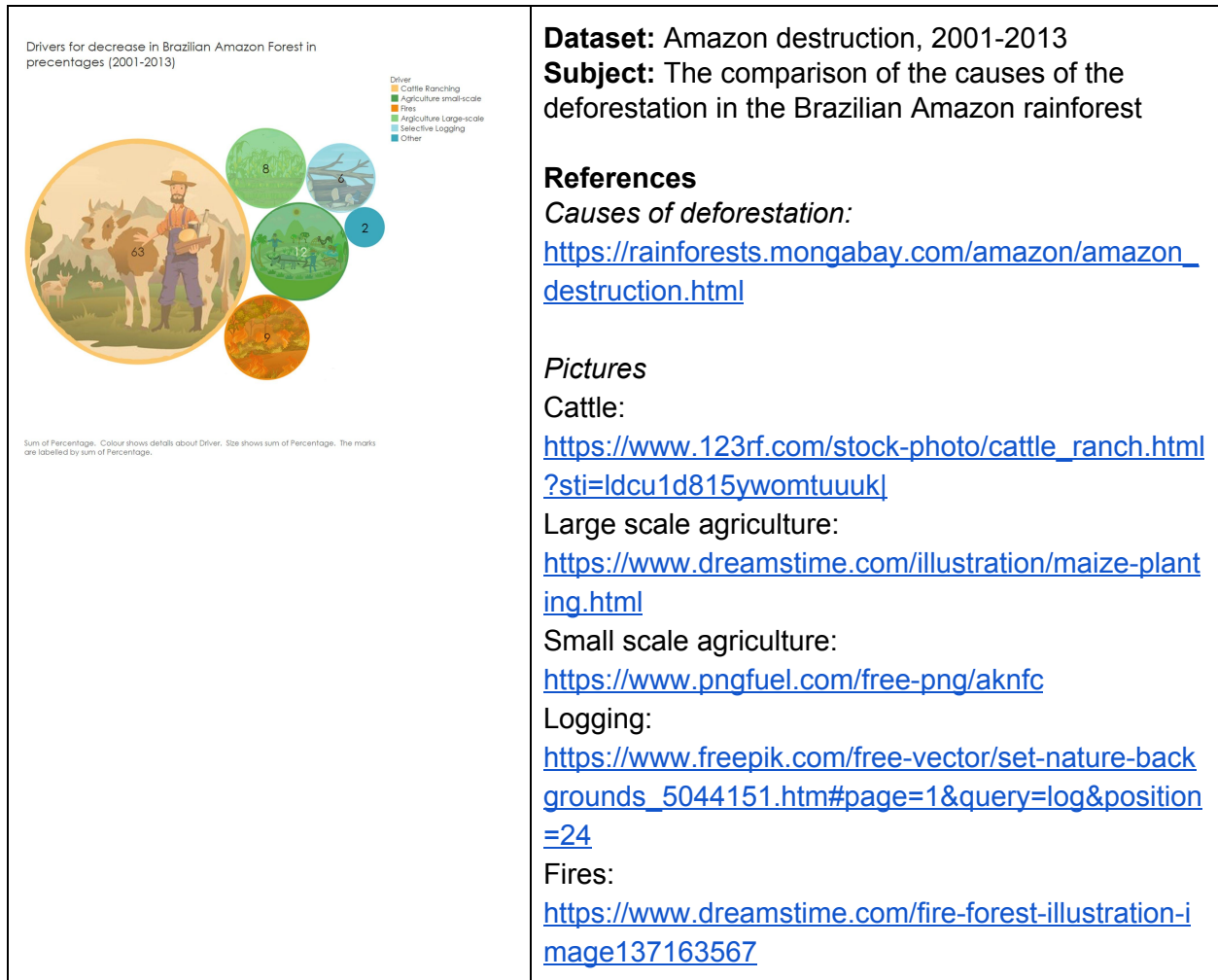
- Amazon Rainforest Decrease & Agriculture - By Rochelle
- Amazon Rainforest Decrease & Global Warming - By Kyana
- Amazon Rainforest Decrease & Green Energy - By Sophie
- Amazon Rainforest Decrease & Wildfires - By Armein
- Amazon Rainforest Decrease & New Forest Growth - By Thijs

