

## **ANALYSIS OF CLIMATE CHANGE DATA**

This study offers a thorough analysis of climate change for many nations over time. Several indicators are taken into account, and during the analysis of this report, the interrelationships of the following elements on climate change were looked into. The analytical visualization charts are frequently taken into consideration. According to the results of the present study, developing nations will be the ones that are most negatively impacted by climate change. Agriculture, food production, and water supplies are at risk as a result of its effects, which include rising ocean levels, altered precipitation patterns, altered temperature patterns, and an increase in environmental disasters.

**GitHub Link:** [https://github.com/AnsiaNijas/ADS1Assignment\\_2](https://github.com/AnsiaNijas/ADS1Assignment_2)

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## Introduction

Eight countries from different continents were chosen for this investigation, and the correlations between the variables arable land, agricultural land, forest area, forest depletion, agriculture irrigated land, agriculture forestry & fishing, and CO2 emission by liquid & solid fuels were all assessed. After the study, the investigation into the causes turned up significant correlations between the variables.

## Visualizations

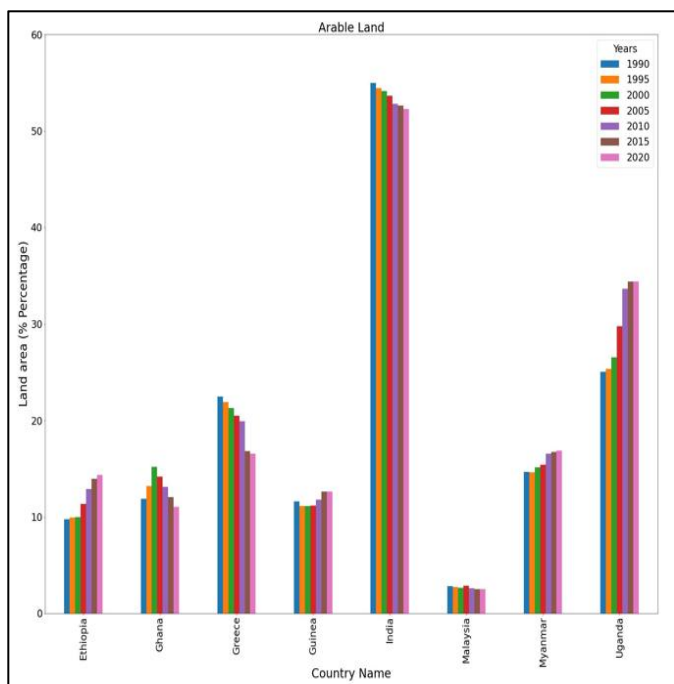


Figure 1a

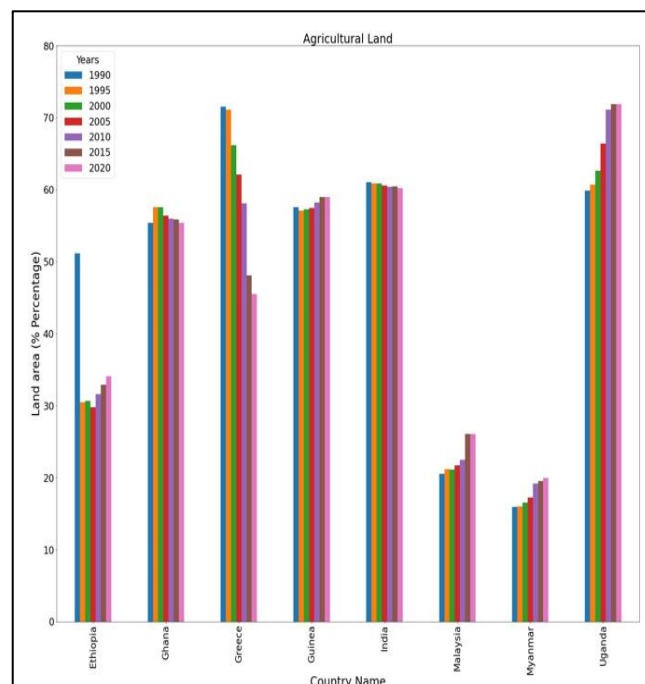


Figure 1b

The bar graphs depicted in Figure 1a & Figure 1b shows that the Percentage of Arable Land area and Agricultural Land area for different countries from 1990 to 2020. India is the country with the highest proportion of arable land, however from 1990 to 2020, arable land will continue to fall as India's agricultural land area, shown in Figure 1b, diminishes. Comparing Malaysia Agricultural Land area to its Arable Land area during the past three decades, Malaysia has the least Arable land area, as pastureland makes up the majority of the agricultural land in Malaysia rather than cultivating transient crops.

