

## **Climate Change and Human Health in Nigeria: A Review of Causes, Effects, Adaptations and Mitigation Strategies**

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### **ABSTRACT**

*This paper reviewed causes of climate change in Nigeria as it affects human health and identified some adaptations and mitigation strategies that can be put in place to tackle the consequences of climate change. Climate change is a global threat to various socio-economic and environmental progresses negatively affecting human health, livelihood and a challenge to achieving food security. This paper identified emission of greenhouse gasses from human activities (anthropogenic) as one of the leading causes of the present-day climate change phenomenon. The paper has critically analyzed direct impacts of climate change to human health which include physical injuries, death and mental health challenges that can be as a result of extreme weather conditions such as rise in temperature resulting in excessive heat. Indirect impacts such as displacement of people from their communities as a result of flooding, disruption of road and other infrastructures as a result of heavy precipitation and wind storm were also identified and socially mediated impacts leading to migration, conflict and struggle for natural resources were also discussed. Adaptation and mitigations discussed in this paper includes organized response for disaster, vulnerability mapping/assessment, partnership with non-governmental organization that campaigns against climate change, proper city planning and landscaping, ending gas flaring and other emissions, funding climate change awareness campaigns, massive public campaigns and advocacy. It is concluded that the fight against the impact of climate change should involve all stakeholders including policy makers and individuals.*

### **INTRODUCTION**

The reality of climate change today and frequency of its unpleasant consequences constitute significant threats to human lives across different regions on earth (Ochang, 2023; WHO, 2021). Climate change refers to changes in the mean variability properties of the climate, which persists over an extended period of time, typically within decades or longer (Kelechi and Vincent, 2021). Climate change according to Olaniyi O.A., Ojekunle Z.O. and Amujo B.T. (2013) is an

increase in the average global temperatures which is linked to natural and human activities. The IPCC in 2007 referred to Climatic Change as a change in the state of the climate that can be identified using statistical tests like the mean and /or other varying properties which may persists for an extended period like decades or longer. The present cause of climate change can be linked to the anthropogenic extension of greenhouse gas into the atmospheric system (IPCC, 2014). The adverse outcome of climate change has necessitated general global concerns and efforts at

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mitigating its effects as well as advocacy for measures that would restrict human anthropogenic actions that induce climate change (Kelechi and Vincent, 2021).

Climate change is a threat to the various socio-economic and environmental progresses made over the years with the potential to cause global impact and negatively affecting human health, livelihood and a challenge to achieving food security (WHO, 2016). Health and the environment are strongly connected, although the impacts of climate on health have been well documented in the literature for decades, attention to and efforts in this space often fall short of commitments. The USAID (2022) called climate change the largest global health threat of the 21st century further underscoring that climate change can no longer be ignored, but also recognizing the need to redefine our perspectives and approaches at this critical juncture. The World Health Organization (WHO) estimates that climate change will cause an additional 250,000 deaths per year between the years 2030-2050 from malnutrition, malaria, diarrhea and heat stress alone. Additionally, the direct cost to the health sector could reach \$4 billion per year, with 80% of the cost being shouldered by Sub-Saharan Africa. Low- and middle-income countries (LMICs) are said to experience a higher portion of adverse health effects from increasing climate variability despite their minimal contributions to global greenhouse emissions (Ruble, 2021).

Researchers have shown that Nigeria is already being plagued with diverse ecological problems, which have been directly linked to the on-going climate change (Ayuba et.al, 2007; Chindu and Nyelong, 2004; Mushelia, 2005). Nigeria is classified as one of the ten most vulnerable countries to the impacts of climate change and natural hazards (World Bank, 2021). The 2019 climate risk index published by the German watch organization classifies Nigeria as a region of high risk and indicates that the country is one of the top most vulnerable countries in the world. Nigeria experienced a double shock of severe drought in the northeast and widespread flooding that affected nearly the entire country in 2012 and similar incidence in 2019. The 2012 floods caused nearly \$17 billion in damages and losses in the 12 most affected states.

