



## CLIMATE CHANGE AND INSECURITY IN NIGERIA: FORESTRY TO THE RESCUE

<sup>1</sup>Asinwa, I. O., <sup>2</sup>Kazeem-Ibrahim, F., <sup>1</sup>Akintan, C. I., <sup>1</sup>A. O. Akintan, A. O and <sup>1</sup>Akomolede, L.A,

<sup>1</sup>Rainforest Research Station, Ore. Forestry Research Institute of Nigeria, Jericho Hill, Ibadan

<sup>2</sup>Sustainable Forest Management Department, Forestry Research Institute of Nigeria, Jericho Hill, Ibadan

*israelasinwa@gmail.com/08056953507*

---

### Abstract

*The climate change as a phenomenon that portrays abnormal variations in the expected climate of an area at particular period of time has been found to be connected with issues on insecurity in Nigeria. Flood, drought, desertification as resultant effects of climate change have led to violence, herders and farmers conflicts and food insecurity. This paper reviews the concept of climate change and insecurity in Nigeria. The main causes of climate change: population increase, urbanization, industrialization, deforestation and their effects are discussed. Adaptation and mitigation strategies in combating climate change and insecurity were looked into as well as the significant roles of forest in mitigating climate change. It is concluded that climate change adaptation and mitigation strategies as well appropriate forest management could be a right step in the right directions in safeguarding the menace.*

**Keywords:** Anthropogenic activities, Adaptation, Mitigation, Amelioration, Forestry

---

### Introduction

Globally, the concept on climate change is no more a news to deliberate upon. It has become issues in the present times with manifestation of variations in different climatic elements such as cloud cover, precipitation, temperature, humidity, sea and other water bodies levels, wind, light intensity and vapour pressure (Ministry of Environment of the Federal Republic of Nigeria (MOEFNRN, 2003). Climate change was viewed by The Intergovernmental Panel on Climate Change IPCC (2007), as statistically significant differences in either mean values of the climate or in its variation over a long period of time, (typically for decades or longer). The United States Environmental Protection Agency (USEPA, 2020) defined climate change as any long-term conspicuous changes in the expected average weather of any place over an appropriate period of time. Invariably, climate change portrays abnormal variations in the expected climate of a region. According to Haider (2019), there is existence of changes in climatic conditions in Nigeria. This changes in country's climatic conditions are evident in; increase in temperature; inconsistent rainfall pattern; rising in sea level, frequent flooding, elongated drought, desert encroachment and land degradation. All these harsh weather conditions thereby leads to negative effects on fresh water resources, loss of biodiversity, disappearance of grazing land, loss of agricultural land, increase in livestock diseases which all resulted in food insecurity (Haider, 2019). As a result of all consequences of climate change, there was hunger, increased unemployment, conflicts among herders and farmers, cattle hustling and insurgency. United State Geological Survey (USGS, 2020) reported that climate change is caused by several factors. These factors are both natural and anthropogenic but basically by the later, and the main route out of the ugly occurrence is forestry via different programmes such as afforestation, reforestation, agroforestry practices and enrichment planting

### Causes of Climate Change and their effects on insecurity

Anthropogenic activity is the major global cause of climate change over the last few decades aside from natural cause (IPCC, 2007). The natural causes of climate change consist of volcanic eruptions and solar activities, while human activity in Nigeria as it is obtainable in several regions of the world has been a major cause for the buildup of greenhouse gases (GHGs). Carbon dioxide (CO<sub>2</sub>) is one of the main greenhouse gases and contributors to the greenhouse effect. When fossil fuels like coal, oil and gas are burnt, they release greenhouse gases (Haider, 2019). Anyadike, (2009) reported that human activities which involve energy combustion as it occurs in generation of warmth in homes and building via heating, use of fuels (in cars, bus, train or plane), water treatment towards provision of portable water, manufacturing process, refrigeration, gas flaring and bush burning emitted carbon dioxide into the atmosphere. Since the industrial revolution as far back as 18th century, there has been sporadic increase in the amount of CO<sub>2</sub> that are released into the atmosphere, the estimate of which has attained 35%. Nigeria is reported to be among countries that emits highest greenhouse gases in Africa most especial with the Niger Delta region of the country alone having more than 123 gas flaring (FAO, 2012). The resultant effects of degrading the environment especially in the coastal region have rendered many youths jobless and made them to become members of militant groups and kidnappers.

