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**AIM INFOSYS CAPSTONE PROJECT**

**THEME: CLIMATE CHANGE AND SOCIAL CONFLICTS – TO UNDERSTAND CONFLICT AND SOCIETIES AND FOSTER PEACE.**

**TOPIC: IMPACT OF DROUGHTS AND WILDFIRES ON SOCIAL CONFLICTS IN AFRICA: A DATA-DRIVEN ANALYSIS**

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INTRODUCTION

Climate change has become a pressing issue globally for communities, organizations, and countries. The Intergovernmental Panel on Climate Change (IPCC) has warned that human-induced pollution has intensified extreme weather events like heat waves, torrential rain, droughts, and tropical cyclones. Natural resource scarcity has led to geopolitical disputes between governments and regions, as many resources, such as oil, gas, minerals, and water, are essential to economic growth, national security, and livelihood. Emissions of greenhouse gases due to global economic activity have caused atmospheric CO2 levels to rise by 50%, contributing to climate change vulnerability (Kaplan and Ramanna, 2021).

Alam *et* al., (2025) reported that the imbalance in the ecosystem and the scarcity of resources, including water, caused by climate change has resulted in competition for scarce resources like water, food, and energy, leading to conflict between and within countries. According to Mackay *et* al. (2024), natural disaster can be regarded as a traumatic experience, especially in developing regions such as those in many places across Africa where they lead to economic vulnerabilities, difficulty in accessing resources and poorly perceived institutional performance. These conditions often result in increased competition for resources between groups of individuals which, in turn, may contribute to the erosion of interpersonal trust. Environmental changes, such as rising sea levels and droughts, force migration, staining resources and contributing to social tension. Social inequality caused by climate change also leads to geopolitical conflict (Mackay *et* al., 2023). Vulnerable communities disproportionately affected by climate change experience heightened inequalities, and foster conditions ripe for unrest and conflicts. Nations may engage in competition over strategic resources as climate-induced scarcity becomes more pronounced (Klare, 2020). In brief, climate change amplifies securities risks, economic challenges, and resource competition, creating intricate connections with geopolitical conflicts.

JUSTIFICATION OF THE STUDY

This study is justified because it addresses a critical knowledge gap on the relationships between climate – induced disasters (droughts and wildfires) and social conflicts in Africa, providing valuable insights for policymakers and stakeholders to develop effective strategies for conflict mitigation and peace-building in the face of climate change.

OBJECTIVES

1. To investigate the relationship between droughts, wildfire and social conflicts in Africa.
2. To identify the most vulnerable regions and communities to climate–induced disasters and conflicts.
3. To analyze the impact of climate change on social stability and conflict dynamics.
4. To provide insights for policymakers and stakeholders to develop effective strategies for conflict mitigation and peace-building.

METHODOLOGY

Source of the Datasets: The dataset was downloaded from the EMDAT site (<https://www.emdat.be/>). It is a site that holds datasets on natural disasters.

Package or Software used for the Analysis: The software used is python jupyter notebook embedded in anaconda.

Data Cleaning: The dataset that was downloaded from the EMDAT site was saved in a folder called python scripts. That way, the jupyter notebook in anaconda would be able to read it. The dataset was cleaned using programming language with the use of codes. Firstly, I imported the libraries which are numpy and pandas as np and pd respectively. These made the dataset to be displayed in array (dataframe). Being that the dataset is in excel sheet, it was read as df = pd.read\_excel(('public\_emdat\_custom\_request\_2025-05-13\_5a50590e-487c-47ce-bd16-cc79e0784121.xlsx'). df.head() displayed the first five(5) rows with the columns. df.shape showed the number of rows and columns that are contained in the dataset. I checked for the columns that are empty and the ones that are not up to 30 – 50% filled and dropped them using the code; df= df.dropna(axis='columns', how='all'). For the very important columns are can not be dropped, I filled them up the zeros. All the unique columns that could not be dropped using df= df.dropna were removed by using indexing, e.g; column\_number\_to\_remove = [19, 34, 35, 36, 37, 38, 39]

df.drop(df.columns[column\_number\_to\_remove], axis = 1, inplace = True). The second dataset was imported as read as excel file; df2 = pd.read\_excel('JME\_Regional-Classifications.xlsx'). After it was cleaned, it was merged with the initial dataset; df1 = pd.merge(left=df, right=df2, left\_on = 'ISO', right\_on = 'ISO Code', how = 'left')

