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Climate Change and Food Security in Nigeria: Exploring the roles Of Government

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Abstract
Nigeria is the most populous country in Africa. It depends heavily on agriculture for both supply of food and economic growth. The era of food insecurity is becoming intensified across Nigeria as a result of climatic factors which have limited agricultural productivity. Climate change induced alterations such as floods, droughts, erosion, rising temperature, increasing aridity and soil acidity, changes in relative humidity, among others. These have adverse effects on agricultural productivity and food security. Through systematic literature review and participant observation, this study identifies the role of government in enhancing food security and climate resilience in Nigeria. Findings indicate that climate is responsible for low food productivity, herder-farmer crisis and have triggered hunger, poor nutrition and poverty. Also, the Nigerian government at all levels (local, state and federal) has a great role to play in policy formulation and data monitoring towards mitigating the impacts of climate change on food security in Nigeria. This study recommends green financing, more incentivization and awareness creation on green entrepreneurship for food security by the Nigerian government towards mitigating the impacts of climate change on food security in Nigeria. International donors and Nigerian government should sponsor and encourage use of modern and climate friendly farming approach like irrigation, ranching, use of tractors and organic fertilizers to improve food production and reduce herders' migration that causes conflict that affects food production. It concludes with a clarion call to researchers, lecturers and scholars in Nigeria for deeper and further research on the role of government in enhancing food security.

Keywords: Climate Change, Food Security, Green Financing, Government, Sustainable Development.

1. Introduction

Climate change refers to any change in climate overtime, which may be due to natural variability or as a result of human activity (Intergovernmental Panel on Climate Change, IPCC, 2001). The United Nations Framework Convention on Climate Change (1992) defines climate change as changes in climate that is usually attributed straightforwardly or not directly to human activity which alters the composition of the overall atmosphere in addition to the usual climate changeability observed over similar periods. Climate change is one of the global problems which has dominated the media headlines in recent times. It is a complex global problem because it is

intertwined with many other issues such as economic development, poverty, health and well-being and conflicts (Mochizuk & Bryan, 2015; Anabaraonye, 2017). Climate change is a global phenomenon that has far-reaching effects on the environment and people's livelihoods (Abid et al, 2016). The reality of climate change is actually very frightening. We are already in times of terrific climate change, with worse forecast if we continue with business as usual through pouring excessive greenhouse gases into the atmosphere (Anabaraonye, Okafor & Hope, 2020). We are already in times of terrific climate change, with worse forecast if we continue with business as usual through pouring excessive greenhouse gases into the atmosphere (Anabaraonye, Okafor & Hope, 2020). There is a growing concern that climate change will seriously affect the ability to meet the food demands of about 10 billion world population come 2050, which is a significant reason why experts are promoting climate-smart agriculture (Elferink & Schierhorn, 2016). Scientists have predicted that expected changes in temperature, precipitation and evaporation as a result of climate change will cause significant change in organic matter turnover and CO_2 dynamics thereby significantly impacting soil fertility (Ibrahim & Ibrahim, 2024). Climate change is one of the most important factors affecting the formation of soil with important implications for their development, use and management perspective with reference to soil structure, stability, topsoil water holding capacity, nutrient availability and erosion (Anabaraonye, Okafor, Ewa & Anukwonke, 2021). The impacts of climate change are greatly felt on Nigeria's agricultural sector which also affects sustainable economic growth (Onnoghen, Orji, Olisah & Anabaraonye, 2024).

Soil fertility is vital in agricultural processes for farmers in Nigeria. Soils are intricately linked to the climate system through the carbon, nitrogen, and hydrologic cycles. Climate change therefore has a profound effect on soil processes and properties. Climate Change can lead to soil infertility which in turn results to food insecurity (Anabaraonye, Okafor, Ewa & Anukwonke, 2021). Food security is essential for achieving the United Nations Sustainable Development Goals (SDGs). Food security focuses on ensuring that people have consistent access to safe, nutritious, and sufficient food for a healthy living (Dauda,2023). The impacts of climate change on food security in Nigeria implies that due considerations to mitigation and adaptation efforts have become a pressing issue (Ukpe,2025). The dimensions of food security include adequate food utilization, physical and economic access to food, and the physical availability of food. Food security is a global concern, interconnected with various factors, including climate change, nutrition, health, and socio-economic issues like insufficient food production, corruption, and gender inequality (Dauda,2023). Failure to ensure food security has unavoidably resulted in many social problems and challenges including civil unrest and riots in many cities of Nigeria. For instance, end bad governance protest in 2024 was motivate by hunger and high cost of living (Akenroye, 2024).

