



SCHOOL OF SOCIAL SCIENCE, ARTS AND HUMANITIES.

DEPARTMENT OF HISTORY, POLITICS AND INTERNATIONAL STUDIES.

MSc. INTERNATIONAL RELATIONS, STRATEGY AND SECURITY STUDIES

CLIMATE CHANGE AND FOOD SECURITY IN NIGERIA, A CASE STUDY OF THE
HERDERS – FARMERS CRISIS

OGBONNA GABRIEL OKORONKWO

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DISSERTATION WHICH WAS SUBMITTED FOR OBTAINING A MASTER'S DEGREE IN
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OGBONNA GABRIEL OKORONKWO

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DECLARATION

I, OGBONNA GABRIEL OKORONKWO, being fully aware of the consequences of plagiarism declare responsibly that this paper entitled ‘ CLIMATE CHANGE AND FOOD SECURITY IN NIGERIA, A CASE STUDY OF THE HERDERS- FARMERS CRISIS’ is strictly a product of my own personal work and all sources used have been duly stated in the bibliographic citations and references. Where I have used ideas, text and/or sources of other authors, they are clearly mentioned in the text with the appropriate citation and the relevant reference is included in the bibliographic references section with a full description.

KEYWORDS= CLIMATE CHANGE, FOOD SECURITY, HERDERS,
FARMERS, NATIONAL SECURITY, ECONOMIC SECURITY.

Abstract

Using qualitative and thematic approaches, this study examined the effect of climate change on food security in Nigeria. The research specifically sought to find out the influence of climate

change and farmers-herders crisis on food security proxied by crop and livestock production and examined whether climate change is the major cause of the intense crisis between farmers and herders experienced recently in Nigeria. The study also proffered the possible solutions that will help mitigate the effect of climate change in Nigeria. The study is anchored on the conflict theory. Findings of the study showed that climate change throughout the study negatively and significantly influenced food security in Nigeria. While the farmers-herders crisis negatively influenced crop production, its influence remained insignificant in both short-run and long-run. Farmers-herders crisis negatively influenced livestock production as found in this study. Finally, climate change and farmers-herders crisis cause food security in Nigeria. The study recommends that climate change mitigation strategies such as the encouragement of afforestation, reduction of bush burning and utilization of fuels/gases that have high global warming efficacies, and the practice of climate-friendly agriculture should be implemented and monitored by the government. Also, the provision and utilization of improved crops and animals that can resist the negative effects of climate change on crop and animal production is highly recommended. Furthermore, grazing farmlands for herders should be considered and appropriate measures taken to ranch cattle since the farmers-herders crisis favors livestock production at the expense of crop production in Nigeria.

CHAPTER ONE

INTRODUCTION

BACKGROUND OF THE RESEARCH

According to Mollier *et al*, (2017), ‘food security is significant in achieving the United Nations Sustainable Development Goals’ (SDGs). This outlines the importance of the availability of good food that will guarantee nourishment and development. Food security is achieved when the

population of a particular state, could have an unrestricted access to food to meet their basic needs, and fulfill their dietary preference in order to lead a healthy lifestyle, this aligns with the report in (FAO, 1996). The crucial aspect that guarantees food security are the physical and the economic access to food, the availability of food, and adequate food utilization of it to avoid wastage. According to Murthy (2016; Matemilola and Elegbede, 2017; Meybeck *et al.*, 2017; McCarthy *et al.*, 2018; and Ben Abdallah *et al.*, 2021), ‘food security can be regarded as one of the major burning and paramount issues of global concern as it has a close relation and effect with human nutrition, health, climate, and other factors’, on the other hand, the implementation of poor policies, gender inequality, and corruption, and illegal migration and closely knitted to food security. Food security, usually according to (Murthy, 2016; and FAO *et al.*, 2021) could lead to diseases such as hypertension, diabetes, obesity and other venereal diseases, due to the inability of having access to quality food that would ensure the basic nutritional values which would aid the proper functioning and wellbeing of an individual.

The grossly decline in world food production in recent years, has been predicted due to increase in population geometrically, crises and wars, urbanization, increase in income especially in less developed countries, and climate change respectively. The mean annual growth rates of agriculture reduced from 3.11% between 1991-2000 and 2001-2010 to 2.97%, and 2.44% between 1971-2010 in Sub-Saharan Africa Todaro and Smith (2015). Irrigation of arable land in Sub-Saharan Africa was 4% against 29% in East Asia and 39% in South Asia, in 2007. Less than 10 kilograms of fertilizer per hectare has been used by farmers on soils that have nearly lost all essential nutrients due to excessive and continuous cultivation over the years, which is against the over 100 kilograms used in South Asia. Only 22% of farmlands grown with cereal in Sub-Saharan Africa are sown with improved varieties, Todaro and Smith (2015). In 2009, about 690 million persons suffered from hunger while about 135 million persons from 55 nations globally, experienced serious food insecurity, with 73 million of these individuals being from Africa. More so, Africa is also seen to have a 51.5% share of undernourished people by the year 2030 according to Ayinde *et al.* (2020). There is a bidirectional association between climate change and food production according to Rojas-Downing *et al.*, (2017).

The glaring and obvious effect of the change in climate and the rate at which it has thwarted every aspect of human lifestyle, ranging from economic, environmental and even relaxation as can be seen in changes in tourism patterns and even causing humanitarian crises all over the

world. The terrible effect of climate change have led to advocacy and joint efforts globally towards mitigating the impacts and this is by discouraging those human activities that causes and amplifies the damages causing and enabling climate change.

A change in climate can be seen as the thwarting of the various variable composition of the climate during a cumulative period of time. According to (IPCC, 2014) it is reported that human activities constitute the essential growth to greenhouse effect which causes climate change. Changes in the average variable features of the climate which happen in a cumulative period of time are referred to as climate change and the longer the changes occurs leading to alteration of atmospheric conditions of a specific place the more accumulation of all atmospheric parameters, including temperature, humidity, rainfall density and the overall weather conditions. Climate change is total thwarting and re-arranging the various climate patterns and this leads to the much talked about global warming, a term that seems to have been reverberating on different climate change forums and discussions.

Global warming, according to Kelechi et al, (2022), is a continuous symptom of climate change and is caused by greenhouse gas capturing humidity that is emitted from the earth into space. Naturally, the presence of greenhouse gases keeps the earth's atmosphere warm to suit the existence of living things (plants and animals). But increased release of these gases into the earth space as a result of industrial, agricultural, and human activity have created a greenhouse effect that quickly raises the average air temperature, also referred to as global warming. The effect of human activities in Agriculture and other Industrial activities increases the emission of carbon dioxide into the atmosphere, the resultant effect of all these human activities according to Ojo and Adebayo (2012) the greatest threat to the sustainable agricultural activities that would lead to food security is the impact of climate change. For instance, it is evident in some areas in the country that were low land and dry plains are recently flooded due to the changes that have occurred in the atmospheric conditions. Heavy rainfall and the changes in the natural composition of the greenhouse gases also worsen the greenhouse effects thereby increasing the humidity of the environment.

Significantly, the increased humidity and dryness of the atmosphere leads to the quick dryness of the water and moisture mixed in the composition of the atmospheric conditions due to quick evaporation. According to Kelechi et al, (2022) the greenhouse effect also causes the warmth of the ocean, which leads to melting of glaciers and ice sheets and raises sea levels. Studies have

demonstrated that a rise in atmospheric carbon dioxide concentration can impact crop productivity in both negative and positive ways. Climate change has resulted in a variety of climatic conditions, including droughts, floods, and extremely high temperatures. These circumstances have led to crop losses, put farmers' livelihoods in jeopardy, and over time have raised concerns about food security, particularly in developing nations. Concerns about the threat that climate change poses global survival leading to unprecedented turn of events, in the case of Nigeria it has gravely amongst other factors ensued the farmers- herders crisis in the country that is both an economic and national security challenge.

