

The Global Climate Challenge, Economic Development and Conflict Resolution in Africa

Edited by

**Adegboyega A. Karim
Steve O. Ojelade
Nkadap Obi-Bisong
Theophilus Fashola**



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The Commandant
National Institute For Security Studies,
+2348052726785
www.nissnigeria.gov.ng
info@nissnigeria.gov.ng
National Institute For Security Studies
Lower Usuma Dam, Bwari, Abuja.

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Contents

<i>Acknowledgements</i>	viii
<i>Foreword</i> – Professor Olawale Isaac Albert	ix
<i>Preface</i>	xi
<i>Notes on Contributors</i>	xii
<i>Abbreviations</i>	xiv
<i>List of Tables and Figures</i>	xvii
SECTION ONE: INTRODUCTION	
Chapter 1: The Global Climate Challenge, Economic Development and Conflict Resolution <i>A. A. Karim, S.O. Ojelade, N. Obi-Bisong, and T. Fashola</i>	3
Chapter 2: The Global Climate Challenge and Africa: Overview of Key Issues <i>A.S. Adeleke</i>	12
Chapter 3: The Global Climate Challenge: Prospects and Priorities for Economic Development and Conflict Resolution in Africa <i>Olukayode Oyesiku</i>	23
SECTION TWO: NATURE OF THE CLIMATE CHALLENGE	
Chapter 4: Climate Change: Meaning, Nature and Indicators <i>S. P. Ejaro</i>	55
SECTION THREE: IMPACTS/IMPLICATIONS OF CLIMATE CHANGE ON FOOD AND AGRICULTURE, HEALTH, ECONOMY, SECURITY AND CONFLICT	
Chapter 5: Climate Change and Food Security: Prospects for Good Governance and Sustainable Development in Nigeria <i>O. R. Karim and A.O. Dauda</i>	85
Chapter 6: Climate Change Related Diseases: An Overview <i>Ali Tanko</i>	102
Chapter 7: Climate Change and Development in Africa: Environmental Impact Assessment <i>Alhassan Mamman Muhammad</i>	106

Chapter 8:	Climate Change and Africa: Population Growth and Constraints to Socio-Economic Development <i>Michael O. Sangodapo</i>	127
Chapter 9:	Global Climate Change and Africa's National Economies: Impacts and Remedies <i>Sarah Olanrewaju Anyanwu</i>	147
Chapter 10:	Global Climate Change and Agro-economic Development in Africa <i>Rhoda Mojisola Olanrewaju</i>	172
Chapter 11:	Africa and the Political Economy of the Global Climate Challenge <i>Ben Obi</i>	187
Chapter 12:	Climate Change and Sustainable Development in Nigeria: Opportunities and Challenges <i>Rachel Toyosi Idowu</i>	198
Chapter 13:	Climate Change and National Security <i>Akintola Oyeteru</i>	214
Chapter 14:	Climate Change, Conflicts and Development in Africa: Implications for National Security <i>Warisu O. Alli</i>	244
Chapter 15:	Climate Change and the Farmer-Herder Conflict: Towards Peace, Security and Development in Nigeria <i>David Oluwatoba Alabi</i>	262
Chapter 16:	Climate Change and Resource War in Africa <i>Gideon Sunday Omachonu</i>	
SECTION FOUR: EFFORTS AT MANAGING CLIMATE CHALLENGE/INSTITUTIONAL RESPONSES		
Chapter 17:	Securing the Environment in an Era of Climate Change: Challenges and Prospects <i>Dokun Oyeshola</i>	305
Chapter 18:	Global Climate Change Challenge and Africa: From the Paris Agreement to COP 26 in Glasgow <i>Kehinde Olusola Olayode</i>	355
Chapter 19:	Climate Change and Natural Resource Conflicts in Africa: A Comparative Analysis of ECOWAS and ECCAS <i>Freedom C. Onuoha</i>	375