The aim of the study therefore is to interrogate the impacts of climate change on food security in Nigeria. It also seeks to identify the roles of the government in mitigating the impacts of climate change on food security in Nigeria. Data used for this study is systematic literature review derived from published works including academic journal articles, conference papers, textbooks and internet materials. The researchers gathered a lot of materials for the research but summarized the characteristics of the papers that centered more on the roles of the Nigerian government in mitigating the impacts of climate change on food security in Nigeria. Therefore, data gathering was done through secondary sources and were analysed through exploratory method of data analysis.

2. Climate Change and Food Security in Nigeria

Climate change was once a distant concern, but now an existential threat and one of the greatest challenges facing humanity. There's no disputing the fact that the upsurge in global temperatures is due to the excessive amount of carbon released into the atmosphere (Bedeke, 2023). Carbon is a basic building block in every living thing, plant or animal. Our soils are loaded with carbon and so are our air and ocean. We take oxygen and exhale carbon dioxide. Plants do the reverse and we coexist happily supplying each other's carbon dioxide and oxygen needs. The problem is that over the last two centuries humans have dramatically increased the amount of carbon dioxide and other greenhouse gases released into the atmosphere which now pose a serious threat to the agricultural sector (Bedeke, 2023; Pickson, Gui, Chen & Boateng, 2023). Climate change has led to environmental challenges, affecting agricultural activities, resulting in lower productivity and food insecurity in Nigeria. Climate change has contributed to the low food quality and nutritional composition of food crops, exposing people to harmful products and causing permanent health issues. Non-renewable energy sources in Nigeria trigger carbon emissions, exposing crops to toxic gases, reducing crop quality, and causing health issues (Dauda,2023). Environmental threats such as erosion, flooding, drought, and desertification have continued to expose human beings to varieties of humanitarian concerns such as hunger and starvation, unemployment, poverty and disease (Anabaraonye, Okafor, & Hope, 2020; Birsel, 2019) including food insecurity.

Food insecurity is defined as the disruption of food intake or eating patterns because of nonavailability of food, shortage in harvest and supply, lack of money to purchase when available, and other resources (Dauda,2023). One dimension of the national policy crisis that characterizes Nigeria's social and macroeconomic instability is its food security crisis. This challenge is aptly identified as a trilemma, encompassing the affordability, accessibility, and availability of food for both domestic consumption (individual, commercial, and industrial) and export purposes (NESG,2024). Food security therefore reflects the stability of the food supply and availability of and access to food. Food insecurity can be brought about by climatic shocks, natural disasters, economic crises or conflict (Idoko, 2016; Ikani, 2016). Moreover, some of the major factors identified to be contributing to food insecurity in Nigeria include climate change, conflict and insecurity, increasing population, poor policy implementation, inefficient agricultural practices, post-harvest losses and low budgetary allocation to agriculture, among others (Mojeed, 2023). FAO (2015) explains that food security hinges on all requirements needed to assess sufficient and nutritious food for a healthy and functioning life. Adding that, the major aim of food security is to ensure individual access to adequate food always needed and utilization of such food to meet body growth and developments. It also identified four components of food security. These include availability, access, utilization and stability. These components must be simultaneously satisfied to meet its objectives (Ibrahim & Ibrahim, 2024). Climate change poses a significant threat to food security in Nigeria, leading to decreased agricultural productivity, increased food insecurity, and potential malnutrition due to factors like erratic rainfall, rising temperatures, and increased pest infestations (Ani, Anyika & Mutambara,2021).

More so, growing population coupled with increased intensity of environmental extreme events like floods, droughts, extreme variability in temperature and rainfall has increased the pressure on the current food production systems which in turn, has heightened the current food security crisis in most of the developing countries (Mojeed, 2023). Nigeria, Africa's largest country by population, is experiencing a serious food crisis, with food inflation rates reaching 40.66% in May 2024. The surge in food prices strains household budgets, forcing Nigerians to allocate 97.4% of their income to food. Persistent factors contributing to this trend include poor infrastructure, resulting in supply disruptions and insecurity in farming communities, thus reducing domestic

agricultural production (Ukpe, 2025). Soaring food prices in major cities across the Nigerian states are being reported with adverse impact on household budgets (Bedeke, 2023). The Boko Haram insurgency in the North-east and North-central; Herders-Farmer clashes in North-central, South-west and South-east pockets of conflicts in some states where basic food items for the nation come from are making food items insufficient in supply and food commodity prices to rise exponentially (Tsojon, 2017).