There have series of global actions and conventions that have been organized to properly tackle the effects of climate change. For Instance, according Kelechi et al, (2022), referred to the Kyoto convention was a major hallmark towards regulating the activities that contribute to greenhouse emission. Nigeria is not isolated from the impacts of these greenhouse emissions that cause climate change. Climate change is having a drastic impact on all of Nigeria's vegetative areas. According to Oyinloye et al. (2018), Additional consequences of climate change that negatively impact Nigeria's food systems and agricultural practices include temperature increases, decreased rainfall, and altered relative humidity, this shift has caused a disruption in the seasonal rhythm of food production and distribution. This shortage in supply has raised food costs and limited access to food, thereby fueling the incessant attacks and reprisal conflicts between the herders and the farmers and equally fueling the food crisis in the country.

Climate change seems to be a major factor in the current food supply chain in Sub-Saharan Africa. According to Idumah *et al.*, (2016), It has been observed in agricultural sector to be solely dependent on nature for its growth which in turn is unreliable due to the increasing rate of climate change The phenomenon has been seen as a threat to food security because it is capable of reducing total availability of food, food accessibility, food use, and food system stability (Idumah *et al.*, 2016; and Rojas-Downing *et al.*, 2017). In terms of food production, climate change has been predicted to affect the Sub-Saharan Africa adversely, with the maximum hit by 2030. Agricultural output is expected to decrease by 50% from rain-fed agriculture. Increased water stress will be faced by 75 to 250 million persons, and freshwater lakes will be affected also in a negative way Todaro and Smith, (2015). It has been opined by the 2006 Stern Review on the economics of climate change that the expected two degrees increase in mean global temperature in 20 to 30 years, will lead to food insecurity and malnutrition adversely in African continent (Sub-Saharan Africa), and water crises in South Asia. 17% of recent food production globally according to FAO (2015) is projected to decrease by 2050 as a result of effect of climate change.

As a result of drought, 20% to 60% reductions in livestock were recorded in the past decades. In South Africa, dairy output is set to decrease by 10% to 20% as a result of climate change.

In Nigeria, the livelihoods of arable crop farmers have been impacted by climate change according to the reports by Abiona *et al.*, (2016) High temperature stress, frequent flood and differences in humidity are seen as great factors affecting cassava production in Ebonyi State, Nigeria as reported by Eze,(2017). Crisis and insurgencies especially in the North Central and North East parts of Nigeria are negatively affecting agriculture in the country.

Similarly, due to the Boko Haram insurgency, which began in 2009 with an attack in northeastern Nigeria, many households in the area have been forced to relocate and displaced of their homes and access to farmlands and according to Ojo, 2020; Ladan and Badaru, 2021) food production have greatly affected food production and leading to the scrambling of arable lands with their host communities. Farmers and ranchers in the North Central geopolitical zone have been embroiled in a protracted conflict over land and water supplies. As a result, herders have destroyed crops on farmlands, killed farmers and herders, displaced communities, caused unemployment, and created food insecurity in Nigeria (Kah, 2017; Udosen, 2022) supporting this development, (Shittu, et al, 2017) maintained that the terrible security situation in these areas makes it harder for households to live a decent lifestyle, or afford the high rise of scarce foodstuff that was created by the insurgency.

Nigeria is experiencing one of the lowest moments in the history of the country, hunger and poverty are rapidly, spreading and a large number of Nigerians are facing food security coupled with the terrorist and kidnapping challenges in the country. As such, several communicable and diet-related diseases are on rapid increase in Nigeria. According to Owoo, (2021) the accessibility of food in Nigeria has been on the decline pattern between 2011 and 2016, such that many urban households adopted different methods to cope with the impending situation in Nigeria.

More than 80 percent of the Nigerian's populations were involved in different agricultural activities before the discovery of crude oil, and agriculture was the bedrock of the economy in the country, contributing more than 60 percent to the nation's gross domestic product (GDP), more so, provided employment, raw materials for industries, export earnings for the country, income to farmers, and made the country food secure Andohol and Abbah, (2018). It has been shown statistically and currently that the country is facing a serious threat of hunger and poverty.

Food insecurity has continued in Nigeria without any reduction in intensity or strength accompanied by a progressive increase in food prices. In 2013, Nigeria was ranked 86th out of 107 countries on the basis of global food security index. In 2019, the food insecurity condition worsened, with Nigeria being ranked 94th out of 113 countries with countries like Niger, Cameroon and Ethiopia being better off than Nigeria on the basis of food security. Furthermore, over 86.9 million Nigerians were found to be perpetual poverty in 2018, while the total number of Nigerians in extreme poverty increased to 102.4 million persons in 2020. According to Ayinde *et al.*, (2020), a major factor to Nigeria's food insecurity is climate change.

There are some levels of uncertainty as to whether climate change is the major cause of farmers-herders crisis that has become intense in recent times in Nigeria. Nwakanma and Boroh, 2019 stated that the intense crisis between the farmers and herders in Nigeria is as a result of systematic ethnic cleansing and the intense Islamization agenda in the North. Also, bandits and war mercenaries believed to have gained access from Libya into Nigeria are also considered as major stressors of the crisis between farmers and herders. Land, scarcity, political factor, population growth, and climate change has been identified by Kwaghga (2018) as stressors of this crisis. Climate change and other factors have an explanation regarding the crisis between farmers and herders in Nigeria Gregory *et al.*, 2005; Todaro and Smith, 2015; Idumah *et al.*, 2016; Rojas-Downing *et al.*, 2017; and Ayinde *et al.*, 2020).

According to Oli *et al.*, (2018), 'the visibility in desert encroachment and shrinking water sources due to climate change is a determinant of the crisis between farmers and herders' which has rapidly increased in recent years in Nigeria because herders continue to search for water and greener pastures for their livestock as they migrate in large populations from northern states towards the central and southern states in Nigeria. The farmers-herders crisis spiked between 2013 and 2014 as recorded by Kwaghga (2018). There is an astronomical increased in the number of persons killed from 63 persons in 2013 to 1229 persons in 2014 respectively as a result of this crisis, promoting the Institute for Economics and Peace using the global terrorism index (GTI) to rank the Fulani herdsman as the fourth most deadly terrorist group after Al-Shabab, Islamic state of Iraq and Syria (ISIS) and Boko Haram in the world, Okoro (2018). In 2015 and 2016 respectively, 525 persons were killed, while almost 1700 persons and 1750 persons were killed in 2017 and in the first six months of 2018 respectively (Agbu *et al.*, 2020). Over 40 million naira of crops has been destroyed annually due to this crisis in some southern

states in Nigeria. The farmers-herders crisis caused the country about US\$14 billion between 1990 and 2015 respectively. Currently, thousands of Nigerians are living in various internally displaced persons (IDPs) camps with Benue state being the worst hit. Agricultural products (crops and livestock) worth millions of naira have been lost also because of the activities of the Fulani herdsmen (Ejiogu, 2019). Adelakun *et al.*, (2015) stated that crop production is at the receiving end of the farmers-herders crisis by the farmers in Nigeria. Ayodele (2017) explains that peace between the two groups can enhance gain of about \$13.7 billion annually, thereby allowing Nigeria to progress economically in a rapid manner. Although farmers and herders in Nigeria and other West African countries are at war in this devastating era of climate change resulting to food crisis, looting of National treasures, and killings resulting to serious National security, peace and understanding between the farmers and herders can bring benefits, enabling them to build their resilience and more successfully adapt to climate change.

1.2 STATEMENT OF THE PROBLEM OF THE STUDY

Empirical data indicates that climate change has induced several changes that are challenging to a healthy lifestyle globally and it is garnering unprecedented momentum. In the case of Nigeria, the effect of climate change could be seen as the major factors that have worsened the food crisis in Nigeria as a result of the insecurity created by the farmer-herder conflicts in country. It has also been linked to security issues in some areas due to conflict over scarce agricultural resources. According to several studies, Nigeria is a country where crisis complexes related to climate change are unfolding without any notable steps being taken to lessen the effects.

