STRENGTHENING SOCIETAL RESILIENCE FOR SUSTAINABLE DEVELOPMENT IN AFRICA IN A POST COVID-19 ERA: THE CASE OF RURAL COMMUNITIES IN THE NORTHERN SAVANNA ECOLOGICAL ZONE IN GHANA

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Introduction and Background

- Sustainable development: humankind co-existing with nature - balancing conservation, livelihood and economic development to guarantee for quality of human life without adversely affecting other components of the environment.
- Africa has made notable progress in the last three decades in terms of life expectancy, school enrolment, and carbon emissions (World Bank, 2021
- However, rapid population growth, urbanization, informal land occupation and poverty are among the key drivers of exposure and vulnerability across African countries. By 2030, up to 118 million extremely poor people in Africa, living on less than $1.25 a day, will be exposed to cyclones, drought, floods, earthquakes, extreme heat and extreme weather conditions (World Bank, 2021).
- Sub-Saharan African (SSA) countries have shown limited financial and institutional capacity for effective adaptation to reduce exposure and vulnerability. As a result, many are among the most exposed and vulnerable in the world (IMF, 2016).
- A second major factor accounting for the vulnerability in SSA countries like Ghana is climate change, especially in most rural communities.
- The most common disasters in Africa are triggered by hydro-meteorological or climatological hazards.

Introduction and Background

- About 90% of all natural disasters in Africa are weather and climate driven and are predominantly droughts, floods, storms and cyclones (WHO, 2021).

- Between 80-90% of all documented disasters from natural hazards during the past 10 years in the continent have resulted from floods, droughts, tropical cyclones, heat waves and severe storms (WHO, 2021).

- Rising temperatures and rainfall volatility are expected to increase the frequency and severity of these disasters, thereby impairing agricultural productivity.

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- Agriculture is expected to suffer from declining yields and reduced arable land, while hydropower generation could also be disrupted. Rising sea levels and environmental degradation will likely generate significant relocation costs and hamper tourism (IMF, 2016).

2. Study Location - the Northern Savanna Ecological Zone (NSEZ) in Ghana

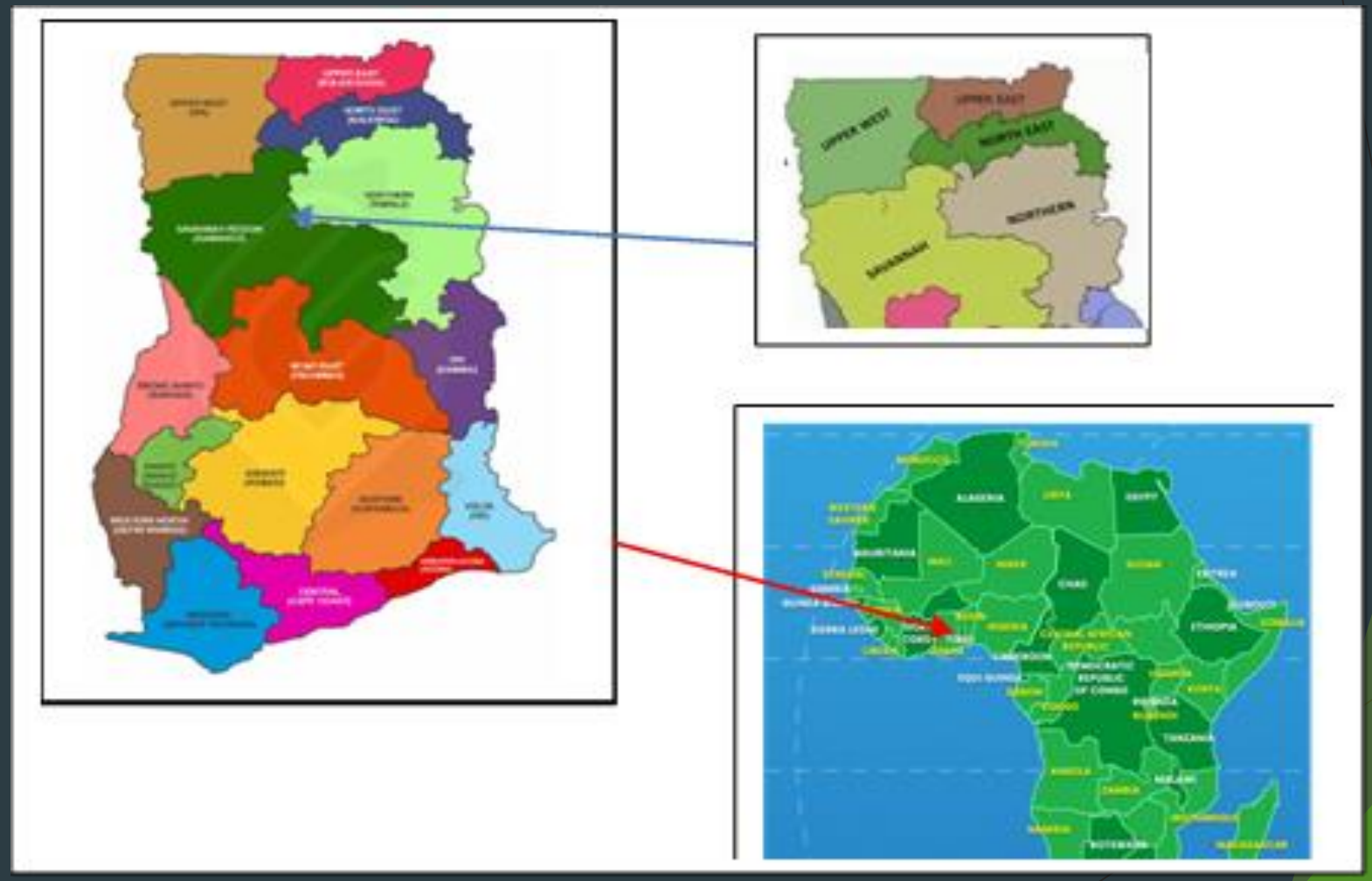
2.1 Key Physical Characteristics of the NSEZ