The impacts of climate change on soil fertility and prospects for agricultural productivity occasioned particularly, by the prevailing challenges of flooding, erosion and excessive rainfalls, remain the increasing challenge not just only to governments (state actors) with their various multi-lateral organizations but to numerous non-governmental organizations (NGOs) around the world (Anabaraonye, Okafor, & Hope, 2020; Anabaraonye et al, 2023). The United Nations estimated in September 2024 that flooding destroyed crops and livestock that would have fed 8.5 million Nigerians for six months. Based on an average yield of 1.5 tons of food grown per hectare, 856,000 tons of crops were destroyed. The UN noted that the flooding exacerbated Nigeria's already deteriorating food security situation (Ukpe,2025). Climate change has increased the severity and rate of occurrence of the flood disaster, with its negative impact on food production, food distribution, food utilization, and food security (IPCC 2007). Climate change and increasing human influence in the natural ecosystems of rivers pose a greater risk to flooding in areas near the riverbeds (Klaudia, Marzena, & Aleksandra,2018). Nwaobiala and Nwosu, (2014) maintained that agriculture is one of the most weather-dependent human ventures in Nigeria. Agriculture suffers due to its vulnerability to climate change and African countries are particularly vulnerable to the incidences of climate given their dependence on rain-fed agriculture. Despite this fact, agriculture has remained an important source of livelihoods on the continent. Studies have shown that an average of 70% of the population in Africa, lives by farming; 40% of all export earnings come from agriculture and about one-third of the national income in Africa is generated by the agricultural sector (McCuster & Carr, 2006).

Climate Change therefore plays a great role in enhancing food security in Nigeria. In Nigeria, the most persistent environmental challenge remains flood which normally occurs when flowing water submerges land areas that were not subjected to inundation before. Several anthropogenic activities have contributed to worsening the event of flood disaster; such activities include industrialization, urbanization, population growth, utilization of environmental resources and infrastructural development (Anabaraonye et al, 2022). The food crisis in Nigeria has reached unprecedented levels, with food inflation soaring and a significant increase in the number of food insecure Nigerians (NESG,2024). The policy brief, developed by the Nigerian Economic Summit Group (NESG), provides a comprehensive analysis of the current food security crisis and offers actionable recommendations to address the urgent humanitarian, social protection, and food systems challenges facing the nation (NESG,2024).

