Assignment: **ADS assignment 2 : Statistics and Trends**

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**Git hub Link:** <https://github.com/Ufelicita/ADS-2-STATS->

File Source : 

**Title: Comparative analysis of Climate Change in Selected Countries**

A graph of growth in countries/regions

Description automatically generatedUsing Statistics and Visualisations, the correlation of five indicators and their impact on climate change in 10 selected countries from different continents in the world will be comparatively analysed. The indicators considered are Co2 emissions, Population Density, Population Total, Arable lands, and GDP.

A graph with different colored lines

Description automatically generated

The Line plot was chosen for this analysis because it is better at showing trends. It shows CO2 emission data in the select countries from year 1990 to 2015.China and United States recorded the highest emissions at over 1 billion and 0.5 billion kt respectively in 2015. India recorded a slight increase from 2005 while United States decline slightly in 2005. The high rate of CO2 emission as compared to the other countries is related to the

high production rates in these countries. China’s population and its heavy reliance on coal are major reasons for the recorded high emissions.

A graph of different colored bars

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The line plot shows that United States had the highest GDP at over $1.75 trillion dollars. Comparatively, China’s GDP began to increase steadily from 2005 and was highest in 2015 at over $1 dollars. Japan and Brazil recorded a slight decline from 2010. United States economic activities contributed a lot to climate change as shown in its high CO2 emissions within the years analysed. The Korea Rep, South Africa, Germany, Australia, Brazil’s relatively low GDP in 2015 reflects low economic activity which also is suggestive to have contributed to low CO2 emissions.

The Bar plot was chosen for comparative analysis The chart shows little or no correlation between population density and arable lands in all of the countries .Nevertheless , China , India and United States have the the highest arable land expanse of over 10,000, 14,200 and 16200 square meters respectively. While several variables could be responsible the negative relationship between arable land and population density, factors such as technology advances, agricultural methods, and land management strategies can change arable land use efficiency, thereby separating it from population density patterns.Nevertheless , if these countries adopt better farming praticises on these lands , it would reduce carbon relase to a great extent. Korea Rep which had the lowest Arable Land but highest population density emitted less Co2 indicating the country’s focus on strong policies existing to mitigate climate change . Their involvement in Green technology and high investment in renewable energy sources is a testament to this as well.

A screenshot of a graph

Description automatically generated

The Heatmap above reveals that China’s high Co2 emmisions has stong correlations with urbanization, ,Population and Production rates but not with Arable land.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Country Name | China | India | United States | Brazil | Japan | China | India | United States | Brazil | Japan |
| Series Name | GDP (current US$) | GDP (current US$) | GDP (current US$) | GDP (current US$) | GDP (current US$) | Population density (people per sq. km of land area) | Population density (people per sq. km of land area) | Population density (people per sq. km of land area) | Population density (people per sq. km of land area) | Population density (people per sq. km of land area) |
| count | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| mean | 3.63E+12 | 9.58E+11 | 1.17E+13 | 1.13E+12 | 4.78E+12 | 135.3463445 | 370.6727907 | 31.37645863 | 21.50467539 | 346.9175673 |
| std | 4.21E+12 | 7.55E+11 | 4.61E+12 | 7.03E+11 | 9.41E+11 | 9.558332705 | 57.3046961 | 2.930764986 | 2.448791552 | 4.762432937 |
| min | 3.61E+11 | 3.21E+11 | 5.96E+12 | 4.65E+11 | 3.13E+12 | 120.9155061 | 292.7670835 | 27.25451361 | 18.03109855 | 338.6670324 |
| 25% | 8.53E+11 | 3.87E+11 | 8.31E+12 | 6.84E+11 | 4.54E+12 | 129.8755861 | 332.3426238 | 29.50403897 | 19.93325381 | 345.099972 |
| 50% | 1.75E+12 | 6.44E+11 | 1.17E+13 | 8.31E+11 | 4.9E+12 | 136.6801236 | 372.3731729 | 31.52608897 | 21.69567954 | 348.4005487 |
| 75% | 5.14E+12 | 1.47E+12 | 1.45E+13 | 1.57E+12 | 5.41E+12 | 141.5827491 | 410.0376677 | 33.42555421 | 23.20665274 | 350.1097394 |
| max | 1.11E+13 | 2.1E+12 | 1.82E+13 | 2.21E+12 | 5.76E+12 | 146.9779493 | 444.931708 | 35.06332868 | 24.54950563 | 351.3580247 |

. A screenshot of a graph

Description automatically generated

Also , United states high Co2 emmissions is corelated with population , poulaton density and Gdp .The rate of production ans economic activities and high rate of urbanisation activities contributes highly to Carbon emission .United States is well known for its large industrial bases

In conclusion from the summary statistics table showcasing GDP and Population Density in China , India , Japan united States and Brazil , it is revelaed that within the given period of 1990 to 2025 , india had the highest population density follwed respectively by China , Japan , Brazil and United states but with GDP , china had the highest maximum GDP , followed by United States . On the other hand , Japan , India and Brazil had lower GDPs compareed to these 2 countries . This shows strong economic activities in these countries and as shown in the line plot also revelaing these countrie, United States and China as the greatest Contributors to Carbon emmisions . Neverthless , India’s high population density might not have contributed as much as United States and China to high Carbon emissions but its high population density also might pose a challenge to managing resources.