Chapter 20:	An Assessment of the UN Climate Change Conferences of the Parties Since 1992 <i>Akin Alao</i>	414
Chapter 21:	Institutional Responses to the Effect of Global Climate Change on Africa: The Case of the Rural Electrification Agency <i>Sanusi Ohiare</i>	432
Chapter 22:	Climate Change Adaptation and Crisis Management in Africa: Exploring Economic and Security Policy Options <i>U. A. Yeldu</i>	443
SECTION FIVE: DISTINGUISHED PERSONALITIES' CONTRIBUTIONS		
Chapter 23:	The Global Climate Challenge: Prospects and Priorities for Economic Development and Conflict Resolution in Africa: The Traditional Institution Perspective <i>Alfred Diete-Spiff</i>	461
Chapter 24:	Impact of Climate Change on Development in Nigeria: The Role of Traditional Rulers <i>Abdulraheem Oladele Adeoti</i>	469
Chapter 25:	The Global Climate Challenge and Governance: The Oyo State Experience <i>Seyi Makinde</i>	496
	<i>Index</i>	501

CHAPTER FIVE

Climate Change and Food Security: Prospects for Good Governance and Sustainable Development in Nigeria

O. R. Karim and A. O. Dauda

Preamble

The worldwide weather and environmental fluctuations being noticed of recent has led to numerous changes in human health and behaviour, food production and supply, as well as environmental changes that could cause other untold hardship. Climate change basically refers to long term shifts in temperature and weather patterns. These shifts may be natural, such as through variations on the solar cycle. Over the years, human activities have been seen as the main driver of climate change, primarily due to burning fossil fuels like local, oil and gas.

The burning of fossil fuels usually produces carbon dioxide, a greenhouse gas with great effect. The effect of the gas, it was said, makes the earth warmer because the greenhouse is warmer than the environment. From this, it can be said that carbon dioxide is the main cause of human induced climate change. The changes being noticed in the climate has seriously been affecting human and animals by causing devastating drought, storms, heat waves, rising sea levels, melting glaciers and warming oceans, etc. which invariably cause shortage of food, shelter, clothing, etc.

However, the major problem of climate change, due to a rise in temperature in the earth's atmosphere, which included a rise in sea levels, collapse of the ecosystem, and more frequent and severe weather change, need to be addressed urgently. It is an important issue to be addressed because it is already impacting seriously on human health, as the changes in weather patterns can seriously harm human and animal lives.

Some of the ways the problem is being tackled is alerting the right body, using renewable energy to power the home, weatherise, invest in energy efficient appliances, reduce water waste, compost food remains, etc. Climate change has been found to affect the social and environmental determinants of

health, for example, clean air, safe drinking water, sufficient food and secure shelter. It should be noted that it has been projected that climate change may cause about 250,000 deaths annually through malnutrition, malaria, diarrhea, heat stress etc. The major causes of global warming include oil gas being used in the industries, gradual deforestation, waste dumps, power plants, oil drilling, unburnt carbon emitting from transport vehicles, consumerism, farming etc.

Food security could be said to the availability of food and individual's ability to access the food. According to the United Nation's Committee on World Food Security, food security was said to mean that all people, at all times, have physical, social and economic access to sufficient, safe, and nutritious food that would meet their food preferences and dietary needs for an active and healthy life (Perez-Escamilla *et al*, 2008; 2013; FAO, 1996). Household food security do exist when all members of the household, at all times, have access to enough food for an active and healthy life (USDA, 2008), as people that are food secured do not complain of hunger or fear of starvation (FAO, 2012).

Food insecurity, on the other hand, as defined by USDA, is a situation of limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable way (Gary *et al*, 2000). Food security incorporates future coping strategies in case of droughts situation, shipping disruptions, fuel shortages, economic instabilities, wars (FAO, 2009). From the various definitions and inferences, the pillars of food security could be said to be availability, access, utilisation, and stability (FAO, 2009). Judging from these, it was said that zero hunger is to be achieved by 2030 through food security and improved nutrition that would promote sustainable agriculture (Webb *et al*, 2006).

Introduction

According to Maslow's Hierarchy of NEEDS, 1943, human needs were placed in different categories based on their major challenges (Figure 5.1).