df1 = df1.drop(columns = 'ISO Code'). The % of the ‘Total Affected’ per Subregion was calculated using; count\_by\_subregion['Percentage'] = (count\_by\_subregion['Total Affected']/sum(count\_by\_subregion['Total Affected']))\*100. The % of the ‘Total Affected’ per Country was also calculated using the codes; count\_by\_country = df.groupby('Country').sum().sort\_values(by= 'Total Affected', ascending=False).reset\_index()

count\_by\_country['Percentage of Total Affected']= count\_by\_country['Total Affected']/sum(count\_by\_country['Total Affected']). The libraries such as plotly.express, matplotlib.pyplot and seaborn for plotting of charts were imported as px, plt and sns respectively. A donut and pie chart were plotted which showed the percentage and number of persons affected per UN Subregion, where different colours represents the Subregions. A map chart was also used to show the subregions in Africa that were affected. A scatter plot was used to show the % of total affected per country. A multivariate bar chart was plotted which displayed countries with their disaster subtype and their income level. A scatter\_plot chart was used to visualize the CPI of different countries, where colour was used for each of the country’s identity.

RESULT DISCUSSION

From my findings, it is evident that the Eastern African Subregion has the highest percentage of total affected (13.8%), as the total number of persons affected are 230,551,996, followed by the Western African Subregion (5.16%, total number of people affected = 86,400,127). The African Subregion which has the lowest percentage of total affected is the Northern Africa (1.07%) with the total number of people affected to be 17,921,597. The most affected African country is Ethopia, which has the % of total affected to be 4.462700%. The % of total affected in Nigeria is 1.141617%. The least affected country in Africa is Gambia, which has 0.02933734% of total affected. Eastern Africa experiences frequent droughts due to its semi-arid and arid climate zones (e.g., Ethopia, Somalia, Kenya). This region is the part of the Horn of Africa, which is highly vulnerable to climate variability like El Niño and La Niña. Western Africa also experiences drought, particularly in the Sahel zone. Northern Africa is mostly desert, with little human settlement and agricultural activities. Eastern and Western Africa rely heavily on rain-fed agriculture and pastoralism, making them more vulnerable to resource scarcity during droughts, leading to conflicts over water, land and grazing rights. The higher % of total affected in the Eastern Africa could have occurred as a result of high population densities in the rural areas, increasing the competition for resources. In contrast, Northern Africa population is more urbanized, and rural communities are sparser, reducing competition and social friction during disasters. Being that most African countries are undeveloped, there are classified as low-income countries. When natural disasters such as droughts and wildfires sets in, the consumer price index (CPI - which measures the average cost of basket of goods and services consumed per household) of such region or country deteriorates. This leads to social instability. This is in agreement with the findings of Mackay *et* al. (2024), which states that Natural disaster can be regarded as a traumatic experience, especially in developing regions such as those in many places across Africa where they lead to economic vulnerabilities, difficulty in accessing resources and poorly perceived institutional performance. From the research findings of Cullen, K.A. (2023) in the Andes region, vulnerability and exposure to drought are shaped by high rates of socioeconomic inequality, urbanization, and economic reliance on water-intensive industries such as mining and agriculture. Drought in the region has historically led to drinking water shortages for humans and livestock, crop failure, outbreaks of vector-borne diseases, electricity shortages from declines in hydropower generation, forest fires, and heat waves (Poveda *et* al., 2020).

CONCLUSION AND RECOMMENDATION

CONCLUSION: The variation in the impact of droughts and wildfires on social conflict across African subregions reflects complex interplays of climate, livelihoods, governance and vulnerability. While Eastern Africa bears the highest burden due to its ecological fragility and socio-political context, comprehensive, region-specific strategies rooted in resilience, governance and sustainable development can reduce these risks significantly.

My recommendation includes the following:

1. Climate-Resilient Infrastructure: Invest in climate-resilient infrastructure, such as water management systems and early warning systems, to mitigate the impacts of droughts and wildfires.
2. Conflict-Sensitive Climate Adaptation: Develop climate adaptation strategies that take into account the potential for conflict and displacement, ensuring that interventions do not exacerbate existing tensions.
3. Community-Based Initiatives: Support community-based initiatives that promote cooperation, trust, and resilience in the face of climate-related disasters.
4. Data-Driven Decision Making: Leverage data analysis and monitoring to inform decision making and response strategies, enabling more effective and targeted interventions.
5. Multi-Stakeholder Collaboration: Foster collaboration among governments, international organizations, civil society and local communities to address the complex relationships between climate change, natural disasters and social conflicts.
6. Peace-building and Conflict Resolution: Integrate peace-building and conflict resolution strategies into climate change adaptation and disaster risk reduction efforts, promoting sustainable peace and stability in vulnerable regions.

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