3.1. Flooding and Its Impacts on Food security in Nigeria

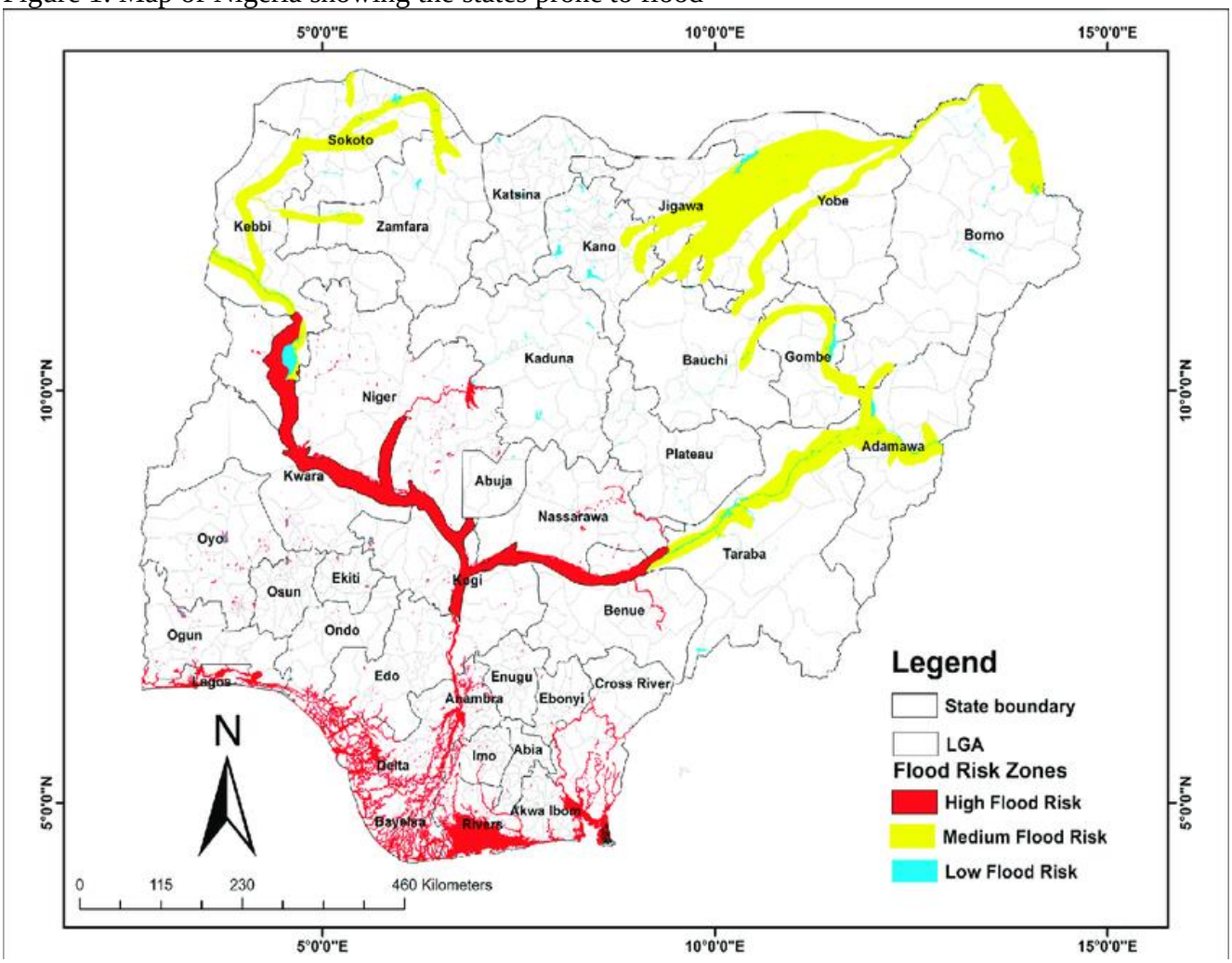
Flooding is one of the major attributes and bye-products of climate change tha greatly impacts food security in Nigeria (Anabaraonye et al, 2022). Flooding is a general condition of partial or complete inundation of normally dry areas from overflow of inland or tidal waters or from unusual and rapid accumulation of run off (Jeb & Aggarwal, 2008). Floods as noted by Odufuwa et al (2012) are the most frequent disaster and widespread natural hazards of the world. UN-Water (2011) noted that floods have caused 84% disaster deaths in the world with an average of 20,000 deaths per year, which makes only a few countries immune to floods. Floods can be very

destructive depending on the nature and level of water volume involved. According to Ikani (2016), flooding is the overflowing of water either as a result of torrential rainfall, a broken dam, a high rise in the volume of water in rivers, oceans or seas as a result of melting ice caps or prolong rainfall, thereby flooding its neighboring environment and beyond. Flooding was found to have influenced food insecurity in agrarian communities of the South East Nigeria (Akukwe, Krhoda & Oluoko-Odingo, 2018). Though, linked as the consequences of climate change, Nkwunonwo (2016) adduced that flooding do not only damage properties and endanger the lives of human and animals but, also produce other secondary effects like outbreak of diseases such as cholera and malaria. In Nigeria, flooding has become dangerous to human health in most urban and rural areas because of overcrowded slums, where drainage is poor or does not exist at all (Olajoke et al, 2013).