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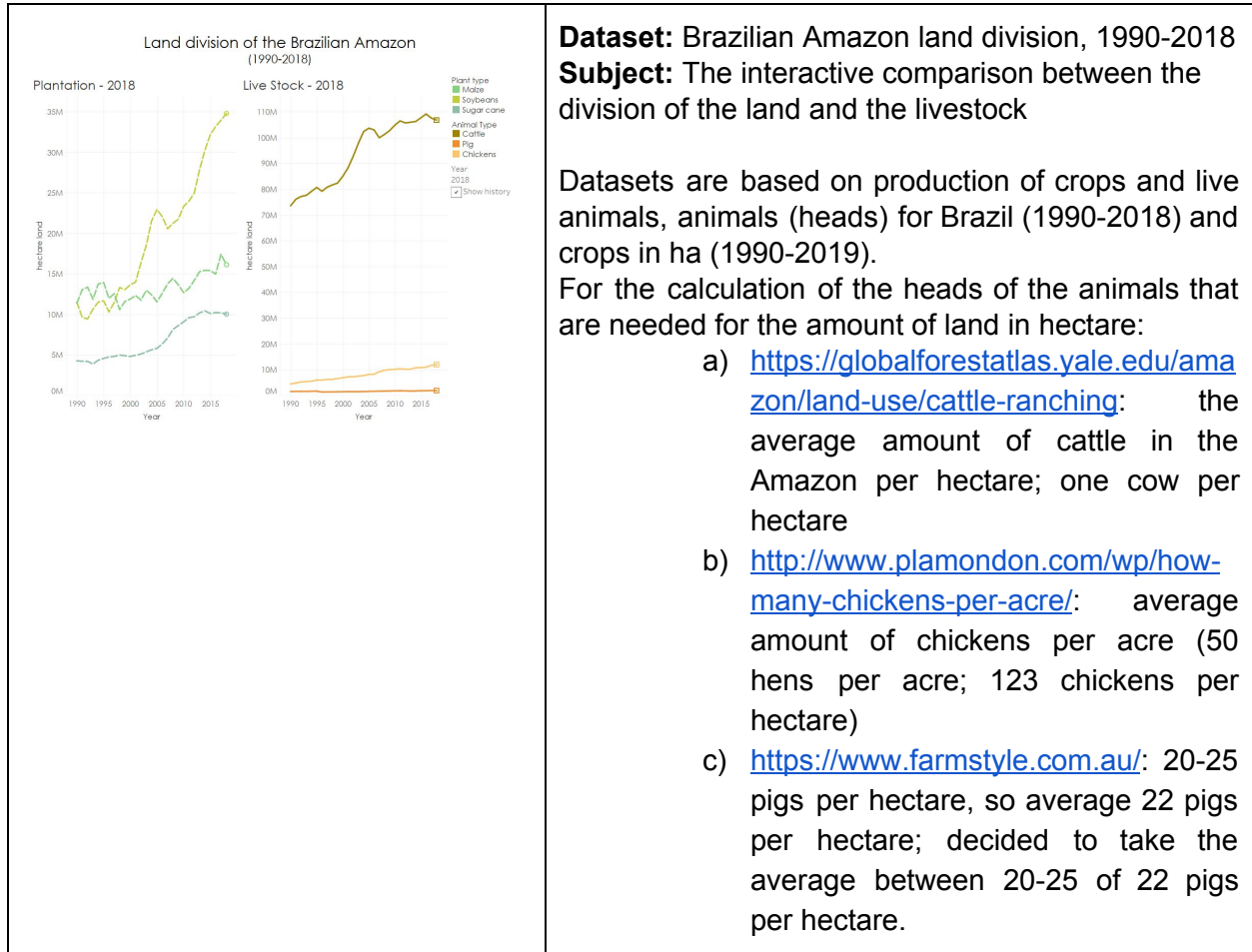
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& Agriculture (Rochelle Spaargaren)