In comparison to its arable land area, Ethiopia's agricultural land area has drastically declined during the previous three decades. Greece has the largest amount of agricultural land among all the nations represented in Fig. 1b, but the land area has been decreasing over a period of three decades. In contrast, arable land increases in Uganda as agricultural land exhibits an upward tendency over a period of three decades. The bar graphs for agricultural land area and arable land area are closely related since they are expanding or contracting equally.

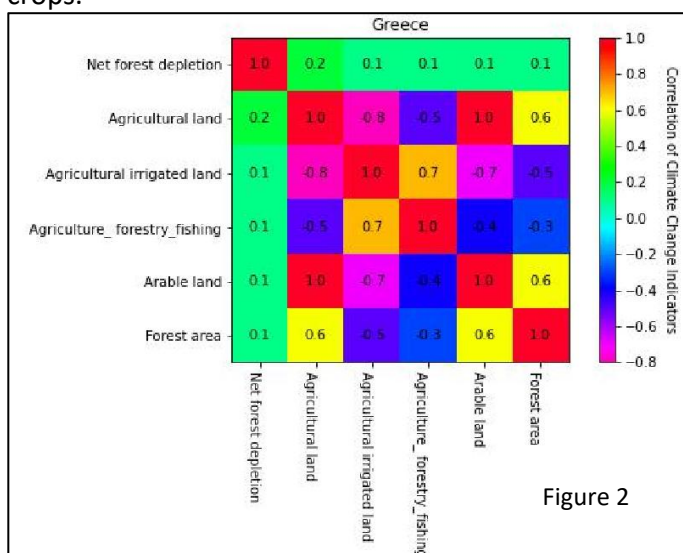


Figure 2

The correlation Heat map for Greece based on several climate change indicators is shown in Figure 2 on the left side bottom. The percentage of arable land is positively associated with the percentage of agricultural land. Since the irrigation infrastructure improves fish farming, agricultural land area is 70% associated with agriculture forestry fishing. By a number of mechanisms, such as the water cycle, soil conservation, and influencing regional climates, forests play a significant role in the development of sustainable agriculture, as can be seen from the heat map, which shows a slight correlation between agricultural land and arable land with forest area.

This table displays a statistical study of the CO<sub>2</sub> emissions caused by the consumption of different countries' liquid and solid fuels from 1990 to 2020. Lower average values for skewness and kurtosis across all nations indicate moderate skewness and kurtosis. India and Ghana are the two nations with the biggest CO<sub>2</sub> emissions from solid sources, respectively. When CO<sub>2</sub> emissions rise, they will have a direct impact on climate change, which will cause serious deforestation and land degradation. Ghana's standard deviation is zero, which indicates that data are grouped around the mean and that liquid fuels have a generally low CO<sub>2</sub> emission level.

We can infer from this analysis that the use of liquid fuel results in greater CO<sub>2</sub> emissions than that of solid fuel. Except than India, all other country's CO<sub>2</sub> emissions are from the burning of liquid fuels.