### Deforestation

This is a situation, where forests are indiscriminately felled without replacement. It is one of the major cause of climate change and accounts for 20 percent of the world's carbon emissions (more than what the entire transport sector produces) (IPCC, 2007). When trees are indiscriminately cut, there are fewer trees left to absorb CO<sub>2</sub>, and then it will build up in the atmosphere. With deforestation, GHGs such as carbon-dioxide, carbon-monoxide, methane, nitrous oxide, are released, offsetting the natural balance immensely, consequently contributing to global warming (Moutinho and Schwartzman, 2005). According to the FAO (2008), Nigeria ranks first among ten countries with the highest rate of deforestation in the world in succession during the 1990-2000 and 2000-2010. In

the period between 1990 and 2010 in Nigeria, about 3.3% annual rate of deforestation was reported as the forest cover reduced to about 10% of its total land area (FAO 2012). With this decrease in the forest, desertification is ushered into the land. Thus, several people sought where environment is conducive for inhabitant, farming and grazing. Then conflicts erupt over limited resources.

#### **Human Population Increase and impacts on climate change and insecurity**

As the world's population grows, there are more people who need food, livestock and energy.

In the year 2012, the estimated population of Nigeria was 170.1million and it was projected to rise to 402.4million by 2050 ( USAID, 2012). This will eventually have corollary increase in deforestation for agricultural land, residential buildings and manufacturing companies which will consequently contribute to the emission of carbon and other lethal substances to the environment. Mainly, population increase aggravates urbanization and industrialization which are main causes of changes in climate (Ausbel *et al.*, 2004). The population upsurge has led to raising of different people of different characters; many are indolent, fraudulent, greedy, self centered, domineering and violent. With all these callous attitude, terrorism emerged among human race

#### **Effects of Climate Change on economy**

Generally, Nigeria is predisposed to severe negative effects of climate change due to its fragile economy, weak resilience and low adaptive capacity. Much of the sensitive economic resources are dependent on climate. For instance, over 70% of the workforce in Nigeria are employed in forestry, agriculture and aquaculture sectors. (FAO, 2012). The heavy concentration of GDP generating industry in locations that are highly vulnerable to climate change - induced sea level rise, e.g. Lagos and the Niger Delta makes the country extremely vulnerable. The 2011 Climate Change Vulnerability Index (CCVI) published by the UK - based risk company, Maplecroft, classifies Nigeria as one of the counties that are on the high risk list failing economy (FGN, 2012). This could be ascribed to the fact that the more the harsh climatic condition, the lower the agricultural crops yield which in turn has significant influence on the generality of the country's economy. (FAO, 2012).

#### **Effects of Climate Change on Crop Yields**

Higher CO<sub>2</sub> levels affect crop yields. Some studies suggest that elevated CO<sub>2</sub> levels can increase plant growth. However, other factors that affect plant growth and development such as moisture, temperature and nutrient can counteract these potential increases in yield if they are insufficient or provided in excess. Harsh climatic conditions have also been found to enhancing several pest and diseases as well as parasites that seriously affect livestock production and crop yields. (Ausbel *et al.*, 2004).

#### **Climate Change and Security of Nigeria Populace**

*Insecurity is defined as an absence of protection or safety. It entails peril, death trap, ambiguity, dearth of fortification and lack of security. Insecurity could be a state of being prone or vulnerable to danger or threat of danger. The state of worry as a result of inadequate security measures can also be regarded as insecurity (Achumba et al., 2013). Beland (2005), defines insecurity as a state of fear or anxiety stemming from a concrete or alleged lack of production. It is a lack of or inadequacy of freedom from danger. This definition shows insecurity that can be felt directly and it is directly linked to other tourist security including, economic, social psychological, and so on. Insecurity can also be seen as a situation whereby one is being subject to all forms of dangers of both natural and human activities towards society or individuals. It is the anxiety that one experience when one feels vulnerable, insecurity and lack of confidence. More so, failure of institutions to play their roles that brings about dysfunction in society is described as insecurity (Achumba et al., 2013).*

Human security according to the United Nations "is a people-centred notion of security that seeks to integrate the various determinants of well-being such as economic, food, health, environment, personal, community and political security." There are several studies that have established that climate change has adversely affected serene human existence in several regions of the world (Kelechi *et al.*, 2021). According to Human Security Network (1999) "building human security is essential for the establishment of a humane world where citizens can enjoy a life that is secured with dignity free from poverty, despair and fear of want." The United Nations categorized human security in terms of acute risks from sudden disruptions such as natural disasters and chronic threats such as disease, hunger and conflict (Kelechi *et al.*, 2021).