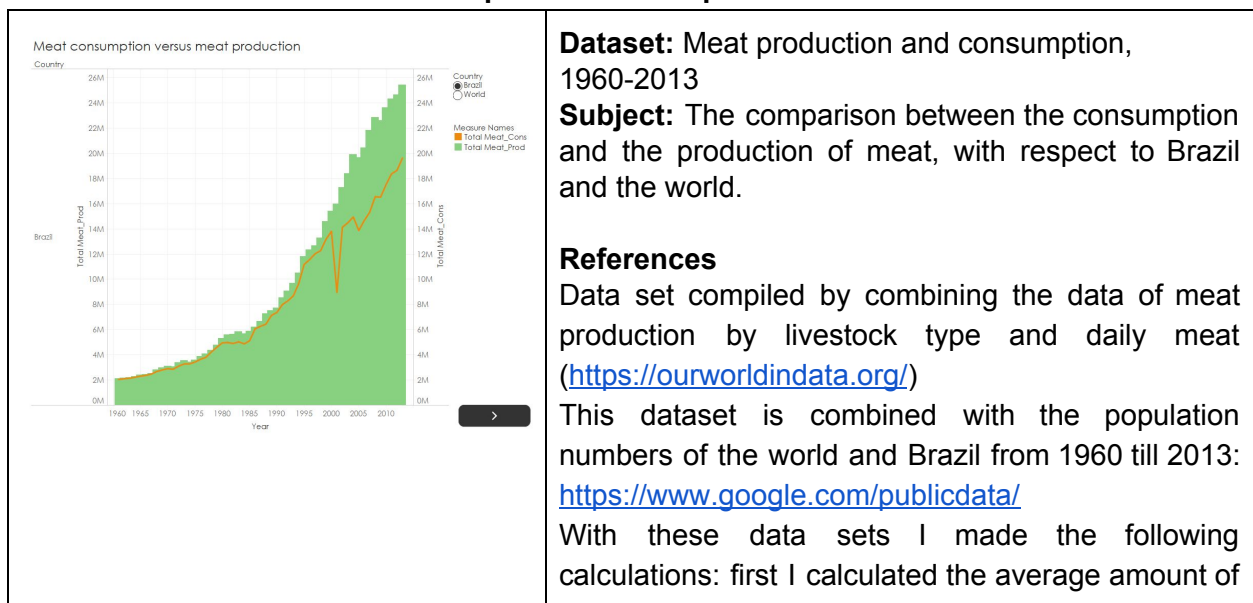
Visualization 1 - Drivers for decrease in Amazon rainforest decrease in percentages



Visualization 2 - Land division of the Brazilian Amazon



Visualization 3 - How much do we produce in comparison to what we consume?