Flooding has far reaching impacts on people's health and its consequences include crisis of access to good drinking water, shelter, sanitation problems and spread of deadly communicable disease like cholera, malaria, diarrhea, skin and soft-tissue infections with other air-borne infections (Anabaraonye, et al,2022). Thus, many water wells and boreholes are contaminated by continuing overflowing sewage and refuse dumps. Again, public water supplies are disrupted, electricity facilities and supply destroyed. All these collectively and considerably have impacted people's health and food security in Nigeria (Kagu et al, 2013). Agriculture is a significant area of life in the Nigerian economy. Therefore, floods can negatively impact the gross domestic product by reducing agricultural yields and productivity (Solomon & Edet, 2018). Flood can also undermine economic growth through loss of produces/products and destruction of infrastructure, which could result in extra-budgetary spending (Federal Government of Nigeria, 2013). The analyzed negative effects of flooding on food insecurity include reduction in crop harvest; decrease in farm income derived from crop sales; damages to roads; destruction of food/ farm storage facilities; reduction in labour demand; pollution of streams, etc. The occurrence of floods in Nigeria is not a recent phenomenon (Akukwe & Ogbodo, 2015). Incidences of destructive floods have been recorded in different parts of Nigeria. For instance, the floods that occurred in Ibadan (1985, 1987, 1990, 2011), Osogbo (1992, 1996, 2002), Yobe (2000), Akure (1996, 2000, 2002, 2004 and 2006), Makurdi in 2008, Sokoto in 2010, Ogbaru and Oguta in 2012. In addition, the coastal cities of Lagos, Yenegoa, Calabar, Uyo, Port Harcourt and Warri frequently experience floods (Akukwe and Ogbodo, 2015; Olajuyigbe, Rotowa, Durojaye, 2012).Among these floods, well noted is the August-October 2012 flood in Nigeria which pushed rivers over their banks and submerged hundreds of kilometres of urban and rural lands (Ojigi, Abdulkadir, Aderoju, 2012), with an estimate of over 7,705,378 Nigerians affected by the floods leaving 2,157,419 persons internally displaced (IDPs). Moreover, over 90% of the 36 States of the country were affected between July and October 2012 with 363 deaths and more than 618,000 damaged houses (OCHA, 2012). In Lagos state alone an estimated 100 people were killed, many were rendered homeless, and properties valued at over 380 billion Naira (US$320 million) were destroyed by flood in 2011 (Oladunjoye, 2011).

Famine Early Warning Systems Network (FEWSNET, 2013) recognized the importance of flood disaster mitigation and management in order to avoid the enormous losses from flood disasters leading to food insecurity. The World Bank's assistance is moving away from traditional relief and reconstruction to supporting the culture of prevention and mitigation for sustainable development. This new approach increasingly relies on knowledge sharing, creating communities of practice, and raising awareness in disaster risk management targeting government officials, civil society, and local communities prone to flood (Ikani, 2016).

Figure 1: Map of Nigeria showing the states prone to flood



(Source: Njoku et al, 2020)

4.1. Impacts of Climate Change on Food Security in Nigeria

The key impacts of climate change on food security in Nigeria include:

A) Decreased Crop Yields:

- Variations in rainfall and sunshine patterns, especially in the northern region, are impacting agricultural production.
- Rising temperatures and changes in precipitation patterns can lead to reduced yields of staple crops like maize, rice, and millet.
- Droughts and floods, exacerbated by climate change, can destroy crops and disrupt agricultural activities (Idoko, 2016).

B) Increased Pest and Disease Infestations:

- Climate change can create conditions that favor the spread of pests and diseases, affecting both crops and livestock(Anabaraonye et al,2020; Njoku et al,2020).
- Changes in temperature and humidity can lead to the evolution of new pest species and the intensification of existing ones (Ibrahim & Ibrahim,2024).

C) Soil Degradation and Desertification:

- Climate change can lead to soil erosion, salinization, and desertification, further impacting agricultural productivity.
- The northern region of Nigeria is particularly vulnerable to desertification, which can lead to land degradation and reduced agricultural potential (Ani, Anyika & Mutambara, 2021).

D) Water Scarcity:

- Changes in rainfall patterns and increased evaporation rates can lead to water scarcity, particularly during the dry season.
- This can impact agricultural production, livestock management, and overall water availability for human and animal consumption (Ibrahim & Ibrahim, 2024; (Anabaraonye et al, 2020).

E) Food Insecurity and Malnutrition:

- This leads to reduced agricultural productivity and increased food prices can lead to food insecurity and malnutrition, especially among vulnerable populations.
- The combination of climate change and other factors, such as conflict and poverty, can exacerbate food insecurity and malnutrition (Mojeed, 2023; Anabaraonye et al, 2020).