- The Northern Savannah Ecological Zone (NSEZ) is lies north of the eighth (8th) parallel1. It is about 130,262 km^2 and represents 54.4% of Ghana's total land size.
- It is made up of the five (5) Northern Regions (Upper East, Upper West, Savannah, North East and Northern regions). The zone shares boundaries with Burkina Faso to the North, Togo to the East, Côte d'Ivoire to the West (see Figure 1).
- The NSEZ is relatively flat and undulating in nature and it possible and easy to undertake different type of development ranging from mechanized agriculture to physical developments and other infrastructure (MESTI, 2015).

2.2 Climate Change Impacts in the NSEZ:

- Climate change and its impacts in Ghana, especially in the NSEZ, are seriously affecting agriculture, income and the food security.
- According to MESTI (2015) reiterated that the Evidence of the impact of climate change on agriculture is threatening agriculture and food security MESTI (2015).
- Example of the climatic variations experienced in Ghana and their corresponding time periods are as follows (Cudjoe et al.,(2011):
- January to July 1976: Very hot weather conditions
- 1983–1984: Drought: A year-long of bush fires
- October–December 1989: Very hot weather conditions
- 1991: Lots of rains throughout the year
- 1995: About 40 days of intensive rains
- 2004: Very cold winds experienced during March–April (Easter) and November–January was very cold
- 2005: Cold periods resulting in animal deaths
- August 2006: 1 week of intensive rains
- 2007: Lots of rains in August and September
- In the years 2012 and 2013, there were severe floods in some parts of the capital city of Ghana (Accra) which made some people homeless and there was also the loss of lives.

Figure 1: Location Map of the NSEZ of Ghana



3. Climate Change Impacts in Ghana and the Northern Savanna Ecological Zone

• Climate change impacts in the NSEZ particularly affect cropping systems, domestic food mix, and livelihood diversification and migration patterns. MESTI, 2015 indicated that the NSEZ will continue to be the hardest hit regarding impacts of climate change and this will adversely affect agriculture and fishing, water provision in urban and rural settlements, industrial areas, water transportation, energy provision (hydro-power based energy sources) and general livelihoods among a host of others.

• Climate change related disasters in Ghana are particularly exposing rural people and economic assets to hazards and thereby worsening the ability of vulnerable groups to cope with the impacts.

• Increase in youth out-migration from rural areas to urban centres is a significant phenomenon attributed to climate change. According to Antwi-Agyei and Nyantakyi-Frimpong (2021):

'Most of our youth are migrating to the southern parts of the country because of lack of employment opportunities in this region. The poverty levels are high and general lack of development in this region has compelled our youth to migrate leaving the less able-bodies especially during the lean season. Some of these youth come back during the farming season but a lot of them do not come back, leading to shortages of labour'. (Focus group discussion, Talensi District, September 2019)

Table 1: Farmer-identified adaption practices by gender-Source: Evidence of Climate Change Coping and Adaptation Practices by Smallholder Farmers in Northern Ghana: Source: Philip Antwi-Agyei and Hanson Nyantakyi-Frimpong, 2021