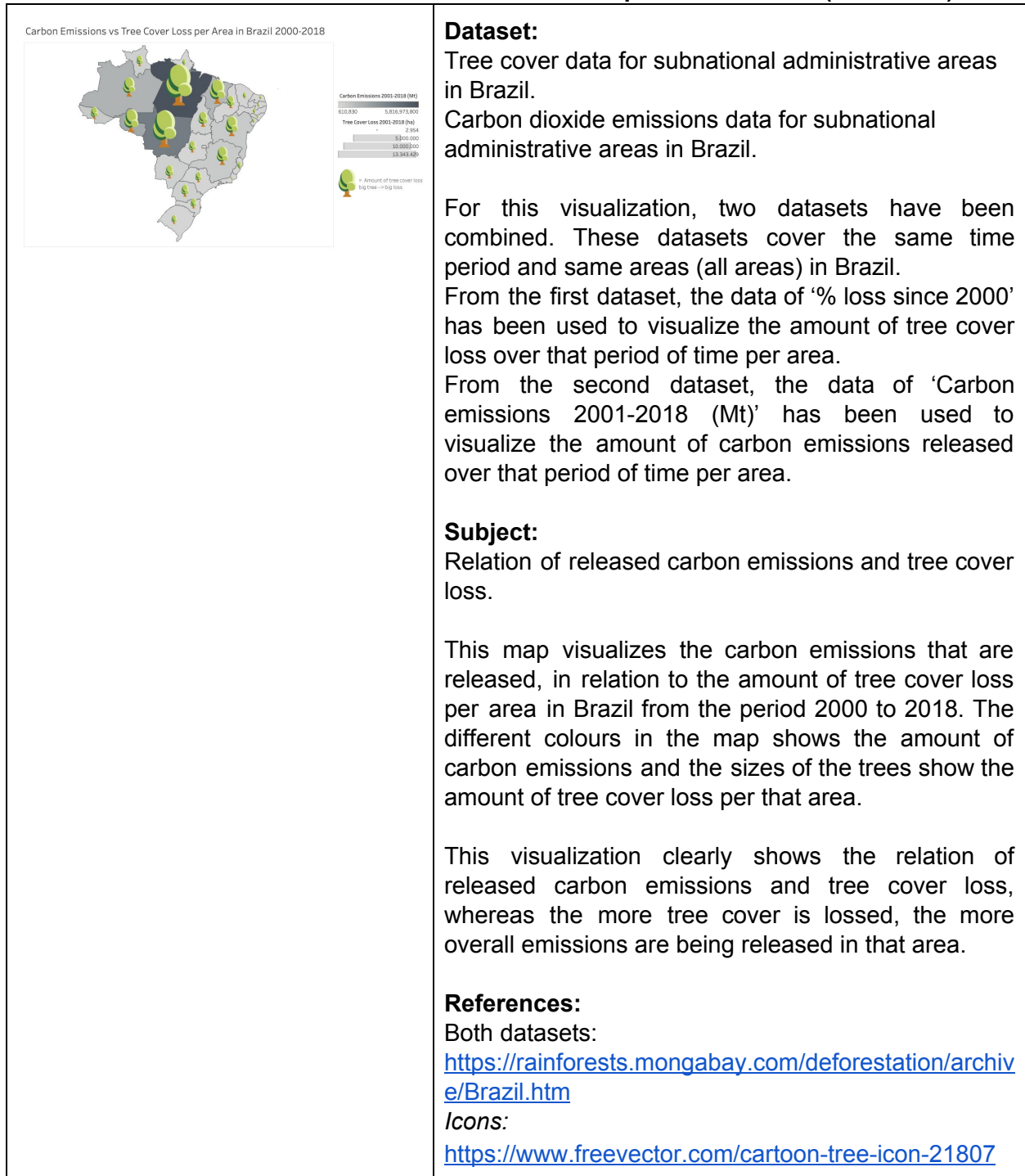


	<p>food a person per year would eat: the average daily meat consumption multiplied with 365 days. Then multiplied that for each year with the population to calculate the final total meat consumption. For the Total_meat_production, I added per year all the different types of meat.</p>
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& Global Warming (Kyana van der Vegt)

Visualization 1 - Agricultural vs Forest Land as a percentage of the total land (1990-2016)

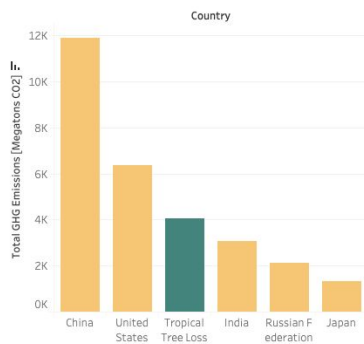
	<p>Dataset: Agricultural land (% of land area) - Brazil Forest area (% of land area) - Brazil</p> <p>Both datasets show annual numbers per subject and have been combined into one dataset to create the pie chart.</p> <p>Subject: The comparison and visualization between the annual decrease of forest land simultaneous to the annual increase of agricultural land over a period of time (1990-2016).</p> <p>This interactive pie chart visualizes the annual percentage distribution of forest land versus agricultural land in Brazil from 1990-2016. The colours show the different sections. The interactive slider shows the annual decrease of forest land and increase of agricultural land. The chart clearly shows the decrease of forest land and increase of agricultural land over that period of time.</p> <p>References: Dataset 1: https://data.worldbank.org/indicator/AG.LND.FRST.ZS?end=2016&locations=BR&start=2000&view=chart Dataset 2: https://data.worldbank.org/indicator/AG.LND.AGRI.ZS?end=2016&locations=BR&start=1961&view=map&year=2016</p>
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Visualization 2 - Carbon emissions vs Tree cover loss per area in Brazil (2000-2018)

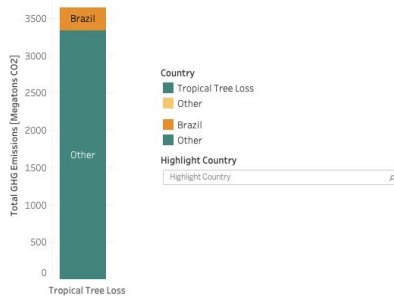
Visualization 3 & 4 - Tropical tree loss emissions as compared to the global top emitters in 2014

3:

Tropical Tree Loss Emissions As Compared to The Global Top Emitters in 2014



4:



Dataset:

Historical Emissions

Global Historical Emissions

For the first dataset, the top 5 global emitters have been retrieved from the dataset and put in a new excel sheet, leaving the other countries out of the visualization. Then, from the second dataset, I have filtered on all countries and land-use change and forestry. From this data, A combined total of all the countries have been made to make up a total tropical tree loss emissions. This data is also used to make the stacked bar graph where Brazil's emission share data is visualized.

Subject:

Tropical tree loss emissions as compared to the global top emitters.

The left bar graph shows tropical tree loss (deforestation) emissions in total as if it were a separate country on its own, compared to the global top emitters from the statistics given in 2014. Three cover loss emissions would be the third highest emitter of the world as compared to other countries. The different colours in the bar graph show the separation between the tropical tree loss bar and the other countries, aiming to focus on the tropical tree loss bar.

The graph is followed by an in-detail stacked bar graph showing Brazil's contribution to the total global tropical tree cover loss emission, also in 2014. The different colours show Brazil highlighted from the tropical tree loss bar in the left graph.

