7PAM2000 Applied Data Science 1

Assignment 2: Statistics and trends

Title: Exploring Environmental Indicators: A Comparative Analysis of Selected Countries (Armenia, China, Pakistan, United States)

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Abstract:

This report delves into environmental indicators, focusing on Renewable Energy Consumption, GDP, Arable Land, Greenhouse Gas Emissions, Forest Area, and Population Growth for the years 1990, 2000, 2015, and 2020. The analysis encompasses the countries Armenia, China, Pakistan, and the United States. The objective is to uncover interrelations between these factors and draw insights into each country's environmental impact.

GitHub Repository:

https://github.com/jamalnasir551/Assignment-2-Statistics-and-trends.git

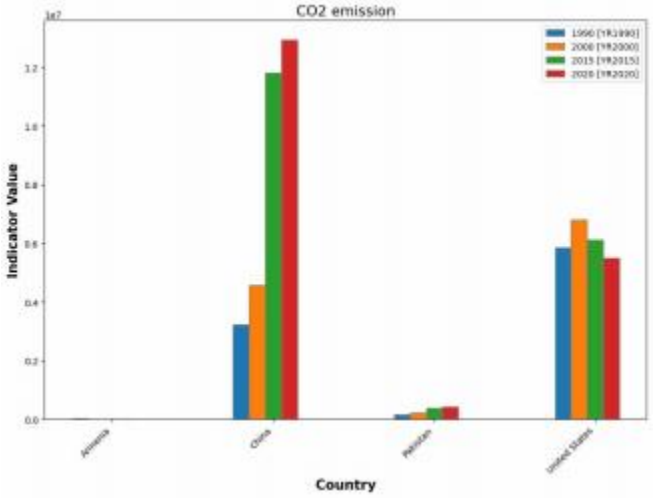
Exploring Environmental Indicators: A Comparative Analysis of Selected Countries (Armenia, China, Pakistan, United States)

Introduction:

The investigation spans multiple indicators to comprehend the intricate relationships affecting climate change. The selected countries represent diverse continents, providing a global perspective on environmental trends. The chosen indicators offer a comprehensive view of each nation's environmental landscape.

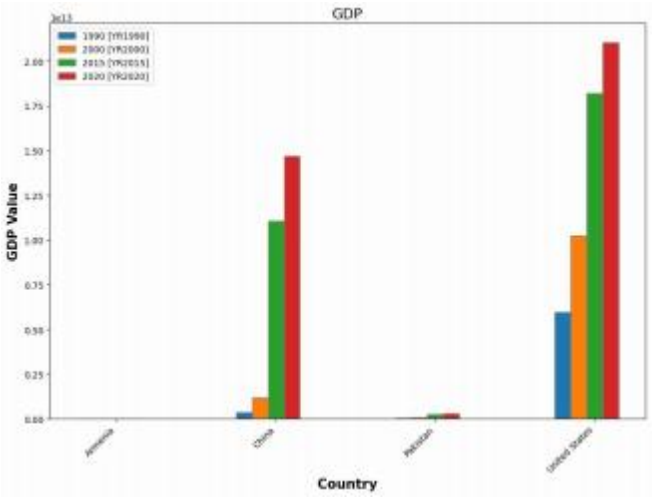
Greenhouse Gas Emissions:

A bar graph illustrates total greenhouse gas emissions from 1990 to 2015 in five-year increments. China emerges as the leading producer, with a notable upward trend. The correlation heatmap for China reveals a connection between urban population growth, economic prosperity, and increased greenhouse gas emissions.



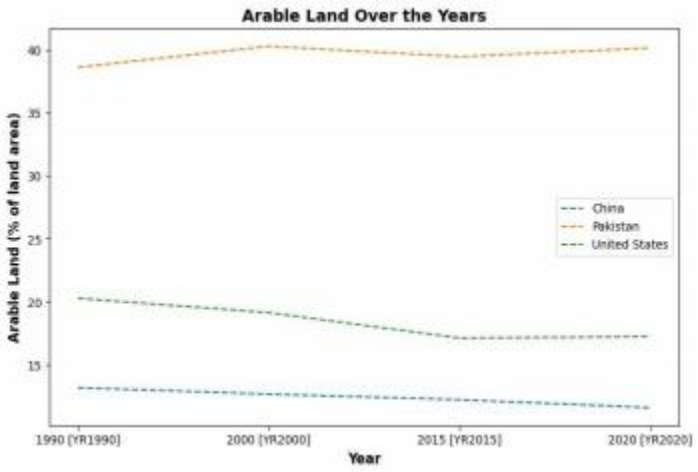
GDP Analysis:

The GDP plot showcases distinctive trends for each country. Armenia and Pakistan exhibit lower GDPs, while the United States and China consistently top the charts. The analysis correlates GDP with other factors, unraveling patterns that signify economic growth.

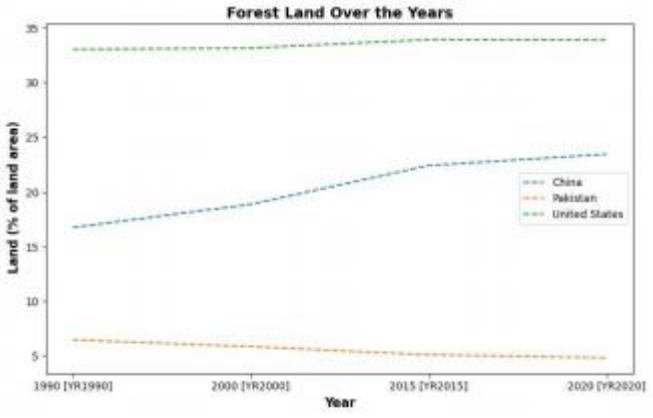


Arable and Forest Land:

Arable land trends reveal a decline in America over the years, indicating potential challenges in agriculture.