The achievement of national and conventional security architecture cannot be realizable without reference to human security. Human security is complementary to national security in the same way that national security complements international security (Kelechi *et al.*, 2021). This approach, according to the resolution calls for people-centeredness (HSN, 1999). Therefore, the appraisal of climate change effect on national and international security can be better understood from human security approach. Climate change constitutes an emerging threat to human security in Nigeria (Kelechi *et al.*, 2021). The phenomenon through its various manifestations has precipitated violent conflicts thereby disrupting public safety and stability. Idumah *et al.* (2016) noted that vagaries in climatic conditions occasioned by climate change has decreased agricultural productivity prospects and has resulted to increasing aridity of pasture areas in parts on northern Nigeria thereby forcing the pastoralists down south and pitching them against local farmers in the south as they compete for scarce resources in their locality. According to HSN (1999), climate change affects human security by reducing access to notable and valuable natural resources and in turn negating the security apparatus that could promote human security." Flood, drought. Land degradation, and desertification have led to population displacement and loss of farmland, then food shortage. Based on the fact that "an hungry man is an angry man" The condition has led to violence, conflicts and insurgency in parts of Nigeria. Climate change has been reported as the major cause of farmer-herder conflicts in

parts of Nigeria (Oladele, 2010; Odo, 2012; Folami, 2013; Adishi and Oluka, 2018). The loss of grazing fields as result of degraded land in the Northern part of the country has influenced the movement of pastoralists to the South and the major consequences of this migration pattern is the incessant violent clashes farmer in the host communities and herders. The persistent drought in the Sudan, Sahel savannah areas being one of the major effects of climate change has forced many pastoralists out of the region towards the guinea savannah and rain forest areas of Nigeria ecological zones.. This has resulted to increased pressure on lands in these areas. The herdsman and their flocks often destroyed a vast area of farmland in quest for water and forage, this always bring them in conflict with local farmers. The ugly scenario of farmers-herdsmen conflicts have been a recurring incident in the middle belt region and parts of southern Nigeria (Oladele, 2010; Odo, 2012; Folami, 2013).

### **Climate Change Adaptation and Mitigation; the way out**

#### **Climate Change Adaptation**

Adaptation involves responding to the changes induced by climate change. It involves all steps taken towards adjustment to real or unexpected changes in climate and their effects (IPCC, 2007). It's all about practicing what we can to live with changes in the climate and reduce to the barest minimum the negative effects that resulted from climate change. Adaptation can be reactive or anticipatory. Where possible, anticipatory actions will provide the most cost-effective response to reduce risk (Anyadike, 2009). Various climate change adaptations cut across different sectors, from coastal and urban area management, natural resources management to agricultural and many more. Some strategies are:

- Improved engineering measure such as construction of drainage channels, elevation of infrastructure couple with abstinence from building along water ways.
- Reducing and recycling water use due to drought.
- Using prescribed fires to prevent uncontrollable wildfires.
- Developing of improved varieties of crops such as drought/flood-tolerant crops

#### **Climate Change Mitigation**

Mitigation involves the reduction in emissions of any greenhouse gases that contribute to climate change. Carbon dioxide is the most considered gas among other ones in several programmes of climate change, as is in the case with carbon offset programmes. However, methane (CH<sub>4</sub>), Ozone (O<sub>3</sub>), Nitrous Oxide (N<sub>2</sub>O), Chloro-Fluoro-Carbons (CFCs) contributes to climate change much more than carbon dioxide (Moutinho and Schwartzman, 2005). In a climate context, IPCC (2007) describes mitigation as human efforts in reducing sources/causes or enhance the sequestration of greenhouse gases in any. In practice, mitigation activities can be carried in many ways such as:

- Use of renewable energies such as solar, wind, and geothermal in place of fossil fuels
- Replacing traditional internal-combustion vehicles with electric options (ideally charged with renewable energy).
- Planting trees and conservation of forest estates of more to enhance storage of more CO<sub>2</sub> from the environment.

### **The Significance of Forest on Climate Change**

An area of land that covered by appropriate number of trees per unit area is referred to as forest. According to FAO (2012), a forest is described as “A land area that is over half (0.5) of an hectare with woody perennials/trees with height higher than 5 meters and canopy covering more than 10 percent.” This is with stern exception of land that is predominantly under agricultural or urban use. The existence and survival of all living beings rest on the forests. They are important to our life as they provide oxygen, food, shelter, fuel, and means of livelihood for the tribal people living in and around the forested area. Forests serve as habitat to 80% of the global terrestrial and arboreal biodiversity and are the source that fulfills all basic needs for adjacent human settlements especially on climatic amelioration (FAO, 2012). Therefore, the management of forest is very essential. However, managing forests in response to climate change is just one component of the broad and complex task of sustainable natural resource management. Appropriate management activities can produce healthy and sustainable forests to help offset impacts of climate change (Haider, 2019).