References:

Data visualization 3:

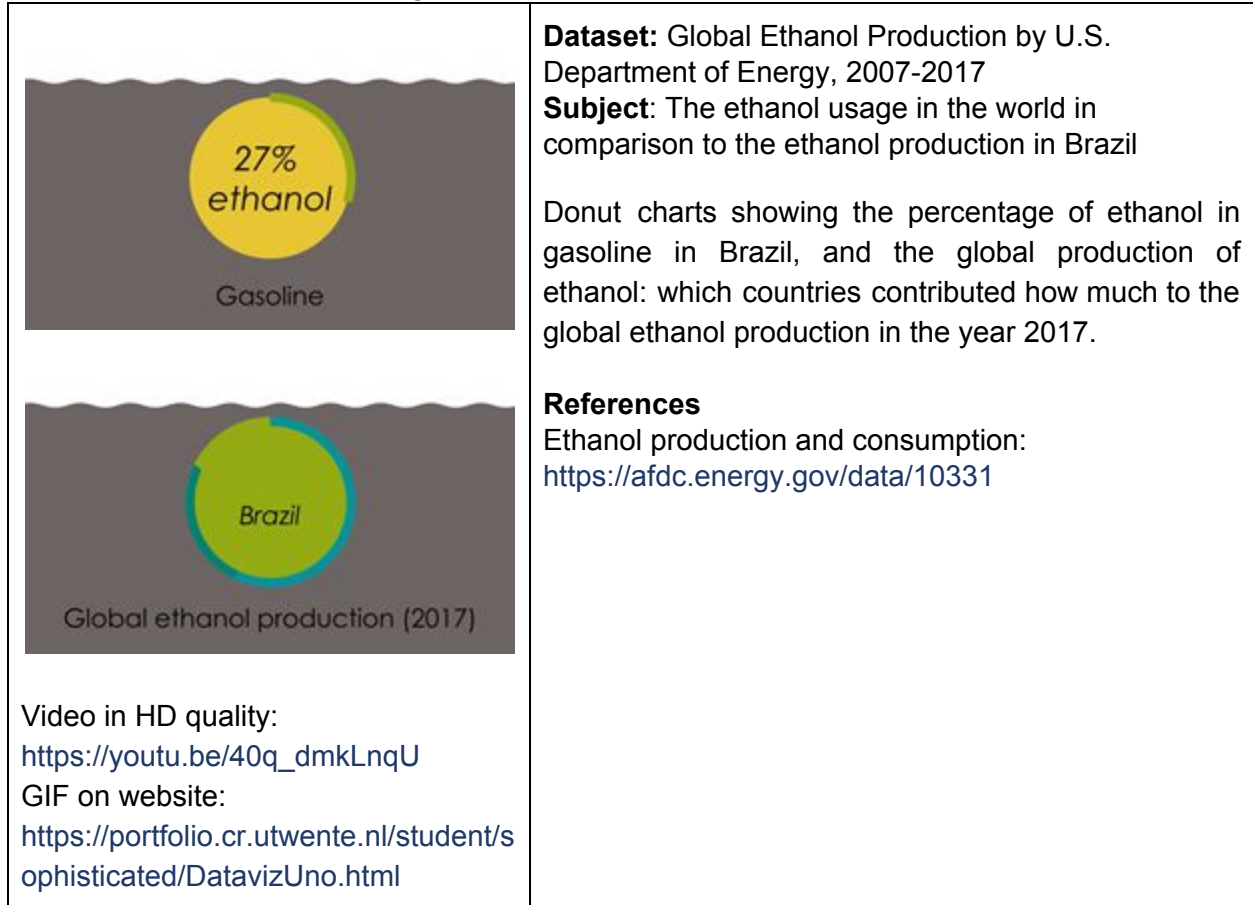
<https://www.climatewatchdata.org/>

Data visualization 3 & 4:

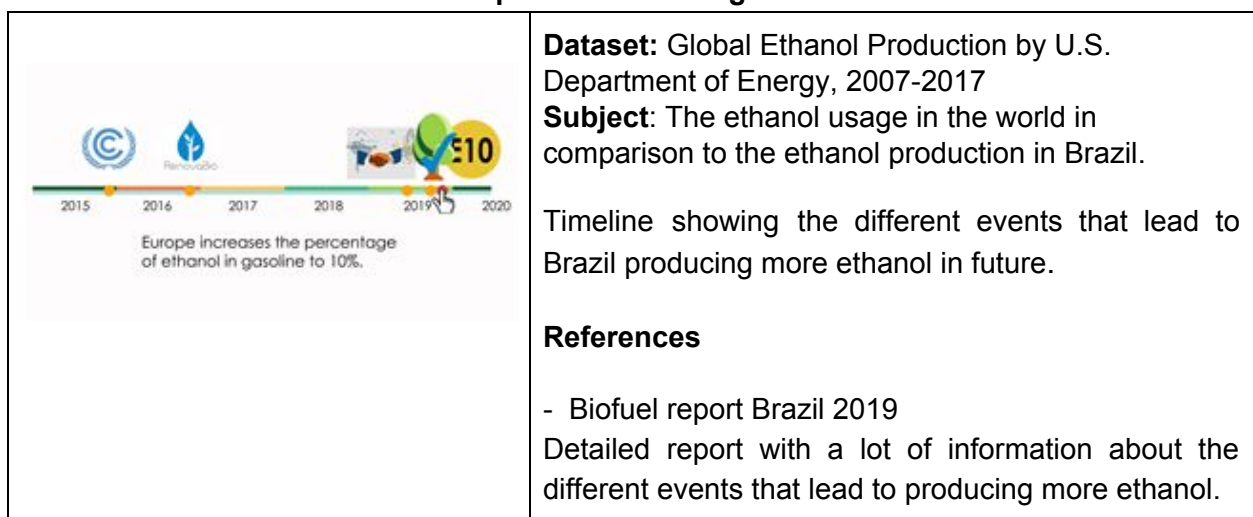
<https://www.climatewatchdata.org/>

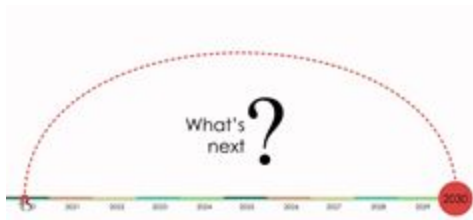
& Green Energy (Sophie Gaastra)

Visualization 1 – Ethanol usage and production Brazil (2017)



Visualization 2 – Timeline: Ethanol production for a greener future:





Video in HD quality:

<https://youtu.be/mJzh8LjHw3E>

GIF on website:

<https://portfolio.cr.utwente.nl/student/sophisticated/DatavizDos.html>

https://apps.fas.usda.gov/newgainapi/api/report/downloadreportbyfilename?filename=Biofuels%20Annual_Sao%20Paulo%20ATO_Brazil_8-9-2019.pdf

- President Bolsonaro revokes decree protecting the amazon from ethanol cultivation

<https://riotimesonline.com/brazil-news/brazil/bolsonaro-revokes-decree-protecting-biomes-from-deforestation-in-the-amazon/>

- Article about 2009 decree that was revoked by President Bolsonaro

<http://www.observatoriodoclima.eco.br/wp-content/uploads/2018/03/factsheet-sugarcane-engVA.pdf>

- E10 Europe

<https://epure.org/news-and-media/news/e10-on-the-move-across-the-eu-countries-adopt-ethanol-blend-to-reduce-emissions/>

- E10 Netherlands

<https://www.epure.org/news-and-media/news/the-netherlands-turns-to-e10-ethanol-blend-to-reduce-auto-emissions/>

Visualization 3 – Is ethanol production in Brazil green?



Video in HD quality:

<https://youtu.be/jx6EUKqsQos>

Dataset: Biofuel report, 2009

Subject: The production of ethanol

Arc diagram with positive and negative consequences of increasing the ethanol production in Brazil from 30 to 54 billion liters.

References

- Biofuel report Brazil 2019

https://apps.fas.usda.gov/newgainapi/api/report/downloadreportbyfilename?filename=Biofuels%20Annual_Sao%20Paulo%20ATO_Brazil_8-9-2019.pdf


- Biofuels explained: Ethanol and the environment

<https://www.eia.gov/energyexplained/biofuels/ethanol-and-the-environment.php#:~:text=Ethanol%20can%20reduce%20pollution&text=Gasoline%20requires%20extra%20processing%20to%20reduce%20evaporative%20emissions%20before%20blending%20with%20ethanol.&text=Producing%20and%20burning%20et>

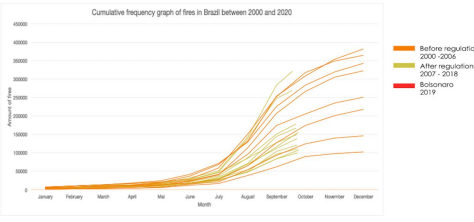
<p>GIF on website: https://portfolio.cr.utwente.nl/student/sophisticated/DatavizTres.html</p>	<p>hanol%20results,CO2)%2C%20a%20greenhouse%20gas</p> <ul style="list-style-type: none">- Area of sugar cane planted in Brazil https://www.statista.com/statistics/742511/area-planted-sugar-cane-brazil/- Land usage for biofuels https://globalforestatlas.yale.edu/amazon/land-use-and-agriculture/biofuels- Petition https://www.rainforest-rescue.org/petitions/1206/brazil-keep-biofuel-plantations-out-of-the-rainforest- Wikipedia page on Ethanol Fuel https://en.wikipedia.org/wiki/Ethanol_fuel
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& Wildfires (Armein Dul)