As a result of the fact that most developing countries like Nigeria, still battle with the basic needs of life, i.e. food, clothing and shelter, it can be seen that these set of countries are at the lowest ebb of Maslow's Hierarchy of NEEDS i.e. the physiological and safety needs. Inferring from that could mean that a slight climatic change would definitely have a great impact in the food supply, shelter, and on the overall, the living standards of the populace.

Food is edible complex biological material that contain many different

chemical constituents to support human growth and development. Food could either be of plant or animal origin e.g. meat, fish, mango, beans, carrot, wheat, eggs, rice etc. Food is a basic or primary need for man's existence or survival, as it contributes to the well-being of individuals, households and communities, beyond its nutritional adequacy, and encompasses enjoyment, as social, religious and cultural heritage (Karim, 2020).

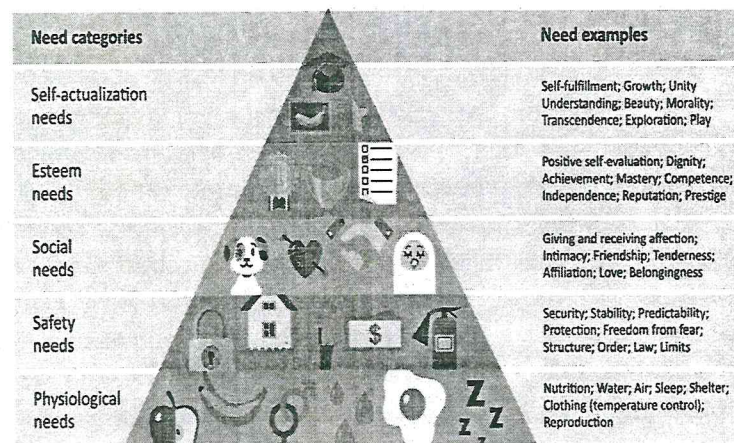


Figure 5.1. Maslow's Hierarchy of Needs

Source: Maslow, 1943.

According to the World Health Organization, food and human health relationship is extremely tight, as healthy diet helps to protect against malnutrition in all its forms, as well as non-communicable diseases, including diabetes, heart diseases, stroke, and cancer, etc. A population that does not eat well is prone to diseases and underdevelopment, but if the population is well fed, proper development is not far from them, and these food-secured people would be able to challenge and conquer other needs.

Nigeria, with the proverbial "a land flowing with milk and honey", is the most populous state in Africa, and was projected to double from its initial 200 million populations to 400 million by the year 2050. The country is blessed with substantial agricultural and natural resources that include 68 million hectares of arable land, fresh water resources of about 12 million hectares, 960 km of coast line and an ecological diversity which enables the country to produce a wide variety of crops and livestock, forestry and fisheries product (Arokoyo, 2012).

Judging by the above statements, Nigeria should have been one of the leading countries in agricultural and food export, but not, because of high level of mismanagement of the economic resources of the country. Government at various times in the life of the country has put in place laudable policies, projects, programmes, as well as agencies to manage some of these projects and/or programmes, but does seem not to be able to muster the synergy or concerted efforts needed for the job. These draw backs have resulted in ineffectiveness, which has even been made worse by climate change.

For food production, Nigeria is seriously performing far below expectations in self-sufficiency, which has even been made worse by its current mono-cultural economy. Also, income inequalities, high unemployment rate, high population growth, with very poor savings and capital formulation amidst the dwindling revenue in recent times could as well be problems. The combined effects of the above has led to major food crisis challenge, with more and more prone to hunger, malnutrition, diseases and other health hazards (Akuwudike *et al*, 2018). Malnutrition could be in the form of under-nutrition (which appears as wasting, stunting, micronutrient deficiency, etc.), overweight, and obesity etc. The UNDP, 2018 report says that on the Human Development Index, Nigeria was ranked, out of 189 countries, in number 158 in year 2018 and number 161 in the year 2019, while the Global Hunger Index ranked Nigeria in number 98 out of 107 countries in 2020, and with a score of 29.2, but with a slightly higher score of 31.1, two years earlier, 2018 (FAO, 2020).