This research is understudying the role of climate change and its impact on Fulani herders who are nomadic by default and how the herders often migrate from the northern states to southern states of Nigeria in search of greener pastures for their cattle. It has resulted to farmers-herders crisis and these crises has been ongoing in different areas in the Middle belt and Northern part of the country for decades due to downward movement of herders and their cattle but started escalating beyond control from 1999 to 2024.

Due to the drastic impact of climate change in Nigeria, it has compelled more herders to migrate further to southern states for grazing. In turn, the farmer has insisted of protecting their farmlands against this large movement of herders. The actions and reactions of herders and farmers due to herders' movement, which aftermath has caused food insecurity, killings, hunger, inflations in prices of goods, poverty and poor economic growth, are the bases for this study.

The main objective of this study is to evaluate the impact of climate change on food security as a result of farmers and herders crisis in Nigeria. The specific objectives are to:

- I. Assess the impact of climate change on food security due to farmers-herders crisis in Nigeria.
- II. Furthermore to ascertain how farmers-herders crisis exert influence on food security in Nigeria.
- III. And to proffer solutions that will help mitigate the effect of climate change in Nigeria.

1.3 RESEARCH QUESTIONS

From the foregoing, this research is to provide answers to these questions:

Given that there are conflicting positions by different persons on the veracity of the existence of climate change in Nigeria, to what extent has climate change impacted food security in Nigeria?

Secondly, how does the farmers-herders crisis exert influence on food security in Nigeria in relation to the inflation and food crisis in the country?

Thirdly, what are the solutions that will help mitigate the effect of climate change on food security in Nigeria?

1.4 THE METHODOLOGY OF THE RESEARCH

In order to conduct an objective and critical research on this study both quantitative and qualitative data was used in order to offer a comprehensive case study. This study also used special studies on climate change from international non-governmental organizations, as well as data from semi-structured interviews with local farmers and herders in the states that are mostly affected by the conflict in Nigeria. The study's conclusions were derived from an examination of data from primary and secondary sources. Recent scholarly publications like articles, books and journals relevant to the topic were sourced for to provide the secondary data. Only articles, books and research reports published between 2010 and 2023 in English were sought. In order to retrieve the right resources, relevant search terms such as 'Climate change', 'Food security in Nigeria', 'Farmers-herders crisis in Nigeria', 'Solutions to farmers-herders crisis in Nigeria'. The most appropriate keywords identified in the topic include: Climate change, Farmers, Herders, Food security, Crisis and Nigeria. More so, to further complement the results from the secondary data, farmers and herders were purposively selected for the study. Participants were selected

from three geopolitical zones with incessant cases of farmers-herders crisis in Nigeria. The three selected geopolitical zones include: North Central (Benue State), South west (Ondo State), and South East (Ebonyi State) respectively. A total of 30 respondents, consisting of 10 respondents per State, were interviewed from the focused areas. The interview schedule was recorded, transcribed and analyzed thematically in tandem with the research questions.

1.5 THEORETICAL FRAMEWORK

THE CONFLICT THEORY

According to the German philosopher Karl Marx in the 19th century, the conflict theory is based on the thought that groups always compete for limited resources and control, leading to inequalities in those groups and their corresponding professions, Adam (2023). Conflict results when unequal amounts of resources and power exist. The people with more power and resources try to maintain them and may even do so by repressing those with less power and fewer resources. Conflict theory includes the following assumptions: competition, structural inequality, revolution, and war, according to Adam (2023).

This research adopts the conflict theory as it offers an explanation for the negative relationship between farmers, herders and climate change in Nigeria, and takes into cognizance the influence of technological change on agricultural output and food security in Nigeria. This theory is appropriate as carbon dioxide equivalent, population growth, per capital income, arable land, and advances in agriculture are determinants of food security proxified by crop and livestock production output.

1.6 RESEARCH GAP

The important of this research lies on the fact that previous researches on the effect of climate change on food security in Nigeria have tailored towards emission of carbon dioxide as a result of its dominance among the greenhouse gases to the detriment of nitrous oxide and methane, which have higher global warming potentials than carbon dioxide. Additional, the influence of fluorinated gases (hydro- fluorocarbon, per- fluorocarbon, sulfur- hexafluoride, and nitrogen tri- fluoride are not considered. In this research, climate change is proxified by carbon dioxide equivalent, which is the aggregation of all the greenhouse gases in a single unit (carbon dioxide, methane, nitrous oxide, and fluorinated gases). Empirically, this research investigates the effect of climate change and food security in Nigeria. Also, unlike previous studies, this research investigated the impact of climate change on food security due to farmers and herders crisis in

Nigeria. Also to ascertain how farmers-herders crisis exert influence on food security in Nigeria. Finally, to proffer solutions that will help mitigate the effect of climate change in Nigeria.

CHAPTER TWO

UNDERSTANDING FOOD SECURITY AND CLIMATE CHANGE IN NIGERIA

This chapter explains how food security and climate change are closely related to the effects of Herders- Farmers crisis in Nigeria. The unprecedented shift in rainfall pattern, extreme weather conditions, and temperature that has resulted to drought and flooding in the country is evidence of the reality of climate change and its consequences. These climate related events are disrupting livestock and food production, thereby making the country volatile to all the security vices that poverty and hunger could foster, like banditry, kidnap and terrorism. It is therefore crucial in understanding the intricate relationship between climate changes and food security, and the security of the country.

Food security is a situation whereby the citizens of a particular country like Nigeria have an access to the good quality and right quantity of food every time, and where there is no

undernourishment or malnutrition, or fear of famine soon, Idumah *et al.*, (2016). According to World Food Summit (1996), food security is the access to enough or adequate, safe, and nutritious food to live in good health by the people. Ojuederie and Ogunsola,(2017) also added that when people live in good health due to the fact that they have the capacity to acquire enough or sufficient, safe and nutritious, and balanced diet for their survival and existence in the country; food is said to be secured in such country.

Food security involved the followings: food access, food availability, and food use. Hence, because of this research, food security is defined as the availability in terms of quality, quantity, enough or adequate amount of crops, and availability of livestock products for consumption by man and other uses. Food security in this research is proxified by livestock production output (LPQ) and crop production output (CPQ) in Nigeria.

2.1 CLIMATE CHANGE AND FOOD SECURITY IN NIGERIA

The global community is rapidly feeling the sweeping effect of the impacts of environmental changes as a result of human activities that is putting pressure on the atmosphere and Nigeria is not spared of these changes, According to reports by Ughaelu, (2017) and Ayinde *et al.*, (2011) Nigeria is one of the Sub-Saharan African nations most vulnerable to climate change. Over the past ten years, the country's repeated natural catastrophes have made life harder for people and reduced food production in some areas of the country. In 2012, sections of Nigeria saw severe floods that had not been seen in forty years, which resulted in a complete loss of life, destruction of crops and livestock, and several communities were displaced forcing a massive destruction of homes and farmlands. As the effect in the environment is sweeping across the country, it affects the six Geo-Political zones of the country in varied degrees, according to reports by (Ughaelu, 2017), in the semi-arid regions of the Sudan and the arid Sahel Savannah regions in the Northern and Southern Guinea savannah belt, It results in altered rainfall patterns, with rainfall typically arriving later and prolonging the dry season. Severe flooding is experienced along shorelines during the rainy season. It causes reduced rainfall, drought, and a rapid increase in desertification. , while In the rain forest zone, a total alteration of the weather condition is experienced as it causes heat waves, prolonged dry seasons, delays in the onset of rainfall, and flooding along the coast; in the mangrove swamp, it causes flooding of regular dry lands. Additionally, the continuous rise in sea level poses a serious risk to farming activities and raises the water's temperature, which has a negative impact on fishing activities.

