Agriculture and Carbon Emissions Project

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[Room 6]

Problem Statement

The goal is to measure disproportionate effects of climate change using a food security index coupled with Greenhouse Gas (GHG) emissions by country through time, while comparing greenhouse gas emissions and sectors to view which is most impactful.

- Research Question: When comparing the United States and Ghana, if carbon emissions aren't reduced, would agricultural productivity decrease?
- Alternative Hypothesis: There is statistical significance between agriculture and carbon emissions between the United States and Ghana.
- Null Hypothesis: There is no statistical significance difference between agriculture and carbon emissions between the United States and Ghana.

Data Collection and Sources

- Data was collected from some of the following sites:
  - World Bank Gas Emissions
  - Food security data by FOA https://www.fao.org/faostat/en/#data/FS
  - https://www.kaggle.com/usda/crop-production
  - https://data.worldbank.org/indicator/AG.LND.AGRI.ZS?view=chart

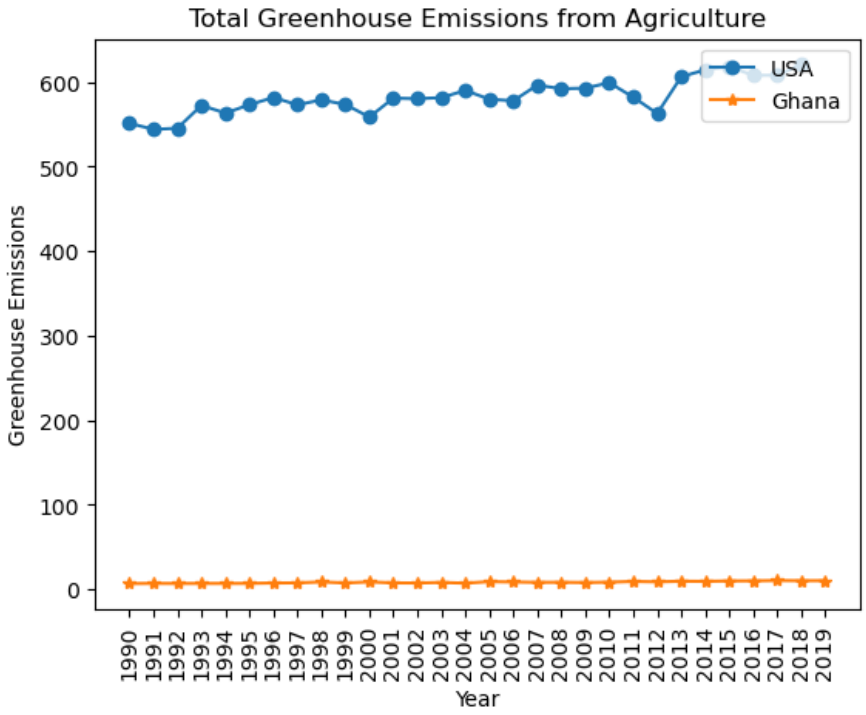
- Key data points:
  - Historical Emissions
  - Historical Land Usage
  - Timeframe (years)
  - Food Security
  - Crop Production

