

CLIMATE CHANGE, AGRICULTURE AND WEST AFRICA

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ABSTRACT

Climate Change is the perennial shift in weather patterns due to the increased human, industrial and economic activities. This has led to variations in rainfall patterns, increased temperatures, sea levels and other natural factors which many scientists have predicted could affect human lives. In a bid to make the earth more conducive for future generations, climate change has been in the forefront of discussions amongst World leaders since the 1970s. The activism to protect the environment has had its focus on reducing the activities that triggers climate change like CO₂ emissions, deforestation, etc. Whilst the developed countries have undergone industrialisation stages and have become prosperous, majority of the countries in Africa are poor with a plethora of natural and human resource to harness. So, the message of climate change may not resonate fervently for nations who need to explore their resources to tap out wealth.

Agriculture employs about 65% of the teeming population in West Africa with a GDP per capita of \$1,783 (ECOWAS 2022). The region's economic prospects depend on agriculture and agricultural programs have led to the increase of agricultural activities which most likely has a counteractive effect on climate change. This research aims to study if the trade off has been worth it as West Africa seeks economic prosperity while paying less attention to climate change.

This analysis studies the relationship between the indicators of climate change as it affects the West African States in the year 2000, 2005, 2010, 2015 and 2019 (due to data availability constraints for the region) with emphasis on Agriculture as it remains the highest employer of labour in the region. The indicators investigated are CO₂ emissions, Agricultural land (% of land area), Agriculture, forestry, and fishing value added (% of GDP), Total population, Population growth and Forest area (% of land area).

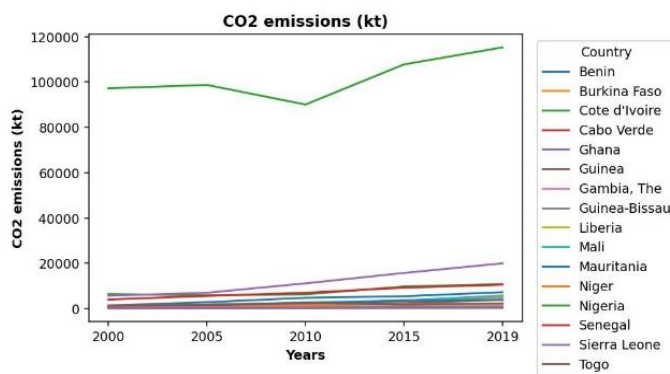


Figure 1

This line graph in *Figure 1* shows an upward trend of CO₂ emissions in all the countries with Nigeria producing the highest level of emissions in the periods under study. Aside experiencing a dip in 2010, it maintains an upward trend throughout the period peaking in 2019.

Similarly, The Total Population size in all the countries burgeoned with Nigeria taking the lead as well as seen in the bar chart in *Figure 2* below:

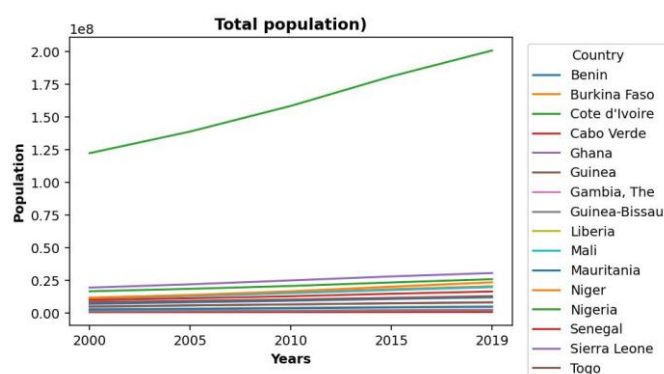


Figure 2

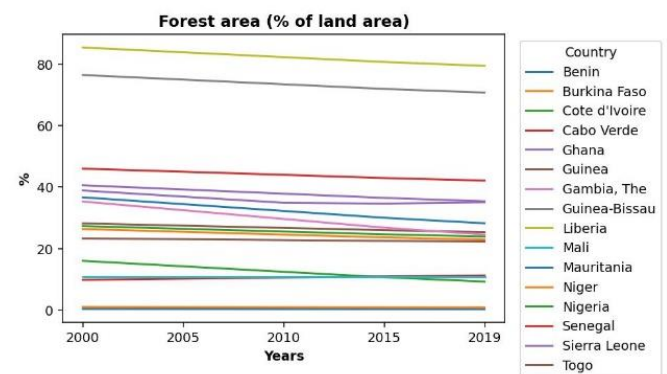


Figure 3

The line graph in *Figure 3* above shows a downward trend in the Forest Area (% of land) for all the countries which suggest that deforestation is thriving in West Africa to accommodate the population growth and increased agricultural activities in the region as seen in the bar graph in *Figure 4* below while disregarding the effects these may have on the environment.

Again, Nigeria leads the pack moving from 72.67% Agricultural Land (% of land area) in 2010 to 76.07% in 2019.