The ongoing food crisis in Nigeria that have grown so glaring such that some citizens in the Northern part of the country had to attack a truck load of foodstuff on the Kaduna expressway and looted the goods is the evidence of the food security, in the reports by Tirado *et al.*, 2010 and Uwazie,(2020) these are as a result the impact of the terrible climate conditions that have led to alteration of the normal rainfall patterns, dryness and desertification which makes it difficult for agricultural activities to thrive. According to Wossen *et al.*,(2018), the continuous reduction in rainfall patterns in specific regions of northern Nigeria has made the affected areas unsuitable for the production of crops and animals by through natural means , and the locals are not

knowledgeable and suffocated on the application of irrigation facilities to mitigate these impacts, similarly persistent flooding in the southern part of Nigeria and along coasts has caused crop damages, nutrient loss, soil toxicity, and soil ecosystem instability. These effects of the climate change have prompted a warning by the World Bank and the Food and Agricultural Organization on the impending dangers as it made push Nigeria further into the precipice and cause adverse conditions of lack of sufficient food, and food crises that would worsen the already National and economic security situation of the country and plunge the citizens into anarchy.

2.2 IMPACT OF CLIMATE CHANGE ON AGRICULTURE

The Nigerian populace thrives on the practice of subsistent Agriculture and the impact of climate change on the weather conditions either through floods, rise in temperature or droughts would definitely thwart the stable production of food, according to Onuoha and Ezirim, (2010) Climate change is threatening the livelihood of 15 million herders in northern Nigeria who are pastoralists by limiting the availability to water and limiting their amount of pasture thereby inducing the constant influx into southern part of the country and fueling the herders – farmers clashes. They maintained that the negative impact of climate change is progressively causing food insecurity especially in vulnerable places where hunger and malnutrition are already common. They went on to say that low-income people would no longer be able to buy basic meals due to the recent surge in food prices in Nigeria.

Similarly, Fasona and Omojola (2005) opined that the growing aridity in the Sudan Savannah and Sahel regions has rendered significant areas unusable for agricultural output, along with the crisis of food security in the impacted, densely inhabited areas. They added that because of the risks posed by climate change, it is anticipated that the number of malnourished children in Nigeria will steadily rise. In support of this assertion, Idumah et al., (2016) in using 1975 to 2010 statistics examined the short- and long-term relationships between a number of meteorological variables, including temperature, relative humidity, and rainfall, and agricultural productivity in Nigeria. They discovered that there is a short- and long-term correlation between climate data and food production.

Apart from the environmental and health concerns on the impact of the changes in the climatic condition in Nigeria, the major risk is the threat that climate change poses to agricultural productivity which one of the basic means of its survival, Nigeria's usual agricultural production pattern is gradually changing as a result of changes in rainfall patterns and temperatures that have occurred within the last ten years. According to Ikem, (2018) there is a direct relationship between climate change and food security, taking into account the importance of adequate food for human existence, it is one of the reason for the escalation of the insecurity situation, be it kidnapping and terrorism as they are usually induced by hunger and starvation. This is seen Drought brought on by climate change has had a detrimental impact on the fishing industry, particularly in areas where fishing is reliant on natural water supplies. According Anyika, (2020) the declining water resources in Nigeria's Lake Chad region have had a significant impact on the region's thriving and profitable fishing industry as a result of climate change. This has reduced

the region's contribution to the fish supply chain and made the majority of the region's fishermen unemployed

The impact of climate change in Nigeria is not only on the environmental compositions which affects Agricultural productivity, but on the storage of food as well, According to Taub *et al.* (2018) the carbon dioxide concentration in a crop, affects its quality, the higher the CO₂ content, the lower the protein concentration of the crop and vice versa. Similarly, Berhanu and Wolde, (2019) in their report maintain that extreme weather conditions such as flooding, drought have a deleterious impact on the compositions of mineral elements in the soil. Excessive rainfall can cause leaching and flooding that deplete soil fertility, which can raise soil acidity and will affect the crop's nutritional contents. In line with the position on the impact of soil content on food quality and storage, Igwe (2019) also mentioned that when flooding occurs over time, it can lead to a build-up of dangerous elements like arsenic in the soil. If crops absorb these elements, consuming large amounts of them can cause serious health conditions like heart failure in humans.

On further analysis of the effect of climate change on Agriculture and its inseparable impact food crops, Ikem (2018) maintains that the rise in humidity poses a serious challenge in storage and processing of root crops like yam, cassava, which are the staple foods in Nigeria, and vegetables like carrot, cabbage would quickly get rotten due to the fact that the farmers and the merchants of Agricultural products in the country do not have modern means of storing and preserving these crops for a long period of time without incurring huge losses.

2.3 LINKAGE BETWEEN CLIMATE CHANGE AND FOOD SECURITY

The wave is sweeping across the globe, affecting the different continents in varying degrees in a subtle but devastating effect; its consequences on human life are hidden by the nuanced nature of climate change. One of its biggest drawbacks is the lack of food. In addition to changing the relative humidity, temperature, and weed and pest populations, it also affects crop and livestock physiologically by reducing water availability and changing the minerals in the soil. Human security is put in jeopardy in areas affected by climate change because of conditions like desertification, erosion, and ecological destruction. According to Kelechi *et al.* (2021) most of its dreaded consequences like droughts, floods, and other environmental extremes definitely lower agricultural output. This resultant risk associated with the practice of Agriculture and production of food in Nigeria which is sporadically hitting its low as against the spiral population growth, is the reason for the food crisis and economic and national security emergencies which the government of the day seems to know little or nothing in terms of tackling the hunger pandemic head-on. Sea warming, changing in sea salinity and high sea acidity were factors observed by Kelechi *et al.*, (2021) as some of the physical changes that climate change brings. Several incidents of mass aquatic deaths in the Niger delta region of Nigeria are indications of the horrendous effects of climate change. Such losses threaten the livelihood of riverine communities that heavily relies on food and trade (Kelechi *et al.* (2021).

Furthermore, according to (Kelechi *et al.*, 2021) Agricultural productivity is one of the glaring and heavily affected sectors in Nigeria and can be seen as greatest influencer in the Herders-

farmers conflict in Nigeria amidst other perceived factors like the idea of the Fulani ethnic group trying to dominate other ethnic groups in Nigeria. The resultant effect of the impact on Agriculture is the food crisis and inflation experienced in Nigeria. These are other aspects the climate change alterations have grave consequences on the lifestyle of the people:

- It has become so audible to the deaf and visible to the blind on the impact of climate change such that the local uneducated farmers know that there is an offset in the pattern of their agricultural activities. Changes to the planting and harvesting seasons: In certain regions of Nigeria, climate change has progressively affected the onset of rainfall and the pattern of cessation, changing the regular planting and harvesting seasons. The shift has also had an impact on the food chain, making some foods scarce during times of the year when they should typically be more readily available. Low-income households and people cannot afford vital food due to a limited availability of food items and a consistent rise in food prices.
- Another consequential impact of climate change is on the aspect of crop output: As a result of climate change, there is a decline in crop yield due to changes in climatic circumstances such as rising temperatures, more precipitation, droughts, high rates of evapotranspiration, increased soil acidity, and flooding. Studies have indicated that rising atmospheric carbon dioxide concentrations affect agricultural yields in both positive and negative ways. For instance, high content of carbon dioxide concentrations cause less grain to be produced, and as one of the staple foods in Nigeria, the scarcity and high cost of available ones are one of the contributory factors of the food crisis in the country.
- Variations in temperature and relative humidity have provided safe havens for the breeding of pests stimulated the growth of a wide range of horticultural and faunal pests. Numerous pests that prey on both plants and animals have been reported on a regular basis. For instance, malaria still remains one of the deadliest diseases in African countries and Nigeria is not exempted due to the easy breeding of mosquitoes that are responsible for transferring plasmodium that causes malaria.
- There was a wide range of national outcry by poultry owners on the massive death of their birds in March 2024; this is not as a result of a bird flu outbreak, but as a result of the hotness of the environment. Just as farmers are experiencing their side of the impact in the change in atmospheric conditions, the poultry owners are having their own experience too, and this has resulted in the high cost of basic dietary products and it seems to be a connecting reaction to the overall prices of Agricultural products.
- The aquatic products are not spared of the effect of climate change. For instance in the Riverine areas of Port Harcourt and the Niger Delta region that is known for their rich aquatic products and huge fishes. There is a massive decline in the size and availability of those aquatic products due to the contamination of the environment and it has affected the cost of living in the country and has added to the food crisis.