  - Sector

GHG Emissions from Agriculture

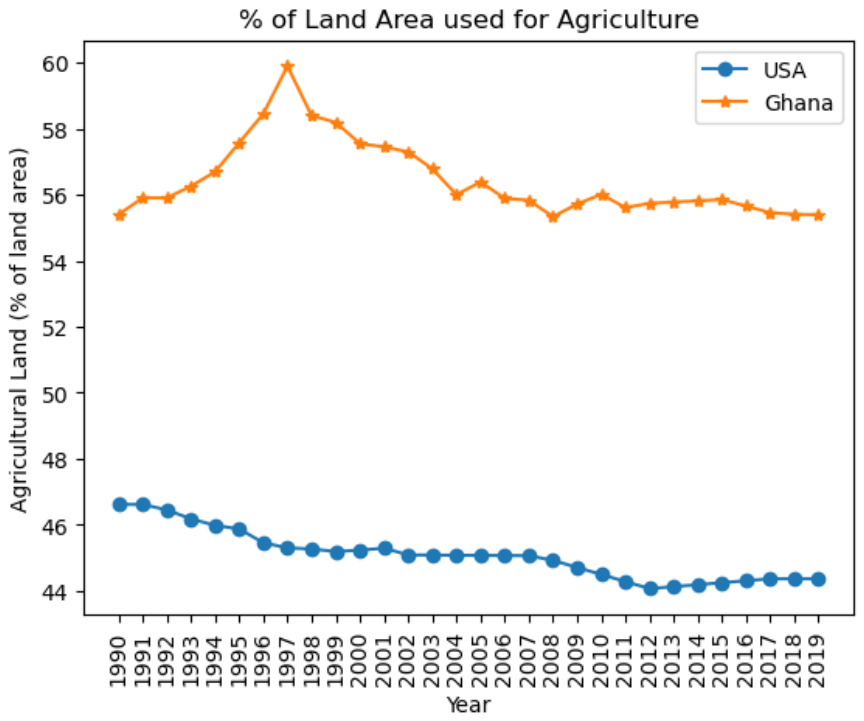
- What is the GHG emissions trend at a yearly rate when comparing the United States and Ghana?
- Between the US and Ghana, which country emits the higher level of GHGs?

- What year between Ghana and the US produced the highest GHG emissions?

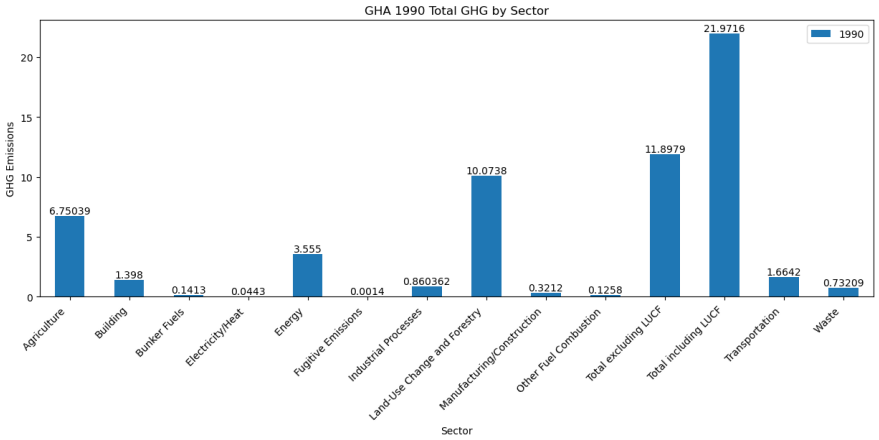


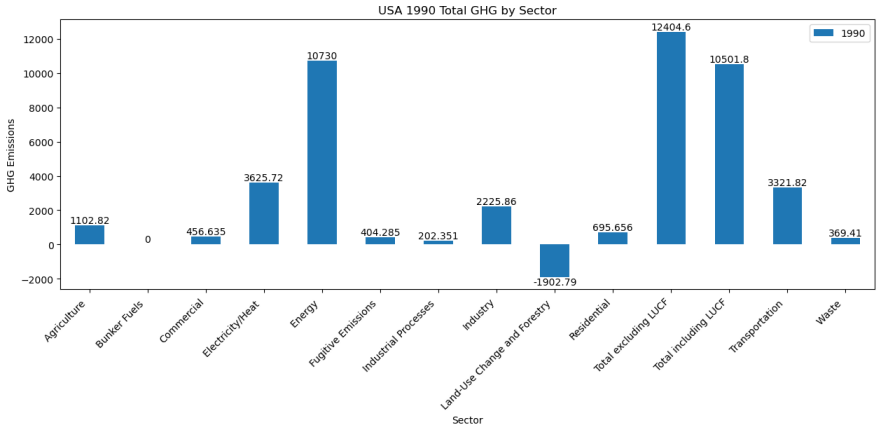
Land Area Used for Agriculture

- How do the US and Ghana compare in land area usage for agriculture over the years?