Visualization 1 - The spread of the wildfire during drought season in Brazil in August 2019

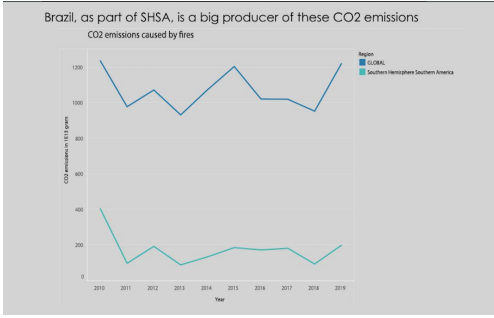
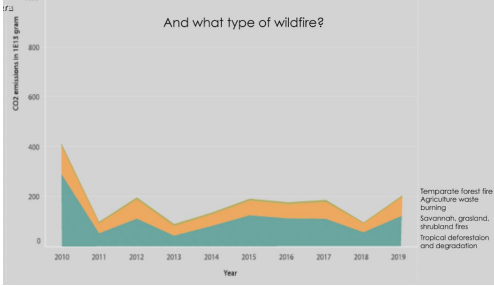
<p>Due to natural causes, climate change and deforestation, Brazil's forest is on fire. This is a wildfire compilation of August 2019, during drought season</p>  <p>Video in HD quality: https://youtu.be/8nWrwwPGS-c</p> <p>GIF on website (only accessible with VPN): https://portfolio.cr.utwente.nl/student/abcreative/DataViz1.html</p>	<p>Dataset: NASA FRIMS, 01/08/2019 - 31/08/2019 Subject: The visualization of the spread of a wildfire</p> <p>Due to an increase in temperature, as a result of climate change, the wildfire in Brazil in 2019 kept spreading, which was being captured by NASA MODIS satellite images. Via this visualization, the density of the wildfire is visualised. However, the little dots indicate a different cause of a fire, such as agriculture waste burning or deforestation. The size of the dots does not determine the intensity of the fire; in this visualization the density indicates the spread of the wildfire.</p> <p>References: <i>NASA MODIS data, which pinpoints the location if there is a fire</i> https://firms.modaps.eosdis.nasa.gov/map/#t:adv;d:2018-11-10:@0.0.0.2z</p>
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Visualization 2 - The amount of fires in Brazil over the years

 <p>Video in HD quality: https://youtu.be/O2y2wf42N8A</p> <p>GIF on website (only accessible with VPN): https://portfolio.cr.utwente.nl/student/abcreative/DataViz2.html</p>	<p>Dataset: INPE, National Institute for Space Research, 2000 - 2019 Subject: The cumulative frequency of fires in Brazil to compare, if there is an effect noticeable of regulations</p> <p>Over the years, the amount of wildfires has fluctuated. Via the cumulative graph, it visualized the amount of fires in Brazil. Since 2006, the regulations have helped to preserve the forest for 6 years by reducing deforestation; however, in 2014 the economic crisis in Brazil started and the following years, the amount of fires has increased. 2007 and 2010 were exceptional years since the regulations as the El Nino has passed. In 2019, Bolsonaro became president, who is less strict with the regulations.</p> <p>References:</p>
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	<p>Amount of wildfires per year in Brazil: http://queimadas.dgi.inpe.br/queimadas/portal-static/e/statisticas_paises/</p> <p>Background information about regulations and the situation: 2019 Amazon Rainforest wildfires</p> <ul style="list-style-type: none"> - The share of Amazon rainforest per country (Brazil: 60%) <p>https://en.wikipedia.org/wiki/2019_Amazon_rainforest_wildfires#cite_note-cbs_bolsonaro_aid-3</p> <p>See how much of the Amazon is burning, how it compares to other years</p> <ul style="list-style-type: none"> - Information about regulations <p>https://www.nationalgeographic.com/environment/2019/08/amazon-fires-cause-deforestation-graphic-map/</p>
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Visualization 3 and 4 - The environmental impact of CO2 emissions by the Brazilian wildfires from 2010 until 2019 and the cause of the wildfires with respect to the CO2 emission