The traditional notion of national security and international security cannot be established without considering human security. Human security is complementary to national security in

the same way that national security complements international security. Hence, human security is rudimentary to the notion of security at national and international level respectively, as it provides more fundamental, detailed and comprehensive method to security discourse. According to United Nations' General Assembly Resolution 66/290 "human security is a method to assist member states in identifying and addressing widespread and cross-cutting challenges to the survival, livelihood and dignity of the their people". This method, according to the resolution calls "for people-centered, context-specific, comprehensive and prevention-oriented responses that strengthen the protection and empowerment of people". The influence of climate change on national and international security can be better appraised from more comprehensive human security method.

The emergence threat to human security in Nigeria is constituted by climate change. As the various degrees of impacts and influences in the lifestyle and availability of basic means of survival has been elucidated in the various chapters. The effect of climate change constitutes a major challenge to the current breakdown of order in the country. According to Mr. Peter Obi, one of the presidential candidates in the just concluded 2023 Nigeria's presidential election, while responding to a media chat On Arise Television station in Nigeria on 30th September, 2022 asserted the poverty in the country is one of the reasons for the increase in criminality and kidnappings. On how he would tackle insecurity and banditry, he mentioned that he would focus in best Agricultural programs that would guarantee food security, and once he secures the availability of food, more than half of the security challenges will be solved. According to (Idumah *et al.*, 2016) the struggle for limited availability of arable land is one of the major causes of the herders –farmers crisis that have claimed thousands of lives and led to destruction of immeasurable properties including destruction of homes and creation of internally displaced persons in their native homes. According to Adishi & Oluwa, (2018) the communal clashes between the herders and the farmers have caused numerous deaths and are increasingly worsening due to the effect of climate change and the unwillingness of the political class to act with the necessary urgency in addressing the situation as it has taken other form of vices like kidnapping, armed robbery, banditry, amidst the scorching economic reality of the country. There is no denying the fact that the unprecedented food crisis in Nigeria, a country that has the enormous resources both human and natural capital would be wallowing in struggling to feed its citizens and meet the basic needs of securing lives and properties.

CHAPTER 3

THE FARMERS- HERDERS CRISIS IN NIGERIA

This chapter will lay the historical analysis of the farmers' - herders' crisis in Nigeria and the magnitude of the effect of the crises, ranging from the incessant attacks by the Herders and the reprisal attacks by the farmers that have led to loss of so many lives and destruction of properties, causing the displacement of indigenous people of the affected states from their homes and the growth of internally Displaced Camps. Prior to recent years, the farmers and the Herders lived harmoniously and even involved in Barter trade, where the herders would exchange the milk extracted from their cows for food from the farmers who would gladly assist them with

drinking water. However, it is a different scenario in the country now and has become a major security challenge, due to the constant clashes.

3.1 THE HISTORICAL CONTEXT OF THE CRISIS AMONG FULANI HERDERS AND THE FARMERS IN NIGERIA

Nigeria's "farmer-herder crisis" refers to the continuous conflicts between Fulani herders and indigenous farmers in the several states that are affected by the crisis. At times, these conflicts might take the form of an ethno-religious crisis between Muslims and non-Muslims, as the herders are predominantly Muslims. Since 1999, there have been numerous crises, particularly in the Middle Belt region of the country (North Central) and little part of the North but it has metastasized into different parts of the country as can be seen in the incessant and repeated attacks on the different farm settlements and communities most especially the Northwestern Nigeria that is witnessing a constant barrage of raids by Fulani bandits targeting farms. The conflict between farmers and herders in Nigeria's Middle Belt can essentially be seen as a land use related conflict as the Fulani herders who are regarded as invaders constantly seek for arable lands for grazing of their livestock, while the ingenious farmers are grappling to cultivate their lands for agricultural purposes. According to the reports of Amnesty international in 2018, the conflict has resulted to the death of tens of thousands of Nigerians, which are usually from the attacks by the herders and retaliatory attacks by the farmers. The local and rural communities where most of the farming activities take place are usually the epicenter of these conflicts, although it sometimes spirals to cities, in form of kidnapping and terrorism.

Farmers-herders crisis in Nigeria have rooted and dated deeply back to pre-colonial eras (before the 1900s). However, these crises have become more serious and severe in recent decades as a result of population increase, the rising downward migration of the Herders towards the southern part of the country in search of grazing and arable lands and the quick drying of water bodies due to the impact of climate change. According to Blench and Roger, (2010), in the colonial era the farmers and herders had an understanding on simple symbiotic system known as *burti*, where certain routes were mapped out as grazing routes for the herders to move along with their livestock. However, the system collapsed in the early 20th century as there was increase in population of farmers who laid claim to their native lands for agricultural purposes, and this resulted to farming activities in those supposed routes being used by the herders as such, the clashes arises when the herders would encroach of the lands of the farmers, destroying their crops.

Similar to the impact of climate change in the role of the downward movement of the Herders towards the southern part was the issue of Tropical diseases in humid climates which was a challenge for herders from keeping cattle large scale over time, but contemporary medical advancements have also allowed herders to relocate their herds even farther south, into the southern "tsetse fly zone." Beginning with the measures put in place by the British colonial government, tsetse fly control initiatives have lessened the risk of illnesses like trypanosomiasis. Herders now have access to medications for dermatophilosis and trypanosomiasis to ensure the survival of their cattle. Secondly, according to Blench and Roger, (2010), the Herders have made

significant progress in improving their cattle's resistance to tropical diseases by crossing trypanosome-intolerant zebu cattle with trypanosome-tolerant hump less varieties.

The consequential influence of climate change and the search for disease-free environment that would enable the herders raise their livestock and make considerable profits have led to the influx of the herders into the southern part of the country that is free from Tsetse fly and that guarantees high profits in the sale of their livestock. In several cases they experienced resistance from communities who viewed the migration as a possible means of forceful takeover of their lands and the destruction of their farms which guarantees their survival thereby engaging the herders in serious combats. This act of resistance and fight for the protection of their lands eventually leads to continuous crisis as the herders would refuse on leaving those communities.

3.2 CAUSES OF THE HERDERS – FARMERS CRISIS

The Farmers- herders' crises which have led to the death of thousands of lives and the destruction of properties is an economic issue as well as a security issue. The constant attacks have led to the scarcity of food and inflation due to the inability of the farmers to safely engage in their agricultural activities. The herders attack the farmers in the course of moving their livestock from one location to another a phenomenon that is obsolete in this 21st century, however the Fulani herdsmen lay claim that it is the only means of livelihood known to them, and they are naturally nomadic pastoralists. As the issue have become a national menace, and cause to death of the citizens of the country, one would be irked to inquire what the root cause of the herders- farmers' clashes is in country.