F) Increased Vulnerability of Smallholder Farmers:

- A large proportion of Nigerian farmers are smallholder farmers who rely on rain-fed agriculture and have limited access to resources and technologies.
- They are particularly vulnerable to the impacts of climate change, which can lead to reduced incomes and livelihoods (Ani, Anyika & Mutambara, 2021; Anabaraonye et al, 2023).

G) Other Impacts:

- Climate change can also impact livestock production, fisheries, and other sectors that are important for food security.
- It can also lead to increased migration, displacement and conflict over resources, further exacerbating food insecurity (Ani, Anyika & Mutambara, 2021; Angbulu, 2025)

Furthermore, Droughts in Nigeria significantly impact food security by reducing crop yields, increasing food prices, and affecting livestock productivity, particularly in the semi-arid north. These impacts disproportionately affect smallholder farmers and pastoral communities, leading to increased food insecurity and malnutrition (Oluwaseun,2024). Drought accelerates soil degradation, diminishing agricultural productivity. In Nigeria, approximately 35% of the land is affected by desertification, primarily due to drought and unsustainable agricultural practices. Soil erosion and nutrient depletion reduce the land's fertility, leading to lower crop yields and increased food insecurity (Oluwaseun,2024; Ake, et al, 2023). Soil erosion in Nigeria significantly impacts food security by reducing agricultural productivity and increasing food prices. Erosion diminishes soil fertility, leading to lower crop yields and, consequently, reduced food availability, and increased costs. This can lead to food insecurity, especially for smallholder farmers who rely on agriculture for their livelihoods (Iruoma,2021).

4.2. The Impacts of herdsmen-farmers conflict on food security in Nigeria

Farmers-herdsmen clashes in Benue and Adamawa states significantly impact Nigeria's food security by disrupting agricultural production, displacing farmers, and increasing food prices. The conflicts, often stemming from competition over resources and land use, lead to crop destruction, loss of livestock, and reduced agricultural output, ultimately affecting the availability and affordability of food (Udo,2021). In Taraba, herder-farmer conflict has spanned many years as a

result of land resource factors. Farmers and herders in Northern Nigeria, particularly Taraba, face reduced access to land resources. There is a lot of violence when farmers and grazing pastures are competing (Solomon, 2021). Local government districts including Ibi, Bali, Wukari, and Takun in Taraba State have been hit the hardest (Abbas,2012). According to USAID (2017), over 1.8 million people were displaced in Borno, Yobe, and Adamawa states, with Borno hosting over 1.4 million IDPs (IDPs). According to a Global Rights report, 3,188 people were slain in 2019, including 2,707 civilians and 481 security personnel. On the other hand, between August and October 2019, the IOM-DTM recorded approximately 2 million displaced individuals in Adamawa and Bauchi states and 507 deaths in January 2020 in Nigeria's Armed Conflict Location and Event Data-ACLED(Udo,2021). Agriculture and other money-generating activities were disrupted, resulting in diminished household income and food access. This study is in line with that of Ahynetal (2018) who concluded that farmers' herdsmen crises have far-reaching implications on Nigerian national integration. The study also found that each region affected by crises suffers food crises(Udo,2021). This study was significant since it confirmed that disputes between the two groups impacted food production, distribution, and availability. Devastated farmland, houses, and schools caused a drop in agriculture output (producing food insecurity) and human capital loss(Tersoo, 2016). Researchers have identified climate change as one of the major causes of herdsmen-farmers conflict in Nigeria thereby leading to food insecurity(Anabaraonye, Okafor & Hope, 2020).The clash between the herdsmen and farmers has placed Nigeria as country of "hotbed" for her citizens to rest on. This conflict has threatened food production, peace and economic activities especially in the rural where the conflict has it grip on(Udo,2021).