Sustainable Development, Good Governance, Food Security and Climate Change

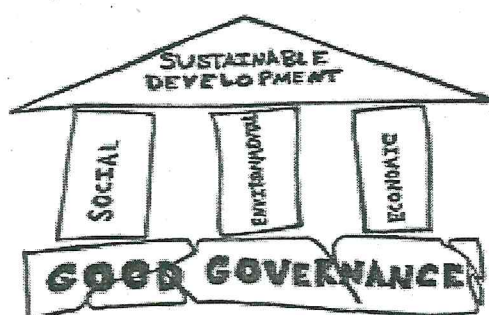


Figure 5.2: Understanding Sustainable Development
Source: Brundtland, 1987.

Sustainable Development

As said by Brundtland in 1987, sustainable development (SD) is an idea of human societies living and meeting their needs without the compromise of the ability of future generation to meet their own needs. The implication of the statement by Brundtland is that the economy and the environment, which are complementary, are seriously considered. The economy is grown, while the environment is properly kept, protected and in high quality for future use. As good as this may be, some factors may militate against its fulfillment, and these factors could be beyond the control of man; one of which is the climate change (Igbokwe-Ibeto, 2019). SD, which has three pillars of social, environmental and economic (Brundtland, 1987), is a good tool to be adopted in organising the society for its availability over a long period of time.

The United Nations was not left on the need for a secured food, as it concerns sustainable development goals. The agenda was adopted at the summit held in New York between 25 and 27 September, 2015. The universal policy had 17 sustainable Development Goals (SDGs) with 169 encompassing targets, which are distinctive and inclusive. The purpose of the policy was to have a Millennium Development Goals by 2030, which could be all inclusive in its approach and application. The focus of the agenda was in five folds called the 5Ps of People, Planet, Prosperity, Peace, and Partnership. Of the UN Development Goals, Goal 2, which stated the desire to have global zero hunger, achieve food security, and enhance/encourage sustainable agriculture by 2030, was very important. This, it was believed, can only be achieved in a potentially dignified and healthy environment.

Understanding Good Governance

Good governance cannot be easily and accurately defined. The World Bank's 1989 document on sub-Saharan Africa looked at good governance under three perspectives of: *Public Sector Management and Accountability; *Legal framework for development; and * Information and transparency. The World Bank again in 1992 on the document titled "Governance and Development", equally viewed the concept of governance and its application under:

- (i) Its application in the form of political regime;
- (ii) The process by which governmental power is exercised in the management of a country's economic and social resources; and
- (iii) The capacity of government to design, formulate and implement policies formulated.

However, Gora, 2020 said that good governance could be assessed using eight parameters of transparency, conscious orientation, equitable and inclusiveness, responsiveness, following rule of law, accountability etc. Briefly:

Participation: Inequalities and discriminations of various kinds like gender, race, caste, creed, place of birth etc. are addressed.

Rule of law: This is the fair legal frameworks that are enforced impartially.

Transparency: These are the decisions that must be taken and enforced in proper legal manner, free and accessible information that are affected; and complete information in easily understandable forms and media.

Responsiveness: Meaning responding with emotion to people and events. This states that governance must yield to the yearnings of all stakeholders within a reasonable time frame.

Consensus Oriented: This requires mediation of different interests in the society to reach a broad consensus in the society on what is in the best interest of the whole community and how it can be achieved.

Equity and Inclusiveness: This addresses the issues of justice and equity. Nobody should be left out in the society or exploited in the process of development.

Effectiveness and Efficiency: This is the developmental needs of the society, which must be achieved through the maximum utilisation of resources at their disposal, which further suggests sustainable use of natural resources and the protection of the environment.

Accountability: Being accountable to all stakeholders at both the public and private institutions should be taken as a serious business, etc.

Understanding Food Security

The UNDP in 1994 promoted the construction of human security with the inclusion of food security as one of the components. However, at the World food summit of 1996, food security was seen as when people (individual, household, national regional and global levels), at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life, while FAO on its own in 2001, states that food security is a situation that exists when all people at all times have physical, social and economic access to sufficient,

safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life.