While those who are in defense of the Fulani herdsmen argue that the attack by the herdsmen is as a result of the stealing and rustling of their cattle by individuals which have led to an economic loss in their business, and even the death of their members from the hands of the cattle rustlers in the process of stealing their cattle, have led them to device means of protecting themselves with AK- 47 rifles against the rustlers. According to Blench and Roger, (2017) a strong advocate for this position in support of the Fulani herdsmen is the Miyetti –Allah social cultural group that constantly defends the actions of the herders, be it the attacks on the villagers or the destruction of people's farmlands as means of protecting themselves from the rustlers or a reprisal and counterattacks by the villagers who according to them often kill the Fulani herders unprovoked when trying to steal from them. Secondly, that the herders have the right in their interpretation as enshrined in the Nigerian constitution to freely move with their cattle from place to place in search of pastures, maintaining their established grazing routes. The position of the Miyetti – Allah is that the herders- farmers crises is as a result of the deteriorating weather conditions that have made it difficult to find greener pastures for their grazing livestock, and that they are defending themselves from cattle rustlers, while maintaining their grazing route. However, on the contrary the Senator Titus Izam representing Benue North senatorial district among so many Nigerians, maintains that all over the world what guides the conduct of human activities and citizens of a country are laid down laws, and the Nigerian senate which is the highest law making body in Nigeria should rise to nip the security and economic challenges which the Farmers- herders crises have caused, both the loss of lives and destruction of

properties. The crises have eluded the efforts of the security agencies; the only option is to enact laws to prohibit open grazing. He echoed that the herders had no exclusive right to ravage communities in their course of rearing their cattle. If the Nigerian senate can make laws to regulate the conduct of the citizens in other areas of life, it is exigent for the senate to make laws to prohibit free movement of herders from place to place. The idea of rendering relief materials to affected communities will not solve the challenge; rather the Senate should rise above the political and ethnic attachments and nip the security and economic crisis above the board. Similarly, there is a wide range of belief among Nigerians especially those from the southern parts that are predominantly Christians and are terribly affected by these menace of the activities of the Fulani herders, that it is an attempt to annihilate them and take over their ancestral lands by the Fulani herders, thereby Islamizing the country in the process by inviting Fulanis in other West African countries to domicile in those places. The activities of the herders have taken a different dimension, developing into banditry, kidnapping and human trafficking as well as raping and other criminal activities. It is an economic as well as a national security issue that has placed the country in a ticking time bomb that may escalate into ethno- religious conflict that will have terrible consequence for the country.

The conflict between the Fulani Herdsmen and the farmers has been reoccurring phenomenon since the year 2000, and it has continued to rear its dreaded monstrous head with no sight of solution, rather it has become one of the issues of National security concerns in Nigeria. One of the epicenters have been the rural and urban cities in Plateau State and in Kaduna such that the volatile nature of the situation have eluded the constant combat of security operatives in the area, who have not been able to quell or completely contain the crises which have led to the death of thousands and the destruction of properties and the burning of communities.

According to Blench & Roger, (2016) the crisis which has claimed thousands of lives and properties seem to have eluded the security operatives in different areas that the herdsmen and the farmers are in constant clash due to the fact that it has not received proper political attention. In their view, the herdsmen's constant invasion of people's farms and the displacement of different homes is a continuation of the primordial claim by the Fulani ethnic group has an unrestricted access to different lands in Nigeria. In fact the former president of Nigeria, Muhammadu Buhari who is a Fulani affirmed their claim in an interview when he was asked what would be the solution to the herders- farmers' crisis.

On the floor of the present 9th senate of the federal Republic of Nigeria, Senator Victor Umeh,(OFR) representing Anambra Central senatorial district, he described the incessant attacks by herdsmen across states of the Federation as heinous and that the political class have been invading the real cause of the crisis, in his words, the herders should be told to confine their cattle in a place since they are engaged in a form of business, they do not have an open latitude to move around with their cattle. The herders move around the country with their livestock, invade people's farm, kill them and destroy their homes, he suggested that there should be a ban on open grazing to help mitigate the marauding gun- wielding herdsmen.

An overall atmosphere of insecurity has developed over time as a result of the sporadic conflicts between farmers and herders in Northern and North Central Nigeria. According to Higazi et al.,(2016), the swift escalation of instability fosters and facilitates more heinous criminal activities, including raids, mass kidnappings, and looting by gangs of bandits targeting critical targets.

LIST OF FARMERS-HERDERS ATTACKS IN NIGERIA

Both International and local Newspapers in Nigeria have been unable to ascertain the exact numbers of casualties that have been Fulani herdsmen. Despite the different attacks and the high recorded death tolls and destruction of properties which has led to the annihilation or the total sacking of different communities, the local and international media rarely report the accurate figures due to the inability to have a firsthand information thereby constantly reporting not accurate statistics according to the reports of Hiribarren and Vincent,(2019).

There have been several attacks and clashes between the herders and the farmers; these are some of the reported attacks that have led to scores of deaths and casualties: according the reports from the Global terrorism index in 2015, the attacks by the herders claimed up to 800 lives and the destruction of large communities.

Similarly in 2016, the herdsmen attacked Agatu and Nimbo community in Benue State, and in Enugu state in the southern part of Nigeria where the herdsmen massacred thousands of the indigenous people. They equally attacked and killed 19 people in Christian worshipers after they damaged different homes. In a reprisal attack between the herders and farmers, in 2018 according to the reports by Ochentenwu & Jim, 2(019) 10 persons were killed in Adamawa state. In one of the deadliest attacks in recent years, June 2018, the dispute between farmers and herders in the state of Plateau resulted in 200 deaths and the burning of roughly 50 houses. Similarly, on the night of 22nd June till the morning of 23rd June 2018, June 23, up to 21 residents of Dowaya, Adamawa State were massacred by Fulani herdsmen; they killed mostly women and children according to the reports of Kazeem and Yomi, (2028). Another dispute between the herders and the farmers in Taraba state, in Yandang community, it resulted to the death of more than 73 persons were killed and several houses were burnt.

In 2023, in what was described as ‘Bloody December’ Fulani herdsmen on the eve of 24th December, attacked Plateau State and sacked about 17 rural communities in Bolko and Barkin Ladi local Government Area and more than 200 person were killed and 500 injured while several houses were burnt as well according to the reports of Asadu and Chinedu, (2023).

There have been series of unreported cases in different communities in both the southern and the Middle Belt region of the country especially the attacks in Enugu state, Benue and some parts of Ebonyi state, where the Herdsmen have destroyed farms belonging to the farmers and thousands of people killed. It has become a reoccurring phenomenon such that the senators representing the different constituencies where these attacks are perpetuated have constantly raised alarms at the floor of the Nigerian senate, advocating for the arrest and prosecution of the marauding herdsmen while they maintained that the herders should confine their cattle in a place instead of moving around with them and destroying peoples farms and homes.

According to Mufutau *et al.*, (2020), farmers are people who undertake agricultural activities of crop farming on either on a small scale or large-scale basis, and whose crops are always being destroyed by herders. On the other hand, Nwankwo *et al.*, (2019), describes herders as nomadic that are responsible for rearing of cattle and in the process of rearing the cattle; they tend to take over communities via forceful means and make them their permanent home. Mufutau *et al.*, (2020) stated that herders as Fulani herdsmen or pastoralists are normally nomadic or semi-nomadic and are known for causing problems with crop producers in Nigeria.

This research sees the farmers-herders crisis as the disagreement between farmers who are mostly peasants that cultivate crops on their ancestral lands for subsistence and commercial purposes, and herders are mostly Fulani Muslims from northern part of Nigeria that migrate in large number towards the south looking for greener pastures for their cattle to graze on. These disagreements are due to grazing routes, destruction of crops by herders, cattle rustling; sudden death of cattle etc. This crisis usually involves the death of large population of people, destruction of farmlands and properties, destruction of crops and farm products, death of livestock, among others.

CHAPTER FOUR

COMBATING THE EFFECT OF CLIMATE CHANGE ON THE HERDERS- FARMERS CRISIS

This chapter presents results and discussion of the findings from farmers and herders, and from the literature review. The results are discussed thematically and are in tandem with objective of the research. It is to determine the level of the effect of climate change and its consequential relations to food crisis in Nigeria and the resultant effect of the farmers-herders crisis in Nigeria, the extent farmers-herders crisis exert influence on food security in Nigeria, and the solutions that will help mitigate the effect of climate change in Nigeria.

This section equally explains through an interview, the opinions of the Herders and Farmers that were randomly selected for the sake of this research. A total of 30 Herders and 30 farmers were selected from the 3 most affected Geo- political zones in Nigeria, one state each from the Geopolitical zones, Ebonyi state from the south- East, Benue state from the North central and Ondo state from south west. The response on the respondents' are their personal opinions and they all choose to be anonymous for the sake of the Research, although 30 persons were choosing for the research, their opinions are not totally different from public opinion, and these states were carefully selected due to the increased cases of Herder Farmers crisis in Nigeria.

