# APPLIED DATA SCIENCE-1

## ASSIGNMENT-2: STATISTICAL AND TRENDS

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Data:08/12/2023

Git Hub Link: https://github.com/Je23aan/ADS1_Assignment2

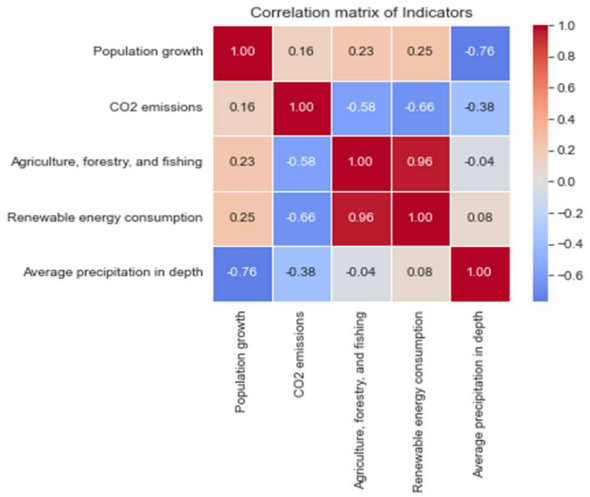
Dataset Link: https://data.worldbank.org/topic/climate-change

**ABSTRACT:**

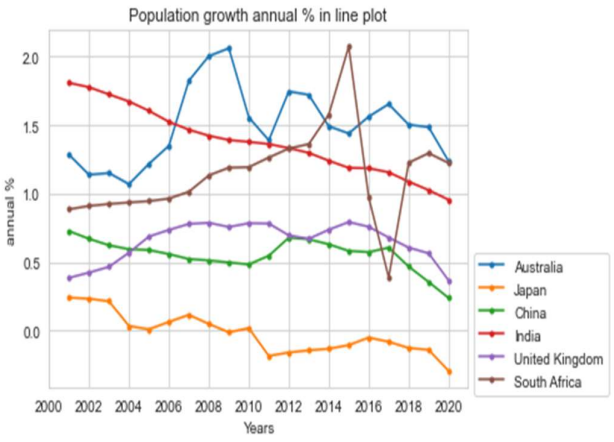
In a comprehensive investigation covering the period from 2001 to 2020, six countries spanning diverse continents were carefully chosen to scrutinize the intricate interplay of factors influencing climate change. The Line graph illustrates variation caused by population growth (annual %) for climate change. However, Co2 emission in metric tonnes is shown in the Dot plot. The bar plot demonstrated the Agriculture, Forestry and fishing of all the selected countries. Whereas the Box plot displayed the Renewable energy consumption for the last 2 decades and the pie plot showed the Average precipitation in all countries for the particular year 2020. The complete analysis and other characteristics, is shown using a heatmap using all the 5 indicators of 6 unique countries. This study provides a subtlety understanding of the multifaceted dynamics shaping the global climate landscape over the past two decades.

# Traversing Environmental Dynamics and Economic Transformations: An In-Depth Examination (2001-2020)

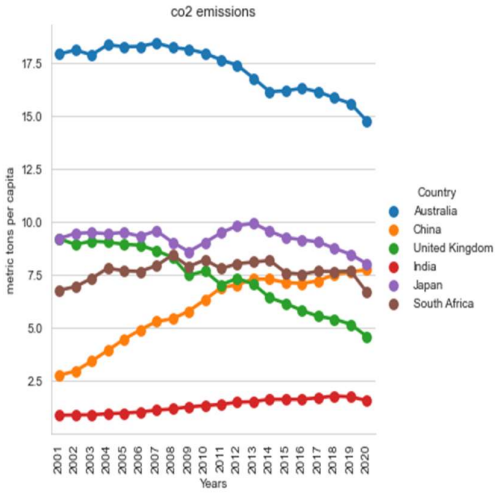
Undertaking an exhaustive examination spanning the years 2001 to 2020, we meticulously identified six countries from diverse continents to delve into the intricate interplay of factors influencing climate change and five unique indicators.