Food security according to the UN and FAO between 2001 and 2018, as it is, has about five dimensions, which are:

Availability, which is agricultural production, processors of produce, storage, marketing and transportation;

Accessibility, which has to do with the prices, income, markets, infrastructure, and food distribution;

Utilisation, which is the nutritional value of the produce, health status, safety, preparation and consumption;

Stability, which is the consistency of supply, permanent rather than temporary or subject to fluctuation, period of accessibility; and

Sustainability, meaning obtaining food (not through food aid, palliative, relief), environmental sustainability, etc.

After food security, food insecurity and/or its causes should be highlighted. It is very difficult to pinpoint one particular reason as the root cause and prevalence of hunger. However, some of the factors that could trigger it include the following:

- (i) Population growth (youth bulge, unemployment).
- (ii) Rapid Urbanisation without commensurate economic and social growth.
- (iii) Political instability and crises; poor governance and government policies.
- (iv) Regional or communal-civil conflicts and terrorism.
- (v) Underutilisation and under development of human resources.
- (vi) Lack of socio-economic development.
- (vii) Climate change, desertification and natural disasters.
- (viii) Emerging, re-emerging, and continuing health and nutrition crises
- (ix) Postharvest handling problems.
- (x) Gender inequalities (i.e. women participation very important, but most times lacking).
- (xi) Other factors such as poor agricultural systems, food processing, storage, preservation, value chain, etc. could also trigger food insecurity or prevalence of hunger.

Climate Change

Climate change is one of the key components of this book. It can be seen as a change of climate attributable directly or indirectly to human activity that alters the composition of the global atmosphere and which is, in addition to natural climate variability, observed over comparable time periods (World Bank, 2012).

Allen (2004) and Osakede *et al* (2016) saw climate change as a complex interaction between earth's atmosphere, stratosphere and troposphere on one hand, and land biosphere on the other hand, while the UN in 2018 says climate change is the most significant environmental threat of the 21st century, and synonymous to global warming.

In 2021, Petteri Taalas, the Secretary-General of World Meteorological Organization said that climate change is seriously having a negative effect on the African continent. This, it was said, is hitting the vulnerable so bad, as well as increasing the case of food insecurity, population displacement and stress on water resources. These could manifest through devastating floods, invasion of desert locusts, leading to serious drought, if care is not taken.

Features and Causes of Climate Change in Nigeria

According to Agbo (2012), climate change has features and causes. The features of climate change include:

- (i) Unpredictable rainfall, heat waves, coastal storms;
- (ii) Fiercer or harsher weather;
- (iii) Incidence of soil erosion caused by excessive flooding;
- (iv) Increased frequency of fire out breaks; and
- (v) Increased frequency and intensity of storms, floods, hurricanes, droughts, etc.

In line with the aforementioned features, the causes of climate change which are complex, could be said to be in two forms of Natural and Anthropogenic (human included) processes or Natural causes, which are variations of solar emissions and earth's orbit, volcanic eruptions, mountain building and tectonic movements, continental drift, volcanoes, ocean currents, etc.

However, FAO 2016 report showed that the causes of climate change are about 60 percent traceable to human factors, and these include:

- (i) Burning of fossil fuels such as automobiles, coal and gas burn,

industrial revolution in gas flaring (Niger Delta), one of the highest emitters of greenhouse gases in Africa and accounts for roughly one sixth of worldwide gas (UNEP, 2015).

- (ii) Deforestation, which includes cutting down of trees without replacing them, changes in land use, domestication of bush animal, etc. with depletion rate of 3.3 percent annually.
- (iii) Population explosion, i.e. increasing number of the populace through increasing influx of people or increase birth rate, which led to increased emission of gas.
- (iv) Poor environmental management in terms of erosion, flooding, blockage of water ways, use of fertilizers, refuse dumps.
- (v) Poor waste management and food losses in the face of population increase (Olufemi, 2018), etc.

Connection Between Climate Change and Food Security

Having looked at the key parameters on an individual basis, do we see any connection between any two of the parameters when compared? Is there any connection or series of connections between climate change and food security. There are many connections between climate change and food security, which could be either positive or negative depending on our understanding.