Carbon dioxide is utilized by the green plants through the process called photosynthesis. These plants thereby store carbon in the form of wood and vegetation otherwise known as biomass in the process called *carbon sequestration* (IPCC, 2000). It has been by found that carbon constitutes 20 per cent of total dry weight of trees and the overall biomass of forests also acts as a carbon sink (IPCC, 2001). However, Destruction of forests through deforestation or fire adds billions of tonnes of carbon into the environment each year (IPCC, 1997). Therefore, in attempt to combat global warming and conserve the environment, there must be increase in the storage of carbon and the stored ones must be prevented from being released to the environment.

Several studies have found that wood products that are gotten from harvested timber serve as potential carbon repository. The longevity of the carbon stored in the wood products is subjective to kind of forest produce. For instance, it could be less than a year for fuel wood and many decades or centuries for lumber (IPCC, 2001). In summary, the participation of forests in climate change according to IPCC (2000) can therefore be categorized into three:

- ✓ they are carbon pools
- ✓ they release CO<sub>2</sub> into the environment during bush burning and other natural or human disturbances.
- ✓ they serve as CO<sub>2</sub> storage with their developed biomass.

## Methods to mitigate Climate Change through Afforestation

### Increasing afforestation

An option to continue to increase CO<sub>2</sub> absorption is to plant new forests. The rate of carbon accumulation, and the maximum at maturity, will depend on the species, site and management system used. Depending on the objectives and constraints of each situation, trees may be planted in farm forestry systems (e.g. shelterbelts) or in continuous blocks, in a single year or over successive years. Each system will have different characteristics as a sink and reservoir. **Managing forests to store carbon**

There are several ways to increase a forest's carbon sink (the rate at which carbon is sequestered or absorbed from the air and turned into carbon in a plant) or reservoir (its capacity to store carbon). Increasing the rotation age allows the trees more time to grow and increases the carbon reservoir in the mature forest. A change in forest management may also increase carbon storage potential, for example a regime with no thinning or pruning may contain more carbon than a more intensive regime (IPCC, 2007).

It is possible to retain a forest as a carbon reservoir and not harvest it. Some species are more suited to this than others. If the trees are not harvested, the carbon content will not increase past a given point. However, if they are harvested they may be turned into wood products, and could thus extend the time before the carbon is released back to the atmosphere (IPCC, 2001).

### Saving forest from being criminals' hideout

It is an established fact that the most valuable roles of forest cannot be substituted as regards to its provision of goods and services. Though, many forest reserves in many parts of globe especially in Nigeria have bastardized, many have been degraded while several exiting ones have been converted to the den of men of underworld; arm robbers, kidnappers, drug barons, terrorists and bandits. The existence of these ganglands is not enough to wipe out forest estates. Therefore the following measures can be put in place to take over forests from criminals:

- Continuous monitoring of forest activities with the use of satellite-based solutions as well as drones or small aircraft
- Periodic management of forest resources. The following aspects of forest management should be considered:
  - (i) Survey of forest,
  - (ii) Compartmentalization of forest.
  - (iii) Economic use of forest,
  - (iv) Administrative setting for forest management,
  - (v) Training programmes for persons engaged in forest management and conservation activities,
  - (vi) Use of forest land as tourist centers,
  - (vii) Social and agro-forestry,
  - (viii) Development of new techniques for the management and conservation of forests,
  - (ix) Research for efficient use and conservation of forest, and
  - (x) Policy decisions and their proper implementation.
    - Employment of more forest guards with optimum military training.
    - Relocation of military cantonment to most of volatile forests
    - Training and empowerment of rural/forest area based vigilante.
    - Stringent security measures at borders.

## Conclusions

Climate change is real and it has adversely affected serene human existence in many parts of the world. One of its consequential effects is insecurity in Nigeria, irregular rainfall patterns; flood, drought and desertification have led to food insecurity, incessant violence, conflicts and insurgency. Climate change adaptation and mitigation strategies as well appropriate forest management could be a right step in the right directions in safeguard the menace.