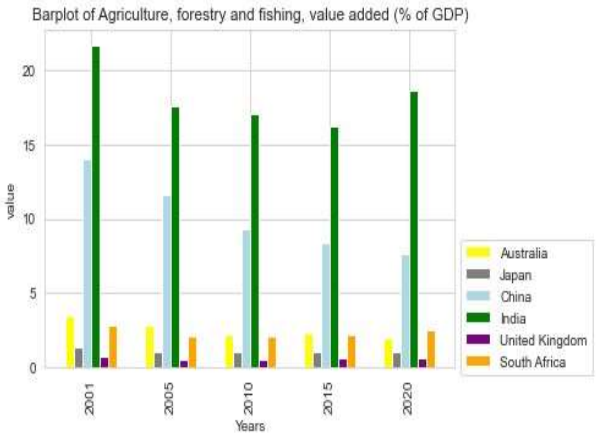

Insights are obtained across national boundaries through the correlation study between population growth and indicator variables. Population increases and CO2 emissions are shown to be correlated, as shown by the correlation of r = (0.16). Population growth and agriculture, forestry, and fishing have a favourable association (r=0.23) with each other. But while there is a positive association (r=0.25) between population increase and renewable energy, there is a negative correlation (r = -0.76) between population growth and average precipitation. The correlation coefficient is scaled so that it is always between -1 and +1.



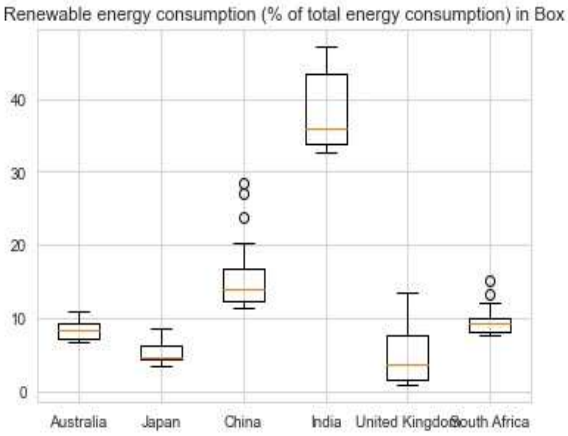

Conversely, in 2000, the population growth rates of Australia and all the other chosen countries were low initially, but they later displayed a fairly stable population growth before declining towards the end of 2020. The only countries whose population growth rates were high at the beginning of 2000 were the ones that saw a continuous decline throughout the years. Africa had to contend with erratic population growth, which saw increases to 1.30% in 2001 and 1.22% in 2020. Every other component was impacted by the population rise.



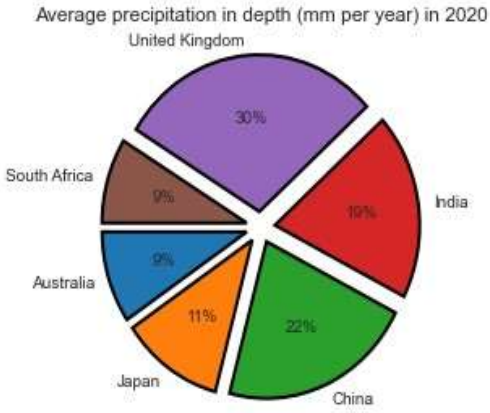

Since the correlation between CO2 emissions and population growth is negative (-0.76). According to this, a nation's CO2 emissions generally decline as its population increases. India's CO2 emissions have not changed much between 2000 and 2020, while those of Australia, Japan, and South Africa show a sharp decline. China, on the other hand, is the only country whose CO2 emissions rise annually. All other indicators will constantly be negatively impacted by rising CO2 emissions, which will also have an effect on people's health.




Furthermore, the correlation between agriculture, forestry, and fishing value added and population growth is negative (-0.58). This suggests that as the value of these industries grows, the population tends to decrease. This may be due to improved healthcare, education, and infrastructure, leading to higher levels of productivity and lower fertility rates.




Additionally, the need for renewable energy is growing daily in tandem with the growth in population. China and South Africa are two examples of nations whose data exhibits anomalies. As the population grows, so does the usage of renewable energy, and vice versa, because there is a positive correlation between the two. Population control will always give a positive impact on climate change and it always helps for a better future.




The precipitation which is the average rainfall of each country will always depend on the Co2 emission and population growth. As the correlation is negative that shows that if the population increases the average precipitation decreases if the rainfall decreases there is lot of impact on agriculture, forest, fishing and added values which are interconnected with one on the other. Nature is everything if the selected indicators are getting increased there will be a serious impact especially on population.

The dataset has a mildly left-skewed distribution with a leptokurtic shape, suggesting a heavy-tailed distribution. The skewness coefficient is 0.179, while the kurtosis coefficient is -0.796. These metrics indicate that most observations fall on the left side of the distribution, and that the distribution has heavier tails or outliers compared to a normal distribution.

In conclusion, the population growth intertwines with various indicators, reflecting the intricate dance between demographic changes, environmental policies, and economic activities. The data underscores the importance of sustainable practices, renewable energy adoption, and thoughtful policies in mitigating the environmental impact of a growing population. The journey of each country, as reflected in these indicators, serves as a testament to the ongoing global effort to strike a harmonious balance between progress and planetary well-being.