The positive relationship between the two include among others: increased productivity with warmer temperatures, possibility of growing new crops, longer growing seasons, increased production from higher carbon dioxide, accelerated maturation rates and decreased moisture stress, while the negative impacts of the nexus are too numerous. They include increased insect infestations, crop damage from extreme heat, planning problems from less reliable forecasts, stronger storms, torrential rain, more floods, increased weeds, increased crop diseases, decreased herbicides and pesticide efficacy, increased moisture stress and increased drought. It could also include too numerous human sickness leading to human labour loss, need for high specialised high chemical food production that is less adaptable, mostly water logged land, climate variability, warming stress etc. We should note that as the temperatures increased, the negative effects increasingly overwhelm the potential positive effects, bringing a reduction to all crops in all regions with increased temperature.

Connection Between Food and Sustainable Development

There seems to be a great connection between food and sustainable

development, as the impacts of climate change on food production (security) and human (sustainable) development cannot be over-flogged. According to Akhakpe, 2018, a society that must sustainably development must be ready to put agricultural development in place. It was believed that a hungry man cannot think rationally nor make meaningful contributions to developmental strides, and a systematic and consistent development of human capital is critical to bringing forth sustainable development in any nation.

Evidences of Food Insecurity Due to Climate Change

According to the report of FAO, 2020, more than 25 percent of the world's population struggle to eat safe, nutritious and enough food in 2019. About 9.2 percent, which is an equivalent of 700 million people were severely food insecure, while 17.2 percent or 1.3 billion people were moderately food insecure. If we combine these two cases (moderate and severe), it could be seen that 2 billion people, which is about 26.4 percent people are food insecure, with Africa being the most affected. In some selected countries between June and August, 2021, food insecurity was so severe in these countries, which are Afghanistan, Democratic Republic of Congo, Ethiopia, Haiti, Nigeria, South Sudan, Syria, Yemen and Zimbabwe (FAO, UN, WHO, 2016-2020).

Taking Nigeria as an example, the data in Table 5.1 below gives a vivid level of food insecurity in the land.

Table 5.1: Prevalence of Food Insecurity in Nigeria

Year	Population (Million)	Number of food (Million) Insecure People
2021	220,140*	60.5*
2020	206,140	41.2
2019	200,875	33.9
2018	195,976	29.8
2017	190,873	25.6
2016	185,960	21.4
2015	181,137	17.4
2014	176,766	15.2
2013	171,766	13.4

*Projected

Source: UN; FAO; WHO; IFRP-GHI: UNICEF: FEWSNET: 1996-2021 Reports

Arising from the table coupled with some other factors, it could be said that the major indices of food insecurity in Nigeria would include:

- (i) Non-communicable Diseases like obesity, high blood pressure, stroke, diabetes mellitus etc., as it was said that an annual upsurge of 5 percent was recorded between 2014 and 2019. In 2016 only, about 23 percent of 1,353,949 of all deaths recorded came through non communicable diseases.
- (ii) There has been increase in food importation. This means that population growth rate out-weighs food production. The importation increase was 8.9 percent in 2017, and this rose to 10.9 percent in 2018, and has been on the increase since then etc.
- (iii) The difference in demand and supply index led to increase in the prices of foodstuffs. The price increase of food stuffs rose from 50 percent to 150 percent between 2015 and 2019, which later skyrocketed to between 200 and 300 percent in the first quarter of 2021 (CBN, NBS, NNHS, FAO, WHO, 2017-2020 reports).

In Nigeria, some cases of the impacts of climate change on food security in the states were highlighted. They were as stated below:

- (i) **Abia State:** In an audience with about 1200 selected farmers, it was seen that climate change had effect in their area by about 25%.
- (ii) **Ebonyi State:** Here, a handful of about 160 women who were involved in cassava business were interviewed. They opined that climate change in the area of severe high temperature stress, variability in relative humidity, and flood frequency affected their cassava, and thus reduced output by 23.3 percent.
- (iii) **Kwara, Kogi and Niger States:** Climate change affected the production of cereals by 10-16 percent between 2018 and 2020.
- (iv) **Ogun, Oyo, Ekiti and Osun States:** Changes in the rainfall patterns and quantity affected the production of maize, cassava, yam, cocoa and vegetables by 20.5 percent between 2016 and 2020.
- (v) **Benue State:** The effect of heavy flooding in 2017 displaced over 200,000 people. (Source: Ifeanyi – Obi *et al*, 2016; Eze, 2017; NBS; 2017; FAO, 2018; 2020.)
- (vi) **Anambra, Edo and Other Coastal States:** Gully erosion causes significant reduction in crop production and harvest quality.