4.3. Mitigating Climate Change To Ensure Food Security Through Government Intervention in Nigeria.

Food security which can be advanced through green entrepreneurship will go a long way to enhance quality of life for many Nigerians (Anabaraonye, 2024; Adesina. & Loboguerrero, 2021). Individuals and households require food availability and adequate intake of food to enable them contribute to national development (FAO, 2015). Food security diminishes when food systems are stressed. The components of food systems with their main elements are as follows: I. Food Availability – Production, Distribution, Exchange. II. Food Access – Affordability, Allocation, Preferences. III. Food Utilization – Nutritional Value, Social Value, Food Safety, (FAO, 2015). The Federal Government has taken action to confront Nigeria’s food security crisis head-on. A declaration of a state of emergency on food security by President Tinubu in July 2023 triggered immediate measures, including releasing fertilizers and grains, optimizing water resources, and bolstering financial support (NESG, 2024). Acknowledging Nigeria’s status as Africa’s most populous nation and one of its largest economies, President Tinubu underscored its responsibility to demonstrate leadership in addressing climate issues. He posited, “To succeed, we must innovate, collaborate, and decide decisively to collaborate as a global community. As Africa’s most populous nation and one of its largest economies, Nigeria recognizes its responsibility to demonstrate the required leadership on these matters (Angbulu, 2025; Globalupfront, April 15, 2025). Additionally, interventions to counter the impact of fuel subsidy removal were introduced alongside landmark agreements with international institutions to enhance agricultural production. The Niger State Government’s exemplary sub-national response underscores the importance of local cooperation and support for smallholder farmers. The government’s comprehensive approach signals a steadfast commitment to addressing Nigeria’s pressing food security challenges (NESG,2024). In a developing country like Nigeria where majority of the households are witnessing or experiencing food insecurity, there is the urgent need for the government to develop programmes to ensure food security, rural development and education (Ibeogu & Abah,2016). The

role of the Nigerian Government in enhancing climate finance and green innovations for sustainable development in Nigeria cannot be over-emphasized (Osadebe et al,2023). In 2008, Nigeria released its National Programme for Food Security (NPFS), laying out numerous constraints to food security in Nigeria and adopting a value chain approach to address these constraints. The objective of the NPFS is to ensure sustainable access, availability and affordability of quality food to all Nigerians and to be a significant net provider of food to the global community (Ibeogu & Abah,2016). National Programme for Food Security evolved as an aftermath of the November 1996 World Food Summit and request for assistance by the Federal government of Nigeria under the Food and Agricultural Organization (FAO), Special Programme for Food Security (SPFS), after the initial participatory review and subsequent evaluation, SPFS was extended to the 36 states of the federation. The National Special Programme for Food Security (NSPFS) implies assumed access to food supply at the household, sub- national and national levels (Ibeogu & Abah,2016). This programme was and is established in all the senatorial districts of Nigeria. The programme is handled by the federal government and the Food and Agricultural Organization (FAO) and it involves food crop production, irrigation, livestock, food processing etc, (FAO,2015). In 2025, President Bola Tinubu has reaffirmed his administration's commitment to implementing climate-smart agricultural practices to bolster food security and reduce environmental impacts. He said such initiatives stem Nigeria's recognition of its responsibility to lead a just energy transition and sustainable development in Africa (Angbulu, 2025). Tinubu said this during his address at the ongoing Abu Dhabi Sustainability Week held in the capital city of the United Arab Emirates. In his 12-minute discourse titled 'Climate Imperatives into Economic Prosperity, bridging Africa's Global Energy Future,' the President emphasized the need for international cooperation to achieve sustainable development and mitigate climate change impacts (Angbulu, 2025). The role of government to mitigating impacts of climate change is enormous that developing countries are finding it difficult to confront amidst other internal socio-economic and security challenges (Vanguard,2017). In 2017, it was reported that it will cost the Nigerian government about $140bn to fight climate change by the World Bank estimation. This calls for a serious concern and involvement of international community especially the developed countries whom their activities impact negatively climate change manifestation in the developing countries especially Africa (Vanguard,2017). The tendency of poverty increasing by 100 million in 2030 is envisaged as a result of ravaging effect of climate. The worrisome thing about this scenario is government's mismanagement of fund provided by the International Agencies and concerned organization to manage climate relate issues and effect of climate problems like flooding and erosions. It depicts government that is not willing to address climate concerns rather sees it as avenue to make money (Osadebe et al,2023).

Climate change leading to drought and deforestation in Northern part of Nigeria has caused herders to move towards to the Southern with relative water and grass availability all year round for grazing of their cattle. This migration of the herders has led to intrusion and destruction of farm lands. There has been an unending killings and insecurity in states like Benue, Plateau, Adamawa, Taraba, Osun, Ondo, Enugu, Imo as a result clash between farmers and herders. This has added to disruption of food production and distributions. Government to addressing this under Buhari created a grazing route from the North to South. The national tension caused by this led to its suspension as indigenous people saw it as a means of taking their lands by the herders. As alternative to this, is the call for engagement of modern facilities to mitigate climate change push on the migrating herders and food producing farmers. Irrigation facilities can help to supply and sustain water for flocks and crops activities around the year. Artificial dams are alternative to water supply to retain soil humidity all the year. Green advocacy and implementation especially tree planting can help to mitigate against drought and desert encroachment in the Northern Nigeria. It

will increase air and soil humidity which invariably will help crops and flocks to produce more yield. Therefore, government needs to depart from traditional agro-policies and practice to climate change mitigating practices that will ensure food security, limit herder migration to promote social harmony and national security.

