"Trends in Urbanization, Agriculture practices and the impact on CO2 emissions"

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GitHub repository: Climate Change GitHub repository

Abstract

As the world's population continues to grow and urbanise, there is growing concern for the environment, especially CO2 emissions that contribute to climate change. This study analyses the World Bank public climate change dataset and uses data to show a comparative analysis of CO2 emissions, urbanisation, and agricultural land use across multiple countries over time. The line charts illustrate the population change and CO2 emissions over time for multiple countries. The table compares the CO2 emissions per capita of different countries over five years. Finally, the bar charts demonstrate the agricultural land area and CO2 emissions of several countries over time.

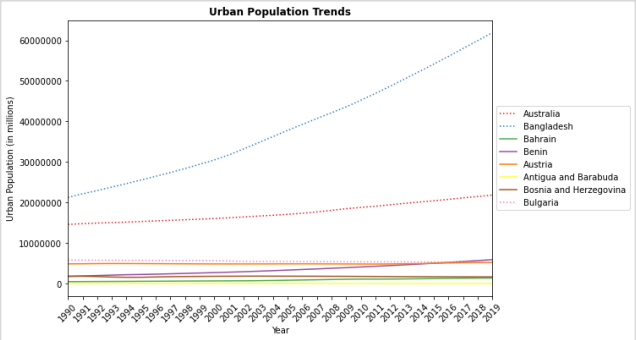

Figure 1:Urban population Trends over time

The line chart illustrates how urbanisation has changed over time in multiple countries. Bangladesh's population has increased dramatically over the last 30 years. The population was 21.2 million in 1990 and 29.4 million after ten years. After 20 years, the population is 43.5 million, and finally, it is 61.9 million in 2019.

Australia's population was 14.5 million in 1990, and it has gradually increased over the last 30 years. It is 21.8 million in 2019.

The population of other countries has not increased significantly, as it was less than one million in 1990, and after 30 years, there has been a small increase, but it is still less than one million.

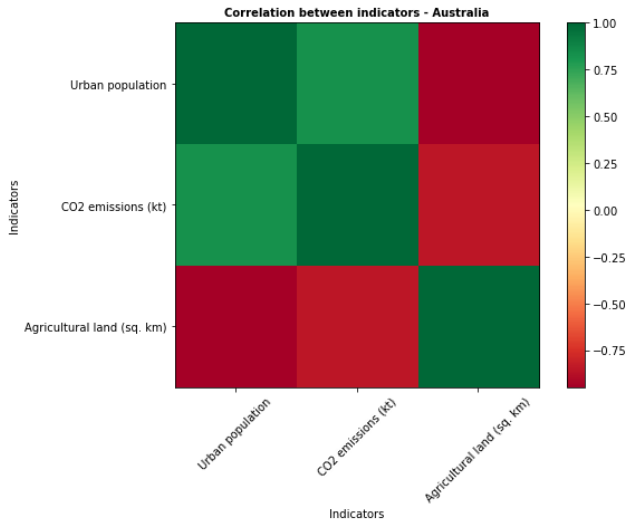

Figure 2:Australia – Heat map

This heatmap of Australia shows a strong positive correlation between urban population and CO2 emissions, which may be due to urbanisation, an increase in energy consumption, and transportation requirements. Urban population and agriculture land have a strong negative correlation, which means when urban population increases, the amount of agriculture land decreases, possibly due to land use to accommodate the growing population. CO2 emissions and agricultural land have a moderately negative correlation, which indicates that as agricultural land decreases, CO2 emissions increase, which could be due to deforestation.

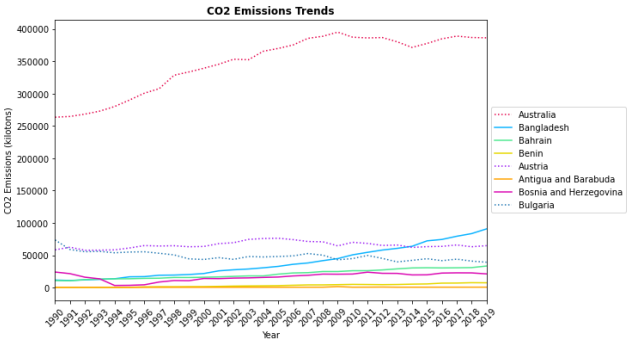

Figure 3:CO2 emission overtime

This line graph shows CO2 emissions by countries over the past 30 years. Australia shows the highest CO2 emissions, which have been constantly increasing over the last 30 years, from 1990 to 2019. Similarly, Bangladesh has also shown a significant increase in CO2 emissions over the years. Bulgaria appears to be taking the issue of CO2 emissions seriously and implementing measures to reduce them over time. In contrast, other countries appear to maintain a relatively constant level of CO2 emissions.

These two line graphs show the evolution of urbanisation over time as well as the relationship between urbanisation and CO2 emissions.

This table compares CO2 emissions per capita for different countries over a 5-year period. This chart illustrates the countries with the highest emissions per person, which could be due to urbanisation and industrialization.

Year	Bangladesh	Australia	Bahrain	Burundi
2015	1.33	18.51	25.22	0.31
2016	1.33	18.55	24.13	0.33
2017	1.37	18.42	23.49	0.37
2018	1.39	18.02	23.2	0.46
2019	1.47	17.71	24.9	0.45

Table 1:CO2 emission per capita

This analysis shows Bahrain had the highest CO2 emissions per capita over the five years, while Burundi had the lowest CO2 emissions per capita over the five years. Australia shows a slight decrease in CO2 emissions per capita over the years from 2015 to 2019.

