Github: https://github.com/snoopsoj/insight-indicators-relevant-to-climate-change/blob/main/ADS 22073997.py
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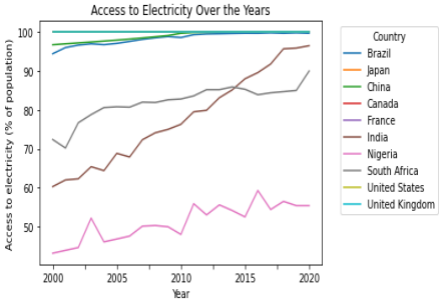
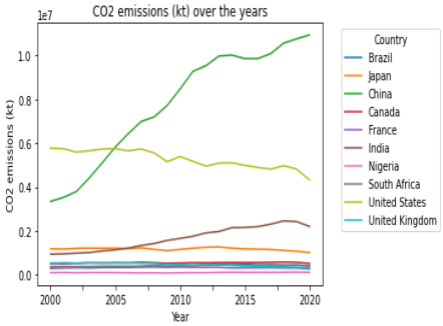
Module: Applied Data Science 1

Climate change data analysis based on World Bank data

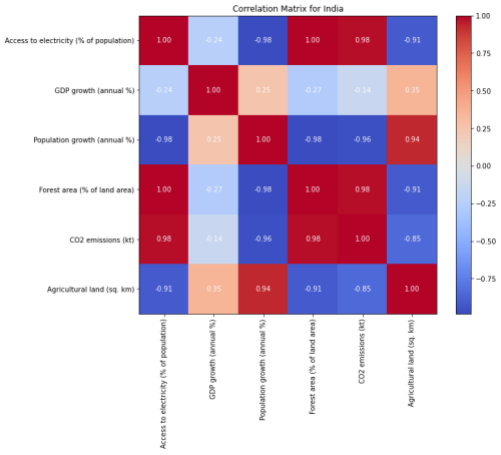
Ten nations from various continents were chosen for this investigation, and the relationships between the following variables influencing climate change were looked into: Access to electricity (% of population), GDP growth (annual %), Population growth (annual %), Forest area (% of land area), CO2 emissions (kt) and Agricultural land (sq. km).
Some correlations between the variables were discovered by the study, and the causes were looked into.



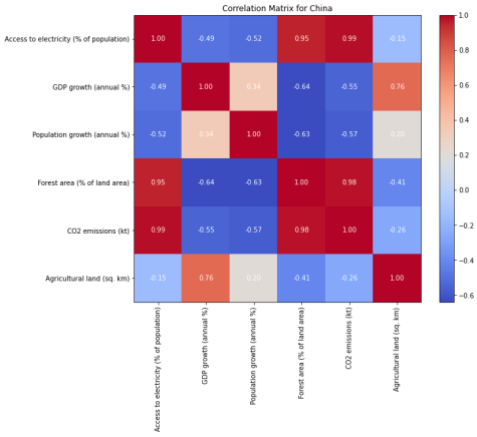
A significant increase trend for India can be seen in the line graph that shows the access to electricity in various nations between year 2000 and 2020. India has steadily seen a rise in the accessibility of electricity over this time, a sign that its energy infrastructure has improved. Comparably, during the same period, China has seen a consistent and notable increase in access to electricity. The country's CO2 emissions in particular have been significantly impacted by this upward trend in the accessibility of energy. As more people have access to power, more energy is consumed, which raises CO2 emissions.



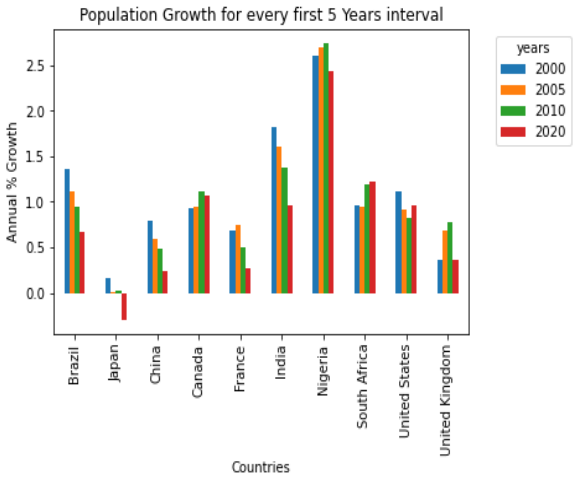
From the line graph above, China has seen an overwhelming increase in Co2 emission over the years compared to other countries, from the left line graph, it shows that China has a consistent increase in access to electricity which impact the upward trends of Co2 emission. India also had increase in Co2 emission over the years deal to the increase in the access to electricity in the country therefore increases energy use, which raises CO2 emissions.