4.1 RESULTS AND DISCUSSION ON THE IMPACT OF CLIMATE CHANGE ON FOOD SECURITY DUE TO FARMERS-HERDERS CRISIS IN NIGERIA

To achieve objective one, a structured interview was conducted to assess the impact of climate change on food security as caused by farmers-herders crisis. A total of thirty (30) farmers drawn from the three selected research areas that represented their geopolitical zones which include North Central (Benue State), South West (Ondo State), and South East (Ebonyi State) respectively were interviewed. In responding to the question on whether climate change has negatively impacted on production and to what extent, 26 (87%) out 30 farmers agreed that climate change has affected their production negatively and 4 representing (14%) were neutral. Similarly, 29 (97%) out of 30 herders noted that climate change has impacted negatively on their livestock production.

This result indicated that the effects of climate change in Nigeria have had a terrible influence on the activities of the farmers and the herders as shown in the response pattern of the respondents. Most of the farmers and herders estimated the extent at which climate change impacted negatively on their farming. The farmers and herders attributed it to the alteration of rainfalls which results to either late arrival of rainfall and prolong dry season, or excessive rainfall resulting to flooding. As a result of these climatic changes that has impacted negatively on farmers and herders in Nigeria; the herders started migrating from the northern part of Nigeria to the southern part of Nigeria, in search for greener pastures for their livestock. These have led to incessant and wanton damaged and destruction on the farmer's farmland and their produce. Similarly, the farmers in an attempt to protect and secure their farmlands resulted to crisis as reported by farmers in the selected research areas in Nigeria. The farmers and herders also affirmed that there is low production of both crops and animals (livestock) due to this crisis between farmers and herders respectively in Nigeria. The farmers that were interviewed on the extent of climate change on food security in Nigeria responded that the high cost of food crops especially cassava and yam recorded in Nigeria is due to the wanton destruction of their farm produce and their farmland by herders. Also, on the part of the herders, they attributed the high cost of beef meat and whole cattle to the fact that farmers are killing their cattle, and due to lack of grazing land for their livestock.

According Tirado *et al*, (2010) who maintain that the extreme climatic alteration leads to excessive rainfall and flooding, desertification and long dry- season which in turn have terrible negative effects on production of food. Similarly, Uwazie, (2020) posits that one of the major

causes of the food crisis and the human insecurity caused by scarcity of food and inflation in the country is largely based on the impacts of climate alteration. Also, Wossen et al, (2018) agrees that the frequent rainfall experienced in certain areas in the North has rendered the affected areas negatively such that it is difficult to engage successfully in any agricultural venture, while in the southern part of Nigeria the effect have led to constant flooding that have damaged crops and depleted the soil nutrients making food production a difficult task.

More so, according to Ogbuchi, 2020, food security is another impact of climate change. He started that it brings about changes in environmental condition which can force people to migrate out of their habitation where they engage in food production and other economic activities, thus making them susceptible to food insecurity. The association between forced migration and food insecurity has been laid down in so many other researches as Ogbo *et al.*, (2019), Oyinloye *et al.*, (2018), and Ngo and Otekunrin *et al.*, (2019). From the findings of these studies, forced migration reduces access to food, thereby exposing the victims to malnutrition.

One of the key determinants of good outcome of food production is rainfall. The patterns of rainy season experienced in certain parts of Nigeria, has led to changes in food production in those areas. Excessive loss of agricultural products has also been seen in some parts of Nigeria due to uncontrollable flooding of agricultural farms. The repeated incidences of these natures have grave effects on the country's food security. According to (Okoli & Ifeakor, 2014) Nigeria is prone to climate change, and these consequential effects on food availability due to low agricultural output. The effect of this development is that a large numbers of Nigerians are below standard and cannot even eat at least three-square meals in a day thereby initiating the food crisis in the country and breakdown of law and order as was experienced in different parts of the country where trucks belonging to individuals were attacked while conveying foods from one state to another. These attacks were prevalent in Kaduna, Katsina and even in the Capital city of the country, Abuja. Similarly, (Etan, 2015) also opined that the altering of rainfall due to climate change Nigeria is subtly changing the planting and harvesting season. He also stated that changes in rate of transpiration and evaporation, uptake of CO₂ by green plants, respiration of plants and biomass caused by climate change, affect crop production negatively.

4.3 RESULTS AND DISCUSSION ON THE INFLUENCE EXERTED ON FOOD SECURITY DUE TO FARMERS-HERDERS CRISIS IN NIGERIA

The second objective of this study was achieved by conducting a structured interview to ascertain how farmers-herders crisis exert influence on food security in Nigeria. Also, a total of thirty (30) farmers drawn from the three selected research areas that represented their geopolitical zones which include North Central (Benue State), South West (Ondo State), and South East (Ebonyi State) respectively were interviewed. In responding to the question on how farmers-herders crisis exert influence on food security in Nigeria, 24 (80%) out 30 farmers agreed that farmers-herders crisis has exerted influence on food security in Nigeria and 6 representing (20%) were neutral. Similarly, 28 (93%) out of 30 herders noted that farmers-herders crisis has exerted influence on their livestock production.

This result shown that farmers-herders crisis observed in Nigeria caused negative influences on food security according to the response pattern of the respondents. Most of the farmers and herders air out their views regarding the extent at which this crisis has influenced their productions in a negative manner. The farmers at the northern part (Benue State) opined that the herders do not only attack the southerners but Christians, irrespective of their location in Nigeria. The Nigeria's herders- farmer's crisis number can be said to be disagreements between the predominantly Christian non-Fulani farmers and the primarily Muslim Fulani herders over the use of the available pastoral land either for farming or for their grazing cattle. According to farmers, the crisis is really biting on them as a result of the large populated Muslims in Nigeria, and that the political powers belong to them, hence, boost their immunity to fight with the farmers. The farmers and herders also attributed the crisis to an increase in population of those involved in cultivating lands for agricultural purposes thereby reducing the grazing lands that would have been useful to the herders. Also, environmental pollutions and the indiscriminate felling of tress that causes desertification and degradation of soil, and the abandoning of the local dispute settling mechanisms between the herders and the farmers resulting to self –help and the proliferation of small arms thereby increasing the incessant attacks in rural areas.

Furthermore, according reports from Amnesty International, Harvest of Death, (2018) who opined that despite the crisis being based on the availability and use of land between farmers and herders across Middle Belt region in Nigeria, the conflict has assumed ethnic and religious coloration as farmers are predominantly from the Christian faith of different ethnic background and the herdsmen are mostly Muslims from the Fulani extraction constituting about 90% of the nomadic. Blench and Roger, (2010) observed that the increasing ease of accessibility to weapons and religious polarization among both Muslims and Christians has added to the potential for crisis. Blench and Roger, (2010); Blench and Roger, (2017) also observed that farmers-herders crisis has led to the death of thousands of Nigerians and displacement of many since 1999.

This result findings also aligns with the observations of (Blench and roger, 2017); and (Bearak *et al.*,2019) that farmers-herders crisis is due to the increased in the population of those involved in agricultural activities, cultivating more lands than using them for pastures, additionally, the deplorable environmental pollution and indiscriminate felling of trees that have cause desertification, the disregard of applying the local mechanisms of dispute settlement between the herders and farmers. These have increased the farmers-herders crisis throughout much of the western Sahel. Insecurity, violence and crisis have resulted in several populations to establish self-defense forces and ethnic and tribal militias, which have engaged in further crisis. According to the reports by (Blench and Roger (2017), the majority of farmer-herder conflicts have been between Fulani herdsmen who are Muslims and the farmers who are Christians.