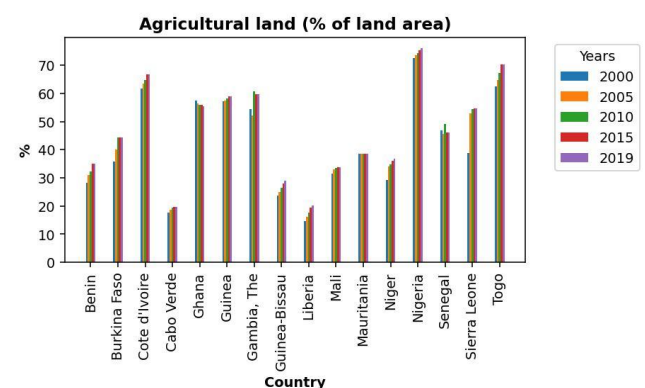


Figure 4

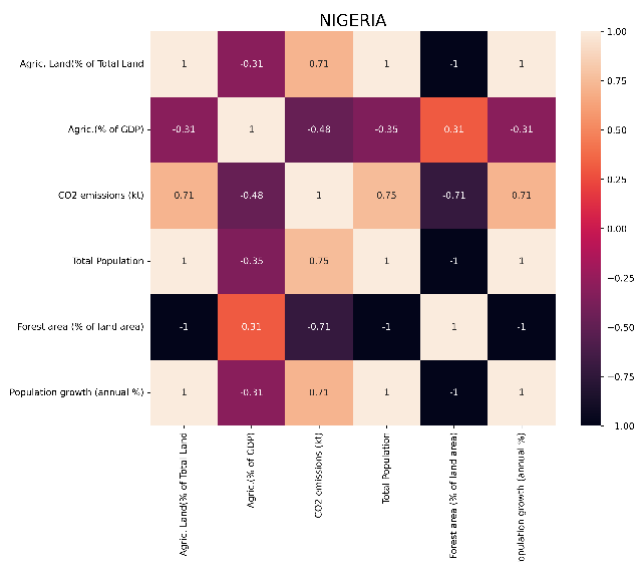


Figure 5

The correlation heatmap of Nigeria above shows a strong negative correlation between CO₂ emission and Forest Area (% of land), a strong positive correlation between CO₂ and Population growth. There's a perfect negative correlation between Forest Area and Agricultural land (% of land area), a perfect positive correlation between Agricultural land (% of land area) and Population growth.

The correlation numbers confirms that as population is growing, agricultural activities is also increasing at the expense of deforestation which has made it impossible to checkmate CO₂ emissions due to increased human activity.

However, the increased agricultural activities have not translated into an increase in the agriculture component of the GDP in most of the countries with only Benin, Cote D'Ivoire, Guinea, Mali, Niger, Nigeria, and Sierra Leone being the exemptions as they improved on the year 2000 values in 2019 as observed in the bar chart below.

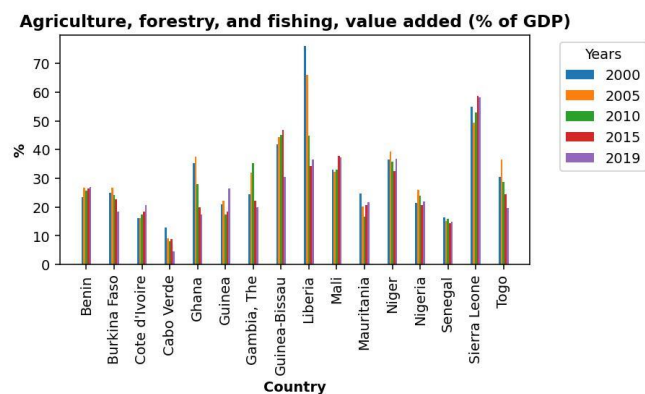


Figure 6

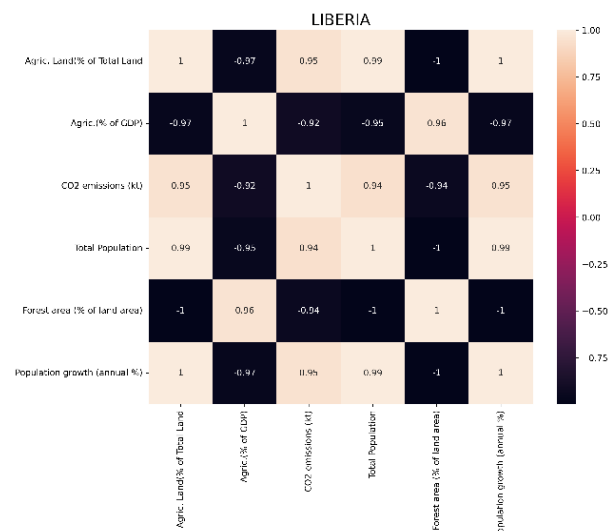


Figure 7

Liberia has no justification for its unchecked deforestation as its Agriculture component of the GDP dropped from 76.07% in 2000 to 36.44% in 2019. The heatmap above shows a strong negative correlation between Agriculture component of the GDP and Agricultural land (% of Total Land) proving the inverse relationship.

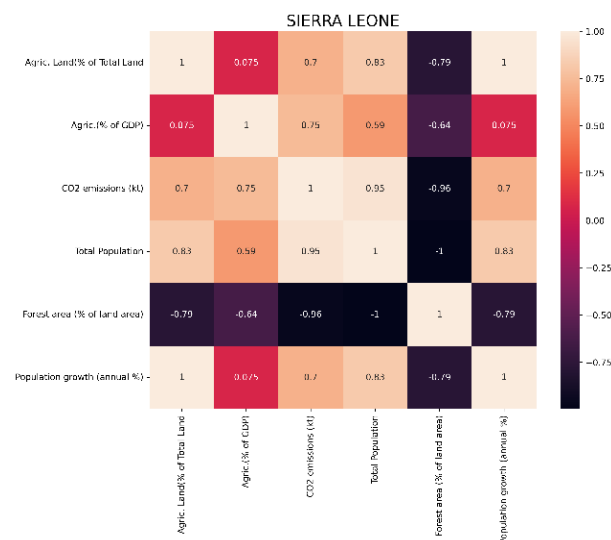


Figure 8

Even though, Sierra-Leone consolidated on the agriculture component of its GDP, the heatmap above shows a weak correlation between the agriculture value added (% of GDP) and the Agricultural land (% of land area). This does not suggest its increase agriculture activities gave rise to the increased agriculture value to the GDP.