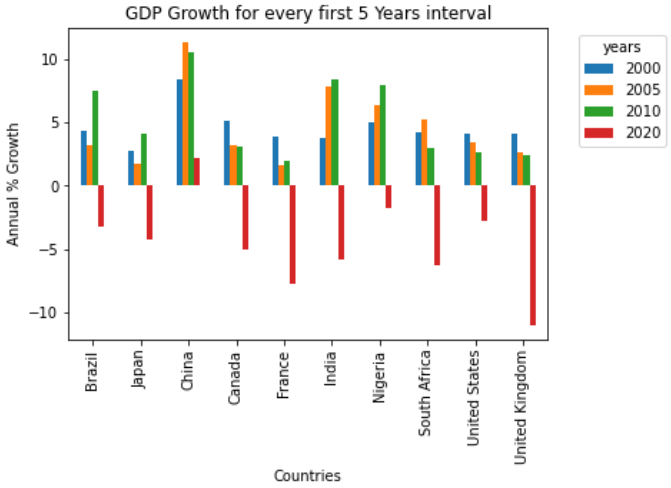


The heatmap above on India data shows that there is a Strong positive correlation between access to electricity, forest area and Co2 emissions but no definite correlation between access to electricity and other factors.



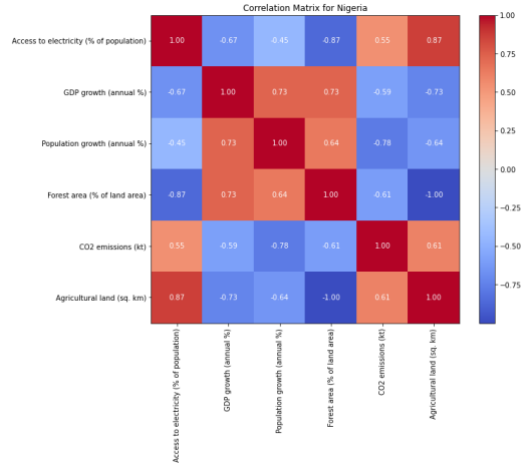
The heatmap above on China data shows strong positive correlation between co2 emission, forest area and access to electricity. Understanding the correlation between CO2 emissions and electricity access is crucial for promoting sustainable energy practices and reducing climate change's environmental impact.





The above bar graph shows annual population growth, was built using the data that was accessible from year 2000 to 2020, in intervals of five years. Nigeria has experienced the fastest population growth throughout time, with an increasing tendency. Despite starting at faster rates, Nigeria's population growth decreased in 2020, which was also reflected in the country's GDP growth, as can be seen in the GDP bar plot on the upper right. In 2020, Japan's population growth slowed down, which was also reflected in the country's GDP growth.

The GDP growth by country is displayed in the above bar graph, which was created using data that was available at five-year intervals between 2000 and 2020. It is clear that, in 2020, GDP growth in every country but China has sharply decreased. It also showed that, in 2020, the majority of the nation experiencing a decline in GDP growth are simultaneously seeing a decline in population growth in year 2020.



The heatmap above on Nigeria data shows that there Is a positive correlation between population growth, gdp growth and forest area. But no definite correlation between population growth and other factors.

The following table shows the difference in the forest area in 20 years for all countries using the data from year 2000 to 2020. According to the table below, it shows that there was an increase in the forest area in China, France, India, United state and United Kingdom. China and France had the highest increase in forest area while Nigeria and South Africa had decrease in forest area and Brazil had the highest decrease in forest area.

Country Name	2000	2010	2020	Diff_20
China	19.0	21.0	23.0	4.0
France	28.0	30.0	32.0	4.0
India	23.0	23.0	24.0	1.0
United States	33.0	34.0	34.0	1.0
United Kingdom	12.0	13.0	13.0	1.0
Japan	68.0	68.0	68.0	0.0
Canada	39.0	39.0	39.0	0.0
South Africa	15.0	14.0	14.0	-1.0
Nigeria	27.0	26.0	24.0	-3.0
Brazil	66.0	61.0	59.0	-7.0