- (vii) **Niger Delta States:** Effect of gas flaring decreased farmlands close to the flare sites, contaminated water bodies affected the survival of fishes and other aquatic animals by 20.7 percent.
- (viii) **Rivers and Akwa Ibom States:** The oil spillages on farmlands, gas flaring sites, burrow pits and other oil and gas activities affected output of banana, pepper, okra and leafy vegetables by 30.3% in 2011-2018.
(Sources: FAO, 2020; Echendu, 2020; FAO, 2018; Atilola, 2016.)
- (ix) **Benue, Niger, Kogi, Edo and Rivers States:** Worst flooding witnessed between July to September, 2012, resulted in 360 deaths, hundreds and thousands displaced, thousands of hectares of farmland submerged, etc.
- (x) **Kebbi State:** Serious flooding of rice farm in September, 2020 caused high losses.
- (xi) **Jigawa and Zamfara States:** Serious flooding caused significant reduction in crop production, harvest quality and the residual feedstock from integrated crop-livestock farms and grain scarcity.
- (xii) **Katsina State:** The issue of hailstones with large ice pellets and heavy rains in September, 2012 destroyed most of the crops (Okra, maize, vegetables and sugar cane) in about 2,000 farms.
- xiii. **Sokoto, Katsina, Kano and Borno States:** Increasing evaporation, drought and desertification causes reduction of food production by 10-22.5 percent. (Sources: Eze *et al*, 2012; Agbo, 2012; Akhakpe, 2018.)

In view of what was observed in the states due to climate change, it can be inferred that:

- (i) The reduction in the water flow into Lake Chad, and the loss of about 90 percent of its surface area since 1960 could be part of the causes of climate change.
- (ii) The reduction in land size, which led to reduced size of cultivatable land, loss of grazing lands, and about 25 percent losses during harvest and postharvest could have also contributed to the problem of food insecurity.
- (iii) Conflicts between farmers, fishermen and pastoralists along the border of the lake could be a potential cause.
- (iv) Grazing extension period by nomadic herdmen over other people's farmlands could cause food insecurity.

- (v) Clashes between a larger number of herdmen and their host communities due to their migration could be a potential food security threat.
- (vi) Other environmental challenges and disasters that led to loss of lives and farm properties are potential food security threat. (Sources: UN, 2018; 2020; Tripathi *et al*, 2018; Ogbeide, 2006; Fagbohun, 2015.)

Challenges to Climate Change and Food Security

Climate change, food, food security and sustainable development, as well as the parameters and causes of climate change as they relate to food security have all been discussed. The challenges to climate change when we talk about food security need to be X-rayed. The challenges to stemming the devastating effects of climate change on food security includes:

- (i) Government Policy on food production, its implementation, which is usually left with public servants, and leaving those directly affected out of the scheme of things should be examined. Meaning that round pegs are not usually placed in round holes, etc.
- (ii) Non inclusiveness, with implementation often fall shorts of expectations. Meaning that the right things are not always done.
- (iii) Delay between policy formulation and implementation is often too long to allow for efficient and effective policy implementation, i.e. civil service beurocracy between policy formulation and policy implementation should be reviewed.
- (iv) Paucity of funds for agricultural development or lack of proper management. Deteriorating economic downturn could be a great challenge, as funds are needed to combat the negative effect of climate change.
- (v) Lack of equipment to manage climatic changes is a demonstration of the fact that the right priority are not pursued. Low technological advancement of developing countries, Nigeria inclusive, would be a great challenge in combating the negative effects of climate change on food security.
- (vi) The structure and organisation required to tackle the effects of environmental occurrences are not available or are managed by poorly mobilised personnel. Lack of properly trained personnels and requisite fund are not available to handle such challenge.

