Analysis of Arable Land, Forest Area, and Population Growth over Time in Various Countries

By **Harsha Sandaruwan Hathamunage**

GitHub repository: **https://github.com/Harsha-hathamunage/ADS1---Assignment-2-Statistics-and-trends**

# Abstract

As the world population increases, there is a growing concern for the environment, especially the conversion of forest areas. This study analyses the World Bank climate change dataset and uses the dataset to represent a comparative analysis of population growth and its impact on arable land area and forest area across multiple countries over time. Bar charts represent the population growth and Forest area of different countries over five years of period.

**Climate change data analysis based on World Bank data**

This study focused on the impact of arable land, forest area, and population growth on climate change. The analysis was conducted on five countries belonging to the BRICS union. The study explored the interrelation between these factors and identified the underlying causes of any correlations found.  
  
The bar graphs below display the changes in Forest area (% of land area) and Population growth (annual %) in the BRICS countries (Brazil, Russia, India, China, and South Africa) over the years 2000, 2005, 2010, 2015, and 2018.

Chart, bar chart

Description automatically generated

Looking at the two graphs, it appears that there is no clear relationship between Forest area (% of land area) and Population growth (annual %) in the selected BRICS countries. Brazil, for example, has the highest percentage of forest area among the BRICS countries, but its population growth rate has been consistently declining over the years. In contrast, India has a lower percentage of forest area, but its population growth rate has been consistently high.

Looking at the Forest area graph, it is evident that Brazil has the highest percentage of forest area among the BRICS countries, and the percentage has remained relatively stable over the years. On the other hand, Russia had the second-highest percentage of forest area but has shown a decline over the years, while China and India have remained relatively stable but with lower percentages. South Africa, however, had the lowest percentage of forest area, and the percentage has declined over the years.

Regarding the Population growth graph, it is evident that India had the highest population growth rate among the BRICS countries, and it has remained consistently high over the years. China had the second-highest population growth rate, but it has been declining steadily. Brazil, South Africa, and Russia have had relatively low population growth rates, with Brazil and Russia showing a slight increase over the years, while South Africa's rate has remained consistently low.

Chart

Description automatically generated

The resulting heatmap shows the correlation coefficients between the three indicators for Brazil. The values range from -1 to 1, with 1 indicating a perfect positive correlation and -1 indicating a perfect negative correlation. The diagonal of the heatmap shows the correlation of each indicator with itself, which is always 1. In this case, there is a moderate negative correlation (-0.76) between forest area and arable land, which makes sense as these two indicators are competing for land use. There is a weak positive correlation (0.09) between population growth and forest area, and a weak negative correlation (-0.07) between population growth and arable land, but these correlations are not significant.

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| --- | --- | --- | --- | --- |
| Country Name | 2005 | 2010 | 2015 | 2018 |
| Brazil | 5.782746 | 6.150292 | 6.522743 | 6.67158 |
| China | 12.86696 | 12.87784 | 12.68936 | 12.67676 |
| India | 53.62725 | 52.80826 | 52.60781 | 52.2933 |
| South Africa | 10.86069 | 10.33147 | 9.892094 | 9.892094 |

The table shows the population growth rate of Brazil, China, India, and South Africa from 2000 to 2018. China and India have the largest populations, but their growth rates have been decreasing. Brazil's population growth rate has been increasing while South Africa's has been declining. The table provides insights into demographic changes in these countries.