Adaption Practices	Female		Male			Difference	
	%	S. E	%	S. E	%	S.E	T-value
Intensification of irrigation	56.3	0.497	52.9	0.500	3.4	0.043	0.800
Using of indigenous knowledge	74.3	0.438	71.2	0.454	3.1	0.039	0.819
Adjusting planting calendar	82	0.385	83.8	0.369	-1.8	0.033	-0.549
Planting drought tolerant and early maturing varieties of crops	87.4	0.333	85.6	0.352	1.8	0.030	0.611
Migration to work elsewhere	24.8	0.433	24.6	0.431	0.2	0.037	0.040
Crop diversification	92.8	0.259	94.6	0.226	-1.8	0.021	-0.843
Complementing agriculture with non-farm jobs	44.1	0.498	32.4	0.469	11.7**	0.042	2.813
Sustainable land and soil management practices	91	0.287	90.1	0.299	0.9	0.026	0.353
Mixed farming	96.8	0.175	95.5	0.208	1.3	0.016	0.798

*,**, *** denote level of significance of 0.01, 0.05 and 0.1 respectively

Evidence of Climate Change Coping and Adaptation Practices by Smallholder Farmers in Northern Ghana: Philip Antwi-Agyei and Hanson Nyantakyi-Frimpong , 2021

Table 2. Perceived impacts of climate variability and change.

Extreme Climate Events	Illustrative Quotes by Farmers	Impacts Reported by Men	Impacts Reported by Women
• Erratic rainfall	*"We used to receive rains earlier than we are experiencing these days. It is extremely difficult to predict the rains nowadays. The rains do not come early and when they come, you cannot predict for how long. This makes planning farm operations difficult."*	Low crop yield.	Travel far to fetch water for domestic uses. Difficulty in accessing water points for livestock. Our animals suffer. Low crop yield.
• Increased windstorms	*"Gradually, we are experiencing a lot of storms in these communities than we used to have. Nobody knows where these storms are coming from, but they can cause loss or havoc to properties including our farm crops."*	Destruction of trees, crops, animals, farms and houses. When trees are destroyed by windstorms, it causes land degradation and soil erosion.	Destruction of crops and economic trees like dawadawa (*Parkia biglobosa*), shea (*Vitellaria* sp.), and baobab trees. Destruction of animals.

Con’td-Evidence of Climate Change Coping and Adaptation Practices by Smallholder Farmers in Northern Ghana: Philip Antwi-Agyei and Hanson Nyantakyi-Frimpong, 2021

• Increased incidence of flooding	*“Flooding has become a regular occurrence now. We do not have regular rains in these communities and when the rains do finally come, they come in high volumes and this often causes flooding of our farm lands, destroying our crops.”*	Destruction of household properties. Destruction of farm crops	Increase in insects from White Volta. Crops are destroyed. Houses are affected.
• Drying up of water bodies	*“Our water bodies are drying up especially during the dry season. This is not what we inherited from our parents in these villages. Drying up of the water bodies puts lots of stress on our women.”*	Losing livestock because when there is no water, animals travel long distances in search of water and sometimes get lost. No water for home gardening.	Travel far to fetch water for domestic uses. Difficulty in accessing water points for livestock.
• Increase in temperature	*“The weather has become warmer than we used to experience in the 1970s. For instance, the harmattan is now very intense compared to when I was growing up in this village. The nights also become hotter and sometimes you cannot even sleep in the room.”*	Increased in sicknesses (CSM), anthrax and airborne diseases	Increased diseases. Drying of river bodies. Animals cannot get water

4. Floods and Droughts: Most Significant Climate Change Events in the NSEZ

- Three major physical impacts of climate change have been identified in Ghana and these are: temperature change, change in rainfall and sea level rise.

- Drought is triggered by insufficient precipitation over an extended period and tend to have a cyclical pattern.

- Drought is occurring at increasingly higher frequencies over the years due to deforestation, land-cover changes, and unsustainable land management.

5. Rationale for Strengthening the Resilience of Rural Communities in the NSEZ

• Rural communities in the NSEZ are more vulnerable to climate change related disasters than other parts of the country. These disasters often inflict huge human, economic, and social costs, including significant loss of life (IMF, 2019).

• Floods and droughts are the most frequent climate change related disasters in the semi-arid NSEZ. It is more prone to these climate change events than the other parts of the country.

• Agriculture is the most important sector of the rural economy in the NSEZ; it provides employment, income and food.

• Climate change affects agriculture and food security in the NSEZ by altering the spatial and temporal distribution of rainfall and the availability of water, land, capital, biodiversity and terrestrial resources.

5. Rationale for Strengthening the Resilience of Rural Communities in the NSEZ

• Deploying a comprehensive approach to building resilience to enable local communities to benefit from greater access to basic services and peace.