- (vii) Development that can lead to abundant food production not yet in place on the continent. Most African leaders are still preoccupied with misplaced priorities. Poor planning, poor or untrained personnels coupled with paucity of funds would be great challenge, most especially, for developing countries.
- (viii) The perception of the state as a distributive agency has not changed radically from what it was in the colonial era in some quarters. Archaic mentality coupled with poor structural establishment could be a great challenge.
- (ix) Government business is seen as a white man's job and its resources are regarded as inexhaustible. Most employed officers are never serious with the task at hand, and as such, the damage would have been done before realising it. (Sources: Akhakpe, 2018; Fatile and Igbokwe-Ibeto, 2017; Logan, 2015; Osaghae, 2011; Burke and Lobell, 2010.)

Exploiting the Prospects in the Challenges

The challenges of climate change on food security were highlighted, out which the prospects can be exploited. The exploitable prospects include:

- (i) **Integrated approach:** This will involve concerted efforts of all stakeholders at different levels, which must involve government, individual, farmers, NGOs and the private sector, e.g. the National Food Security Council.
- (ii) **Implementation and Enforcement of National Policies.** The strict and early implementation of policy on the soil, coastal erosion, flooding, land degradation, desertification, deforestation and loss of biodiversity identified. With the strict implementation, reduction of emission of greenhouse gases, planting one or two trees when one is cut down should be practiced, provision of necessary drainage structures and other erosion, as well as desisting from erecting buildings along water ways etc.
- (iii) **The need for full integration of environmental concerns.** The policies formulated to cater for this challenge must be properly integrated into developmental plan of the nation at all levels of decision-making for effective results.
- (iv) Environmental education and public awareness on the need for

proper environmental management must regularly be carried out.

- (v) Addressing the root causes and early interventions should be our watchword, and should be promptly acted upon.
- (vi) Targeting interventions at real peasant farmers towards reorientation and up-scaling of their agricultural activities. Most farming operations in Nigeria are carried out at small scale levels and as such, policies that would eradicate or prevent the harsh effects of climate change should be driven through these small-scale farmers.
- (vii) The adoption of climate-smart-agricultural practices for example the use of high yielding and diseases crops adaptable to extreme weather condition; irrigation technologies, etc. should be employed. The proper use of ranch for livestock or cattle to prevent herdmen and host community clashes, as well as the cultivation of crops when rains are expected rather than during the planting season.
- (viii) The need to build resilience in the food systems could help to stem some of the causes and challenges of climate change on food security.
- (ix) Gender inclusivity in agricultural systems considering women roles. In some communities, women are the farmers, and as such, they should be included in policy formulation and implementation for effective result(s).
- (x) Addressing attrition and occupational and rural-urban migration enhance the health care, educational, social infrastructural sectors for the rural poor who are largely in agriculture. It has been said earlier that most of the agricultural practices in this country are done by peasant farmers and these small-scale farmers live in the rural areas, with poor per capital income. The need to improve their living conditions, as well as the social and economic amenities of rural places should be taken seriously to stem the wave of urban migration by rural people.
- (xi) Targeted interventions at real peasant farmers towards reorientation and up-scaling of the agricultural activities. The rural farmers should be used as the bench mark of planning and intervention programmes for effective result.

Conclusion

Food is an important ingredient in the economic growth of a country. If agriculture goes wrong, nothing else will have a chance to go right. A collective vision for a holistic response is required to seriously combat climate change effect on food security. This, we believe, will solve some problems such as:

- (i) Reducing food insecurity and improving sustainable development;
- (ii) Reduce the effect of climate change on food security, which is more pronounced in developing countries like Nigeria;
- (iii) Reducing food insecurity through large scale action; and
- (iv) Proper management of climate change for sustainable development to be realised, etc.

Fulfilling the food needs of the populace and enhancing their capacity will translate them from the lower rungs on the Maslow's hierarchy of needs, gradually upward along the curve towards sustainable development. President Muhammadu Buhari at the United Nations Climate Action summit held in September, 2019 said the fight against climate change effect is a race we can win, and a race we must win. He said these while stating his administration's strategic plans to mitigate the effects of climatic change on food security and Human Development in the country.

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