## References

- Achumba, I. C., Ighomereho, O. S and Akpor-Robaro, M. O. M. (2013): Security challenges in Nigeria and the implications for business activities and sustainable development. *Journal of Economics and Sustainable Development*, 4(2).
- Adishi, E. and Oluka, N.L. (2018): "Climate change, insecurity and conflict: issues and probable roadmap for achieving sustainable development goals in Nigeria", *International Journal of Social Sciences and Management Research*, Vol. 4 No. 8, pp. 12-20.
- Anyadike. R.N.C (2009): Climate Change and Sustainable Development in Nigeria: Conceptual and Empirical Issues." Enugu Forum Policy Paper 10 African Institute for Applied Economics, Nigeria.
- Beland, D. (2005): Insecurity, citizenship, and globalization: the multiple faces of State Protection. *Sociological theory*, 23(1), 25-41.
- FAO. (2012): State of the World's Forest 2012. Food and Agricultural Organization, Rome, Italy. pp. 46.
- FGN (2012): Nigeria's Path to Sustainable Development through Green Economy. Country Report to Rio+ 20 Summit 2012, Federal Government of Nigeria. Pp. 121
- Folami, O. (2013): "Climate change and inter-ethnic conflict in Nigeria", *Peace Review*, Vol. 25 No. 1, pp. 104-110.

- Haider H., (2019): Climate change in Nigeria: Impacts and responses. K4D Helpdesk Report 675. Brighton, UK: Institute of Development Studies.
- Human Security Network (1999), “Annual ministry meeting on human security, key note”, available at: [www.legal.un.org](http://www.legal.un.org). Accessed on 15/6/2022
- Idumah, F.O., Mangodo, C., Ighadaro, U.B. and Owombo, P.T. (2016), “Climate change and food production in Nigeria: implication for food security in Nigeria”, *Journal of Agricultural Science*, Vol. 8 No. 2, pp. 74-83.
- Intergovernmental Panel on Climate Change (IPCC) (2007): *Climate Change 2007: Impacts, Adaptation and Vulnerability: Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge University Press, Cambridge, UK.
- Intergovernmental Panel on climate change, (1997): *Guidelines for National GHG Inventories* (J.T. Houghton, L.G. Meira Filho, B. Lim, K. Treanton, I. Mamaty, Y. Bonduki, D.J. Griggs and B.A. Callender (eds)) IPCC, Meteorological Office, Bracknell, Great Britain.
- Intergovernmental Panel on climate change, (2000): *Land Use, Land-Use Change and Forestry - Special report*. (R.T. Watson, I. R. Noble, B. Bolin, N.H. Ravindranath, D.J. Verardo, D.J. Dokken (eds)). Intergovernmental Panel on climate change, Meteorological Office, Bracknell, United Kingdom. 377 pp.
- Intergovernmental Panel on climate change, (2001): *Third Assessment Report - climate change 2001. climate change 2001: The Scientific Basis Contribution of Working Group I to the Third Assessment Report of the Intergovernmental Panel on climate change (IPCC)* J. T. Houghton, Y. Ding, D.J. Griggs, M. Noguer, P. J. van der Linden and D. Xiaosu (Eds.). Cambridge University Press, UK. pp 944
- Kelechi, J. A., Vincent, O. A. and Emmanuel M. (2021): The impact of climate change on food and human security in Nigeria. *International Journal of Climate Change Strategies and Management*. Vol. 14(2). Pp 148. Available at <https://www.emerald.com/insight/1756-8692.htm>. Accessed on 15/6/2022
- Ministry of Environment of the Federal Republic of Nigeria (MOEFRN). (2003): *Nigeria’s first National communication under the United Nations framework convention on Climate change*. Abuja, Nigeria.5 -10.
- Moutinho, P and Schwartzman, S (2005): *Tropical Deforestation and Climate Change*. Amazon Institute for Environmental Research, Washington DC, USA,
- Odo, S.I. (2012): “Climate change and conflict in Nigeria: a theoretical and empirical examination of the worsening incidence of conflict between Fulani Herdsmen and farmers in Northern Nigeria”, *Arabian Journal of Business and Management Review*, Vol. 2 No. 1, pp. 110-124.
- Oladele, O.I. (2010): “Job-burn-out and coping strategies among extension Agents in selected states of South Western Nigeria”, *Botswana Journal of Agricultural Applied Science*, Vol. 6 No. 1, pp. 81-89.
- United State Geological Survey USGS, 2020. *Why is climate change happening and what are the causes?* Published US department of Interior.
- United States Environmental Protection Agency (USEPA) (2020): *Climate Change Indicators: Weather and Climate*. Published by United States Government.
- USAID (2012): *World Population Data Sheet*. Population Reference Bureau, USAID, Washington D C, USA.