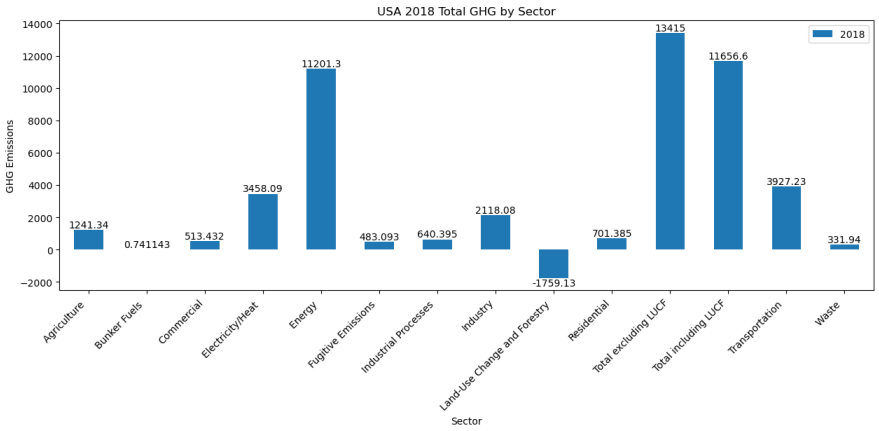


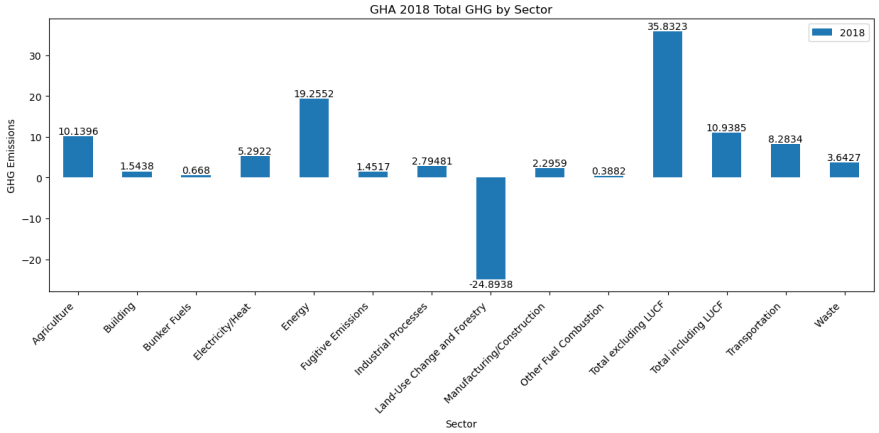
1990 Total GHG by Sector Comparison



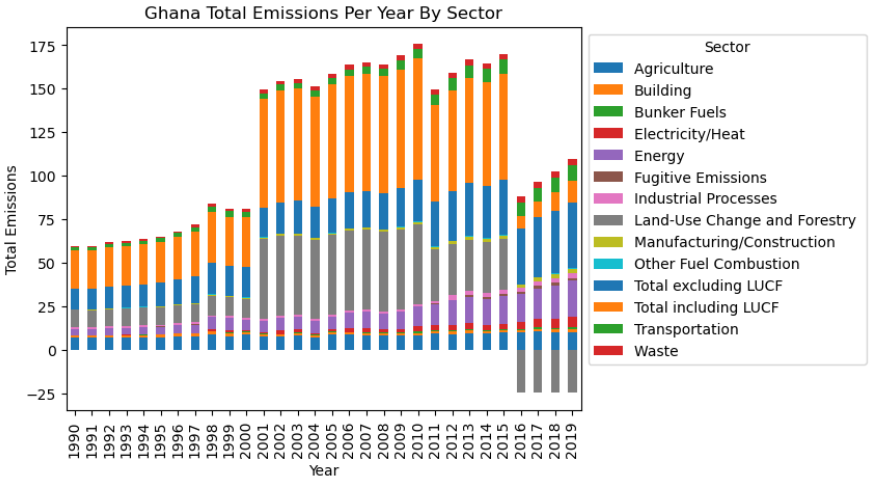


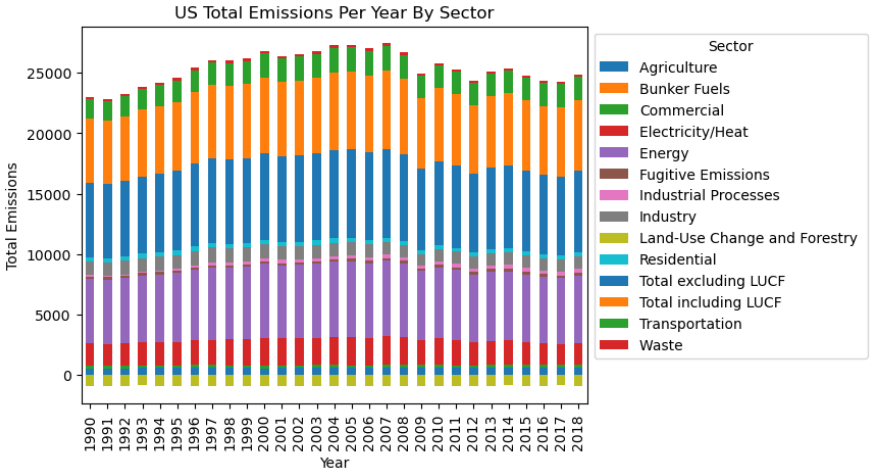
2018 Total GHG by Sector Comparison





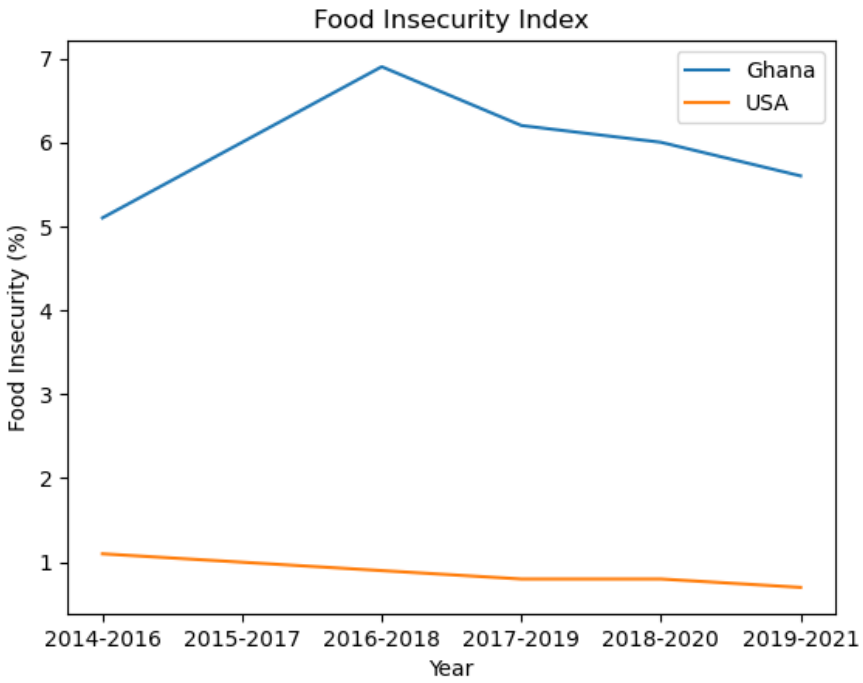
Total Emissions Per Year by Sector Comparison





Food Insecurity Index

- How does the Food Insecurity Index compare between Ghana and the US within the presented time frames?



Conclusion

- The relationship between greenhouse gas emissions and food security in Ghana is complex and multifactorial. Carbon emissions have indirect effects on food security, such as changing weather patterns, extreme weather events, and impacts on crop production. Quantifying the exact proportion of food security that can be attributed solely to greenhouse gas emissions is challenging.
- Changes in land use for agriculture, droughts, flood events all contribute to food security, however it's important to note food security in Ghana is influenced by multiple factors beyond carbon emissions like infrastructure, policies and socioeconomic factors. Addressing food insecurity requires an approach that takes both indirect and direct effects on carbon emissions.