<p>Viz 3</p>  <p>Brazil, as part of SHSA, is a big producer of these CO2 emissions</p> <p>CO2 emissions caused by fires</p> <p>Region ■ SHSA ■ Southern Hemisphere Southern America</p> <p>CO2 emissions in 10¹² grams</p> <p>Year</p> <p>Viz 4</p>  <p>And what type of wildfire?</p> <p>CO2 emissions in 10¹² grams</p> <p>Year</p> <p>Temperate forest fire Agriculture waste burning Savannas, grassland, shrubland fires Tropical deforestation and degradation</p>	<p>Dataset: Emissions (monthly, daily, 3-hourly) and burned area (with small fires), 2010-2019</p> <p>Subject: The CO2 emissions of the continent Brazil is within (SHSA) compared to the world</p> <p>As a consequence of the fires, more CO2 is emitted. By having more fires there is more CO2 flowing into the air, which is illustrated by the years 2018 and 2019. 2010 was exceptional, as the El nino passed, which is also indicated in this visualization. Brazil is a country within the continent of South Hemisphere South America. As is visualized with the first part, this continent is a big producer of CO2 emissions.</p> <p>The second visualization shows the biggest cause of the CO2 emissions are the deforestation and the degradation of the Tropic Forests, which is for a great part within Brazil.</p> <p>These fires have worsened the situation, as there are less trees that convert CO2 into oxygen.</p> <p>References: <i>Global and brazilian CO2 Emissions</i> https://www.globalfiredata.org/</p>
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Video in HD quality:

<https://youtu.be/dt5iBuHa-bY>

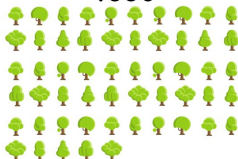
GIF on website (only accessible with VPN):

<https://portfolio.cr.utwente.nl/student/abcreative/DataViz3.html>


<https://www.geo.vu.nl/~gwerf/GFED/GFED4/tables/>

& New forest growth (Thijs van Zeijts)

Visualization 1 - Forest loss and gain in Brazil

<p>Forest loss and gain in Brazil Forest loss and gain over time (🌳 = 10' ha)</p> <p>1990</p>  <p>GIF on website: https://portfolio.cr.utwente.nl/student/sophisticated/DatavizTresThijs.html</p>	<p>Dataset: FRA rapport, 2015 Subject: The ratio between the loss and gain of Brazilian rainforest</p> <p>I looked at the total forest growth over time and compared that to the growth rates of new generated forests.</p> <p>References <i>FRA rapport:</i> http://www.fao.org/forest-resources-assessment/past-assessments/fra-2015/en/ <i>Icons:</i> https://www.freevector.com/cartoon-tree-icon-21807</p>
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Visualization 2 - Forest loss and gain in Brazil

<p>Share of brazil in total forest destruction Brazil's part of the total deforestation from '90-'15</p>  <p>GIF on website: https://portfolio.cr.utwente.nl/student/sophisticated/DatavizDosThijs.html</p>	<p>Dataset: FRA rapport, 1990-2015 Subject: The ratio between the loss and gain of Brazilian rainforest</p> <p>I compared the share of Brazil to the total deforestation of the world to get a better grip for how much forest is destroyed in Brazil.</p> <p>References <i>FRA rapport:</i> http://www.fao.org/forest-resources-assessment/past-assessments/fra-2015/en/ I compared the deforestation of Brazil to the rest of the world in the period of 1990 - 2015. <i>Icons:</i> https://www.freevector.com/cartoon-tree-icon-21807</p>
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Visualization 3 - Regrowth rate in Brazil

<p>Regrowth rate in Brazil How long it takes to regrow all destroyed forest from '90-'15</p> <p>Plant 1000 football- fields every day Current growth rates in Brazil</p> <p>GIF on website: https://portfolio.cr.utwente.nl/student/sophisticated/DatavizUnoThijs.html</p>	<p>Dataset: FRA rapport, 1990-2015 Subject: The ratio of regrowth of the Brazilian rainforest between the ideal and current situation</p> <p>Here, I wanted to look at how fast the forest could regrow. There are more assumptions in this calculation but it shows just how much forest is destroyed. It takes a forest approximately 65 years to grow, so for these calculations I looked at planting speed + growth of the forest. Important to note is that these numbers only account for those 25 years (between '90 and '15) and that for every piece of forest that is destroyed beyond 2015 that adds up to the total amount of years that it would take.</p> <p>References <i>FRA rapport:</i> http://www.fao.org/forest-resources-assessment/past-assessments/fra-2015/en/</p> <p>I compared the current growth of new forests to an arbitrary chosen number to see how fast it would take to regrow what is destroyed in 25 years. <i>Current situation regrowth (65 years):</i> https://www.newscientist.com/article/dn14112-how-long-does-it-take-a-rainforest-to-regenerate/</p> <p><i>Icons:</i> https://www.freevector.com/cartoon-tree-icon-21807</p>
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