- This paper therefore calls for concrete actions for strengthening the resilience of vulnerable individuals, households and communities, especially in rural areas in the NSEZ by empowering them to withstand, adapt, and quickly recover from stresses and shocks, both from natural and man-made disasters.

• An important option is to support food and nutrition security, protect vulnerable livelihoods and promoting social protection schemes for the most.

6. Vital Resilience Strengthening Actions Required for Rural Communities in the NSEZ

- Undertaking concrete actions to reduce vulnerability of rural communities in the NSEZ in Ghana to climate change impacts in a post-COVID-19 era.
- Addressing the root causes of vulnerability: poverty, unemployment, lack of education, food insecurity, poor access to markets, climate change, etc.
- Providing robust flood and drought resilient infrastructure and basic services in rural communities in the NZEZ.
- Strengthening the innovation capacity of rural farmers and other agricultural stakeholders to effectively combat the increasing climate change impacts.

6. Vital Resilience Strengthening Actions Required for Rural Communities in the NSEZ

- Embedding the climate change strategy in the development planning and investment decision-making processes.
- Building strong and inclusive institutions with clear policies and skilled professional staff to drive the transformation towards a sustainable and resilient future.
- Building strong networks and partnerships to effectively redress the vulnerability of rural communities to climate change impacts in the NSEZ.
- Engaging in strong advocacy for sustainable development and actions for strengthening the resilience of rural households and communities in the NSEZ.

7. An Example of a Concrete Action: LAMDAM in Lambussie District, Upper West Region

- Agriculture is the most important sector in the economies of most African countries. Northern Ghana and UWR are located in one of the harshest climatic zones that is characterised by prolonged drought and floods. The information provided in Figure 1 on the project "Construction of Lambussie Irrigation Dam for Promoting Sustainable Agriculture, Food Security and Improvement of Livelihoods (LAMDAM)" is an example of a concrete action that seeks to build the resilience of rural households and communities in the NSEZ to effectively combat climate change impacts, improve food and nutrition security and enhance their welfare.
- Agriculture is the main source of employment and means of survival for most people in LD. Most smallholder farmers are currently constrained by harsh climate change impacts, unreliable rainfall patterns and a shrinking rainy season and are therefore unable to produce enough food to satisfy their families' yearly needs in a year.
- LAMDAM seeks to provide water throughout the year to enable the population of Lambussie District (LD) in the Upper West Region of Ghana (UWR) to engage in all-year-round agriculture and to promote food security and improvement of livelihoods.
- Since agriculture in the district is mainly rain-fed, recurrent adverse climate change impacts are significantly affecting the livelihoods of the population in a number of ways.
- The nature of the impacts of climate change in LD are economic, social, environmental and food

7.1 Expected project outcomes and benefits

• LAMDAM is expected that the farms of the 2,000 beneficiary smallholder farmers will serve as effective demonstration antennas to another 2,000 farmers plus agricultural extension agents, researchers, and the general public. LAMDAM will allow farmers in LD to more than double their production of vegetables, food crops, animals and fish of high value.

• It will help to increase agricultural yields and give about 4,000 families and empower the population, especially women groups.

• The beneficiary farmers and other stakeholders will be assisted to manage the soil and water resources of the district in a sustainable manner. We shall promote sustainable agricultural practices (irrigation of crops, animal production, fish farming and efficient soil and water resources management), food/nutrition security and improved quality of life practices to benefit about 51,654 people in the district.

• It is expected to create all-year-round food security and economic opportunities for the population, especially smallholder farmers, the youth and women.

• The employment and income opportunities to be created will significantly help to reduce poverty and improve the livelihoods of the target groups and the population of the district.

8.Conclusion

The effects of climate change on the earth's temperature in all zones in Ghana are rising, and rainfall regime has become increasingly erratic, unpredictable and reducing in volume.

- Climate change is the key barrier to increasing agricultural productivity and food security in Ghana and the NSEZ in particular.

- The negative impact of climate change in the agricultural sector is evident from the reduction in yields.

- Clearly, climate change presents a threat to Ghana's ability to attain the Sustainability Development Goals, e.g. SDGs 1 and 2.

- It is therefore essential to implementing cost-effective climate change adaptation measures to strengthen the resilience of vulnerable rural communities.

- Key adaptation practices include the planting of drought-tolerant crop varieties, the use of modernised farming systems, intensification of irrigation agriculture, adjusting the planting calendar, crop diversification, mixed farming, and sustainable land management practices.

- Irrigated agriculture such as the LAMDAM project has the potential to lead the transformation of agriculture in rural communities in the NSEZ and improve the livelihoods of the population.

- However, effective continuous collaboration among key stakeholders to increase investment in implementing climate change prevention, mitigation and adaption of measures is primordial.

9. References

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