4.3. Further Mitigation Strategies To Enhance Food Security in Nigeria include:

A) **Climate-Smart Agriculture:** Promoting sustainable agricultural practices that can help farmers adapt to climate change and increase their resilience (Adesina.& Loboguerrero, 2021).
B) **Investing in Climate-Resilient Infrastructure:** Developing irrigation systems, storage facilities, and other infrastructure that can help farmers cope with climate change impacts.
C) **Promoting Climate-Smart Agricultural Research and Innovation:** Supporting research and development of climate-resilient crops and livestock breeds.
D) **Raising Awareness and Building Capacity:** Educating farmers and other stakeholders about climate change and its impacts on food security.
E) **Strengthening Disaster Risk Management:** Developing early warning systems and disaster preparedness plans to mitigate the impacts of extreme weather events.
F) **Addressing Socio-Economic Factors:** Tackling poverty, inequality, and conflict, which can exacerbate food insecurity.
G) **International Cooperation:** Working with international partners to address climate change and promote sustainable development.
H) **Urgent Humanitarian and Social Protection:**
I) Immediate interventions are needed to provide emergency food assistance, social protection, and support for displaced populations.
J) **Strengthening Food Systems:** Addressing the underlying causes of food insecurity, such as conflict, economic instability, and climate change, is crucial.
K) **Supporting Livelihoods:** Providing access to agricultural inputs, credit, and non-farm income opportunities is essential for long-term food security.
L) **Coordinated Response:** Governments, international organizations, civil society groups, and the private sector need to work together to address the crisis.

5. Conclusion

Climate change is global phenomenon that is affecting the global system. Its effects are greatly felt in area of food chain because that is the basic need of man. In Nigeria food security has been adversely affected by climate change through flooding, drought, desertification, shortage in rain falls, and erosion. Climate change impacts like drought and desertification have led to migration of herders towards rain forest zones to feed their flocks. Conflict of different magnitude has erupted between herders and farmers leading to killings, destruction of farmlands, farming infrastructures and equipment like irrigation and storage facilities, tractors, etc. Responsive, deep and transformative actions are needed, not only to reduce emissions and stabilize global temperatures, but to build a safer, healthier and more resilient agricultural sector for sustainable development and economic growth in Nigeria. Climate change indeed has proven to have deteriorating impacts on food security in Nigeria. It is therefore pertinent to note that public awareness and public participation which can be greatly enhanced by the Nigerian government can play a great role in

minimizing the effect of climate change. It was also found that government and concerned international development agencies have not done enough in engaging modern technologies to mitigate alarming advancement of climate change in the northern Nigeria that is the food base of the country and other parts of Nigeria in generally. Finally, there is great need for deeper and further research on how new technologies can be adopted by the Nigerian government in mitigating climate change and enhancing food security in Nigeria.

6. Recommendations

i) Nigeria government should depart from traditional climate change management to modern use of technology like modernized irrigation to retain soil and air humidity, modern artificial dams and afforestation practices to mitigate against drought, desertification and food insecurity.

ii) Climate change literacy, grants and loans should be readily made available to the young Nigerians who are higher percentage of Nigerian population to enable them to access and embrace climate smart technology thereby enhancing climate resilience and food security for sustainable economic growth in Nigeria.

iii) Flood emergency and contingency plans should be laid down by the government in order to enhance climate resilience, food security and sustainable economic growth in Nigeria.

iv) Green financing, more incentivization and awareness creation on green entrepreneurship for food security by the Nigerian government, the World Bank Group and other SDGs institutions towards mitigating the impacts of climate change on food security in Nigeria

v) Research, climate change education and exchange of knowledge among lecturers, students, farmers and other relevant professionals in the field of mitigating the impacts of climate change to ensure food security in Nigeria (Anabaraonye, 2017; Solomon & Edet,2018).

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