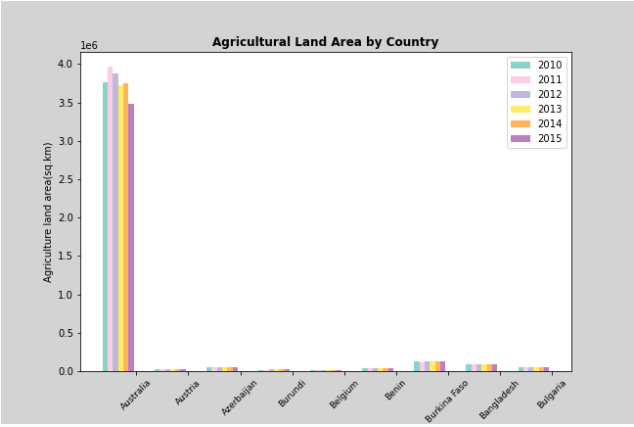

Figure 4:Agriculture Land Area

This bar chart presents the agricultural land area of several countries over a period of six years, from 2010 to 2015. Australia has had the highest agricultural surface area over the past six years. This demonstrates that Australia has prioritised agriculture and has maintained a high level of agricultural area over time. Belgium and Burundi had the lowest agricultural land area compared to other countries.

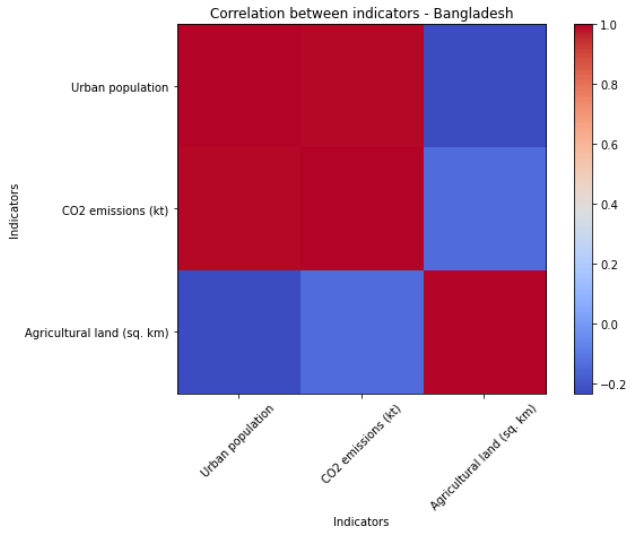

Figure 5:Bangladesh heatmap

However, the heat map in Bangladesh shows a negative correlation between agricultural land area and CO2 emissions, which implies that when the agricultural land area increases, CO2 emissions decrease. This may be due to the use of renewable energy sources for farming activities.

CO2 emissions tend to rise in Bangladesh as the urban population grows.

Figure 6 represents the CO2 emissions by country over a six-year period. Australia has the highest CO2 emissions over a six-year period, whereas Burundi has the lowest CO2 emissions over the same period.

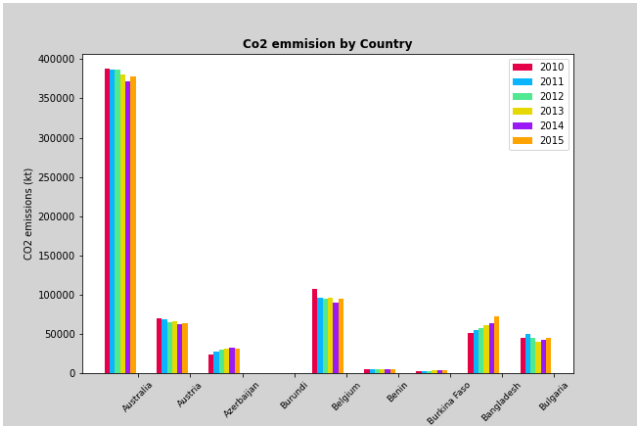

Figure 4:Co2 Emission

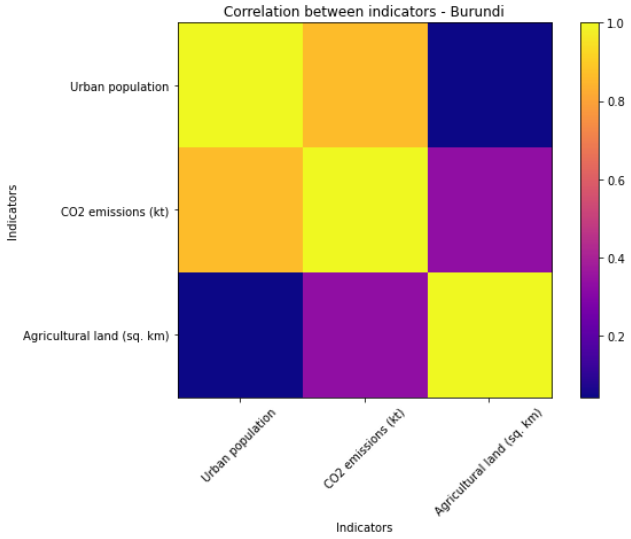

Figure 7:Burundi Heatmap

However, as this heat map shows, CO2 emissions in Burundi have a moderately significant positive relationship with the urban population. There is a weaker relationship between agricultural land and CO2 emissions. However, it is still positive. Even though the relationship is weaker, the agricultural practises in Burundi still slightly contribute to CO2 emissions.