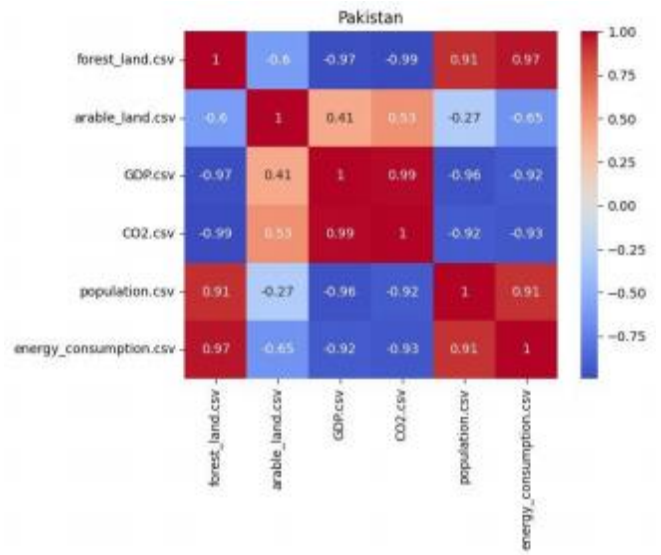


Conversely, forest land in Pakistan experiences a consistent reduction, raising concerns about deforestation. Correlation heatmaps offer insights into the complex relationships between these factors and other indicators.



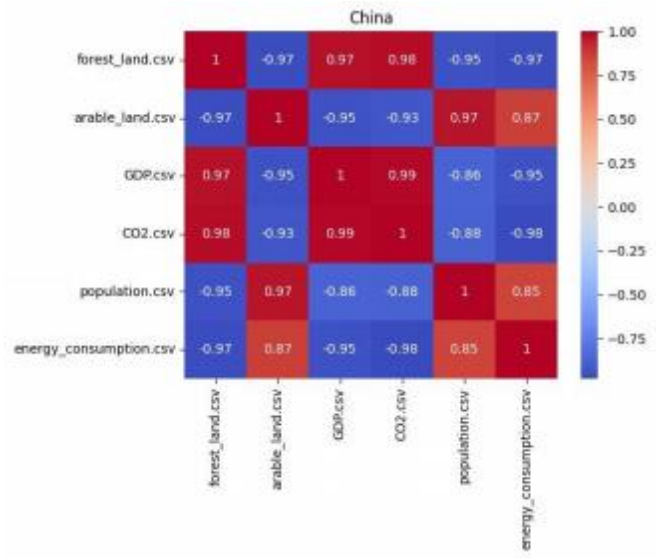
Correlation heatmaps Analysis:

Correlation heatmaps offer insights into the complex relationships between these factors and other indicators.

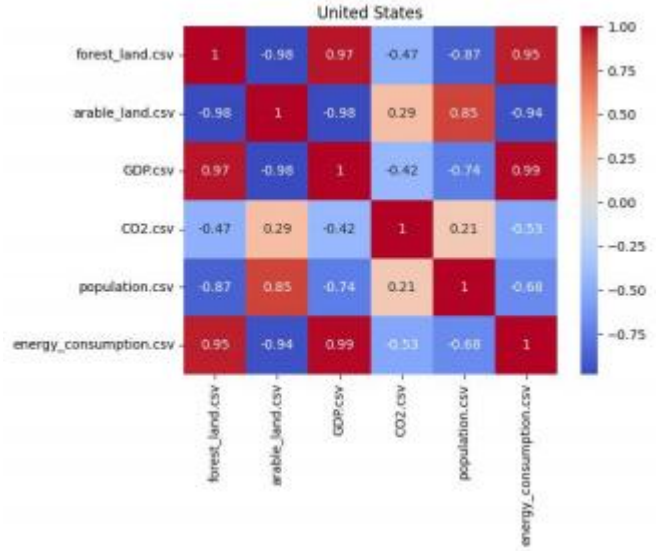


The heat map of Pakistan suggests an inverse correlation between forest cover and GDP, indicating that regions with more forests tend to have lower economic output. This observation could be attributed to factors such as a reliance on traditional or less economically intensive land use practices in forested areas, impacting overall regional economic development.

The heat map of Pakistan reveals a robust correlation between population density and energy consumption, suggesting that areas with higher population concentrations tend to exhibit increased energy demand. This correlation could be influenced by greater urbanization and industrial activities in densely populated regions, contributing to higher energy consumption levels.



The heat map of China indicates a weak correlation between forest land and population, suggesting that population distribution does not closely align with forested areas. In contrast, there is a strong correlation between arable land and population, implying that areas suitable for agriculture are more densely populated. This observation may reflect the significance of arable land for sustaining and supporting larger populations in China.



The low correlation between population and forest land in United States suggests that densely populated areas may not necessarily coincide with extensive forested regions. This could be due to various factors, such as urbanization, land use patterns, and economic activities that might dominate densely populated areas, leading to a lower correlation with forest cover. The observation implies that population distribution and forested areas are relatively independent variables in the context of the United States.

Conclusion:

The findings underscore the importance of understanding interconnections between economic prosperity, population growth, and environmental impact. Each country exhibits unique patterns, emphasizing the need for tailored environmental policies.