4.4 RESULTS AND DISCUSSION ON THE SOLUTIONS THAT WILL HELP MITIGATE THE EFFECT OF CLIMATE CHANGE IN NIGERIA

Several researches have been carried out on mitigating the devastating consequences of climate change on food security and farmers-herders crisis. To achieve objective three of this study, a structured interview was conducted between the farmers and herders in order to obtain their own views regarding the solutions that will help mitigate some the aftermath of climate change in Nigeria. Thirty (30) farmers were drawn from the three selected research areas that represented their geopolitical zones which include North Central (Benue State), South West (Ondo State), and South East (Ebonyi State) respectively for an interview, these states were selected due to its crucial positioning and landmark in Nigeria and represents the places that have frequent clashes between the herders and the farmers. In responding to the question on what should be done to mitigate the effect of climate change in the country, 29 (97%) out of 30 farmers agreed that raw materials like improved seedlings, exotic breeds of farm products, drought resistance crops, pest and disease resistance crops, incentives, and warehouses for silos should be provide by the government to local farmers across the three geopolitical zones of Nigeria and 1 representing (3%) were neutral. Similarly, 26 (87%) out of 30 herders were of the opinion that government should provide grants and compensation to affected persons, and grazing lands for herders across the three affected geopolitical zones of the country.

The results of the findings obtained in this study was in tandem with the report of John (2018), that government should designate grazing fields for the nomadic herdsmen and make them pay tax to the state or federal government of Nigeria. Raw materials to aid food production and farming, provision of warehouses for storage of food produce, awareness creation, and grants and compensation to the affected person(s) should be given by state or federal of Nigeria.

The findings of Higazi *et al.*, (2016) and Blench and Roger, (2017) are also in line with the findings obtained from this study, they professed the importance to create awareness of the effect of climate change as its causes reduction and deteriorating environmental conditions, degradation of soil and desertification and also led to Fulani herders from the northern part of the country to change their grazing directions. Due to the availability of greener pastures and water bodies for their cattle, they found the need to travel down the southern part in order to feed their livestock.

According to (Rachael and Abujah, 2018) ranching has been frequently proposed as a remedy to the clashes between the herders and the farmers in the country, this has proven not solved the crisis due to a number of reasons ranging from poor infrastructure, unstable electricity and lack of portable water and the herculean task of land ownership. Additionally, Cattle rustling with the legal challenges of acquiring a land are major setbacks to the herders. However, the herders could take responsibility for their cattle since it is a profession or business that they profit from,

other than encroaching on the farmer's farmland which have caused loss of lives, properties and is a security challenge in Nigeria.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Climate change has additional risk in Nigeria towards food security. The process leads to multifaceted forms of violent, crisis, insecurity, menace, and instability of life, which have led to wonton vandalization of human properties and communities, malnourishment, high level of unemployment, destitution, destabilization of human lives, lack of political and public stability and peace ad hunger.

The depressed state of food security in Nigeria has caused a lot of individuals to be malnourished, starved and poor, which is due to the rapid increase in the population in Nigeria, and if issues are not tackled properly, it will constantly trigger public instability and crises. The

increasing risk to food security in Nigeria is due to change in climatic condition. Differences in climatic factors or elements recently have increasingly and gradually destabilized the process and system of production of food in Nigeria. Reduction in the supply of food which is associated to change in climatic condition has led to rapid increase in prices of food commodities and products in Nigeria thereby exacerbating food security condition. The constant of dryness and reduced rainfall in the northern states of Nigeria, has negatively affected production system and activities of agriculture in the area. More so, lack of enough grazing land and pasture in the areas has led to forcefully departure of herders from the region towards the north central (Benue State), south west (Ondo State), and south east (Ebonyi State) parts of Nigeria. These herdsmen are regularly causing incessant violence with local and indigenous farmers, leading to worsening of the insecurity challenge in the country.

The insincerity of the political class in administering good governance in Nigeria is also exacerbating the effect of change in climatic condition in Nigeria. Government should do the needful in order to reduce the negative influence of climate change by providing the necessary requirements for nation building but it is evident that the political classes in Nigeria are usually charged with corruption and misappropriation of public funds. They think more of self and interest of a small close-knit of people who do not readily allow others to join them.

The problem of food security challenges, insufficient education, and change in climatic condition are vital issues to be considered at the national level, because many graduates do not show any concern in agricultural extension services and education. There is high disassociation between the non-practical forms of learning that is ongoing in most of our institutions, and therefore there is need for practical-based education in all levels to be initiated in order to change agricultural practice in the country.

It is needful for Nigerians to embrace, and apply some intrinsic measures in order to manage and survive with the negative effects imposed by change in climatic condition in Nigeria to ensure availability of food through long lasting agricultural process and system. Such strategies will also gear towards addressing some negative effects that result to farmers-herders crisis in some parts of Nigeria.

RECOMMENDATIONS

The issue of climate change has become a global concern as it is upsetting different aspects of human existence, ranging from harsh weather conditions, to displacement of persons due to the effects of flooding, desertification and other associated disasters that have caused speedy migration for survival. Measures to tackle the causes of climate change involve applying the best agricultural practices and avoid the activities that deplete the environment. To solve these impeding problems caused by change in climatic condition on security of food and the resultant

effect on the farmers and herders crisis, the study recommends the following in order to mitigate the problem;

- Illegal waterways, indiscriminate cutting down of trees and gas flaring should be prohibited by government, while establishing friendly environment in order to restore the nature state of the environment. Proper implementation of laws that protects the environment would also help to maintain the conservative practices while activities that deplete the environment should be discouraged or mitigated.
- Secondly, Researches should be tailored towards alternative to natural production of crops and livestock to ensure security of food. Production of breed of crops and animal with short duration for maturity should be researched on, in order to combat the issue of low rainfall that may likely affect agricultural productivity.
- Furthermore, novel agricultural approaches that can withstand any change in climatic condition should be inculcated to ensure sustainability of food in Nigeria.
- More so, Crops that can withstand dryness should be planted in locations that are prone to dryness. This would help reduce the illegal migration of herders and their attacks on farmers in Nigeria. This strategy will also ensure long lasting harmony and food security in Nigeria.
- Similarly, Grazing farmlands should also be established for the herders in the northern parts of Nigeria by the government to reduce the incessant crises in Nigeria. Also, Establishment of artificial water bodies and irrigation as alternative practices in the northern parts of Nigeria should be implemented by state and federal government as well as other stakeholders to ensure that clashes between the herders and farmers are prevented and that the farmers could go about their activities without fear of being attacked.
- Finally, Climate change mitigation strategies such as the decrease in bush burning and the constant use of fuels/gases that have high global warming efficacies, the encouragement of afforestation, and constant practice of climate-friendly agriculture should be highly initiated and monitored by the government.

APPENDICIES

APPENDIX 1

CLIMATE CHANGE AND FOOD SECURITY

QUESTION: Has climate change affected your production as a farmer?

In responding to the question, all the 30 respondents admitted that their production of crops were significantly affected due to climate change.

APPENDIX 2

FARMERS-HERDERS CRISIS AND FOOD SECURITY

QUESTION: How do you react to illegal grazing in your farmland?

In responding to the question, majority (29) of the farmers agreed that they forcefully ordered the herders to leave their farmlands because of the damage the cattle have done to their farmlands.

QUESTION: How do you react to the aggrieved farmers when being confronted on their farmlands?

In responding to the question, all (30) the herders admitted that they use weapons to protect themselves and their cattle.

APPENDIX 3

SOLUTIONS TO MITIGATE FOOD SECURITY AND CLIMATE CHANGE IN NIGERIA

QUESTION: What do you suggest as the possible solutions to this crisis?

In responding to the question, the farmers suggested the following:

- i. Raw materials like improved seedlings, crops that can resist climatic change should be provided to aid crop production.
- ii. Provision of warehouses to store their farm produce.
- iii. Workshops should be organized to create awareness on the dangers of climate change on food security in Nigeria.

On the part of the herders, they suggested the following:

- i. Provision of grants and compensations to the herders.
- ii. Provision of grazing lands for the cattle to graze on.

iii. Provision of exotic and improved breeds of cattle that can withstand climate change.

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