Counties	CO <sub>2</sub> emissions	Average	Std. deviation	Skew	Kurtosis
Ethiopia	Liquid	77.5	40.5	-0.3	1
	Solid	1.6	3	1.6	0.7
Ghana	Liquid	83.2	40.4	-1	0.3
	Solid	0.1	0.1	1.3	-0.2
Greece	Liquid	40.6	17.5	-1.9	1.5
	Solid	31.3	13.9	-1.7	1.1
India	Liquid	23.6	10.5	-1.7	1.2
	Solid	58.9	25.4	-1.9	1.5
Malaysia	Liquid	42.1	22.5	-0.5	-0.4
	Solid	13.2	9.9	0.4	-1.1
Myanmar	Liquid	49.9	23.5	-1.1	0.8
	Solid	6.2	5.6	0.8	-0.4

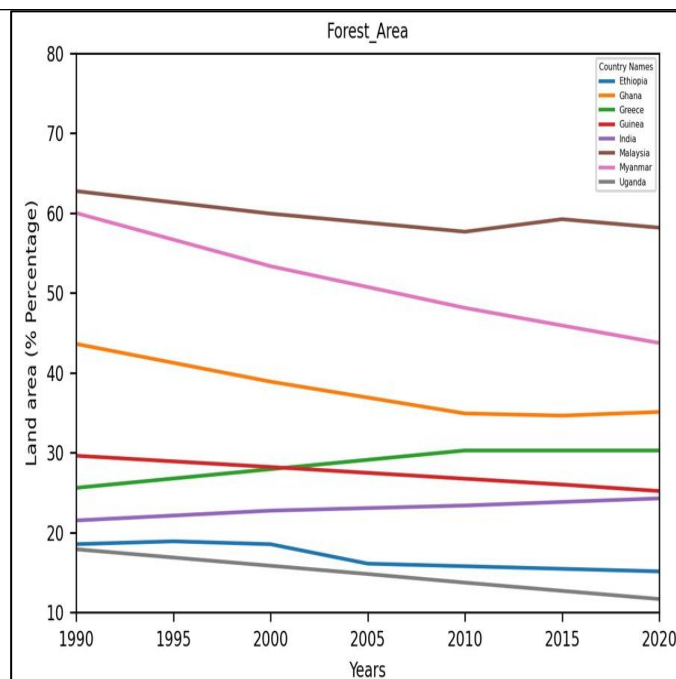


Figure 3a

The analysis of forest area and forest depletion for several countries over a 3 decades is shown in the line graph above. Except for India, almost every country has a downward trend in the reduction of forest area. India has a constant increase in forest area and no change in the depletion of forest over these years. As the percentage of forest depletion rises, the percentage of forest land in Myanmar has significantly decreased. For the past ten years, Uganda's forest area has progressively shrunk, although this has had no discernible effect on the percentage of the forest area. The expansion of agricultural land is positively influenced by Uganda's growing forest cover.

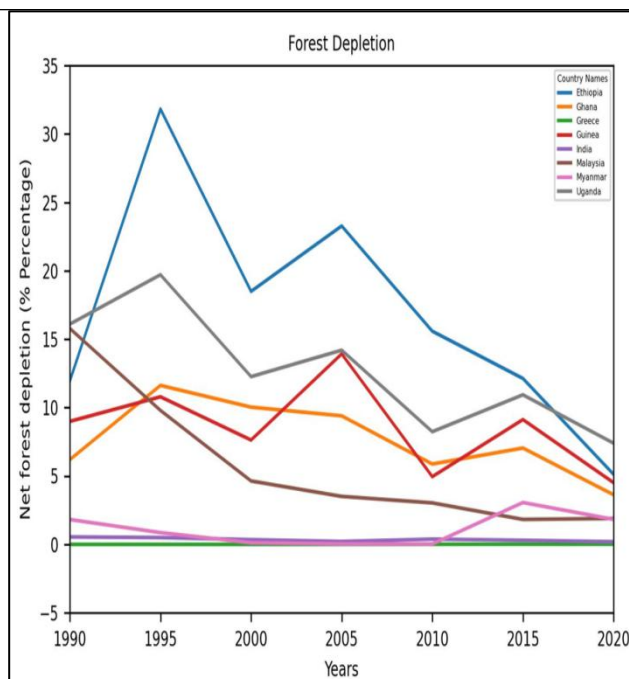


Figure 3b

The depletion of forests is declining across all nations. Ethiopia's forest depletion rose uniformly between 1990 and 2000 before gradually declining over the following two decades. Malaysia significantly lowers the rate of forest depletion, protecting the forest area. India and Greece are the only two nations preventing the loss of forest land through lowering CO<sub>2</sub> emissions, halting deforestation, and other measures.