Nigeria is regularly affected by multiple hazards such as floods and droughts. Furthermore, low-income households are the most vulnerable to weather-related natural disasters. In Nigeria, 80% of these rural dwellers are basically farmers and are heavily impacted by flooding and drought. The degree of vulnerability will vary from one region of the country to another; the northeast and northwest geopolitical zones that constitute the arid and semi-arid areas of the northern Nigeria where most of the countries staple food and livestock are raised are highly vulnerable to climate change (NCCP, 2021). The rapid rise of urbanization and urban poverty has increased potential flood risk in many areas in the urban centers. An estimated 24% of Nigeria's populations (approximately 41 million people) are living in high climate exposure areas. Some of the highest overall exposure is concentrated in the coastal areas like cities of Lagos state, Warri in Delta state and Port Harcourt in Rivers state, these areas have large populations of poor households and slum areas. In view of the concerns of the threats posed by climate change globally, the combination of frequent natural disasters, large population, poor infrastructure, and low resilience to economic shocks made Nigeria vulnerable to climatic risks. This paper examines how climate change negatively affects human health in Nigeria and how mitigative and different adaptive strategies can be applied to prevent these impacts.

#### **IDENTIFIED CAUSES OF CLIMATE CHANGE**

Researchers have attributed climate change to natural and man-made (anthropogenic) causes (Nzeh E.C., Uke P.C., Attamah, D.C., Nzeh, D.C., and Agu O. 2016; Ani, K. J., Anyika, V. O. and Mutambara, E. 2022; Ochang; 2023). Natural phenomenon linked to alteration of the climate of an area according to Ochang (2023) includes changes occurring within the sun which can result in the change in the intensity of the sunlight that gets to the earth. If the intensity of the sunlight that reaches the earth is more than what was initially obtainable, an increase in temperature will be experienced causing warming of the earth. Volcanic eruption is also identified to release carbon dioxide and aerosol into the atmosphere. Carbon dioxide (CO<sub>2</sub>) is identified as one of the gases that trap heat in the earth's atmosphere preventing the exit of the heat

from the sunlight from the atmosphere thereby raising the temperature of the earth. This is termed “greenhouse effect” or “global warming” (Enete, 2000; IPCC, 2012; Ani et al. 2022; Ochang, 2023). Others gases apart from Carbon dioxide that have been identified to cause global warming include methane ( $\text{CH}_4$ ), nitrous oxide ( $\text{N}_2\text{O}$ ) and water vapor ( $\text{H}_2\text{O}_{(g)}$ ). Synthetic compounds that also contribute to global warming include fluorinated gases like Hydrofluorocarbons (HFCs), Perfluorocarbons (PFCs), Sulphur hexafluoride (SF) and Nitrogen trifluoride ( $\text{NF}_3$ ).

IPPC (2014) maintained that the main cause of the climate experienced today is the expansion of greenhouse effect. Enete (2000) stated that human being has continually uttered the concentration of greenhouse gases and aerosol, both of which influence the climate. Kelechi and Vincent (2021) stated that human industrial and agricultural activities have led to expanded emissions of these gases into the atmosphere thereby resulting to an expanded greenhouse effect which brings about increase in the mean atmospheric temperature further adding to the global warming phenomenon. They further expressed that human activities such as burning of fossil fuels, coal and oil have led to high concentration of  $\text{CO}_2$  In the atmosphere. CFCs which have synthetic compounds of industrial origin have contributed to the destruction of the ozone layer thereby contributing to global warming.

**Greenhouse Effect :** The Sun is Earth's only external form of heat and it emits solar radiation mainly in the form of shortwave visible and ultraviolet (UV) energy. As this radiation travels toward the Earth, about 25% of the radiated energy is absorbed by the atmosphere and about 25% is reflected by the clouds and other gases back into space while the remaining radiation travels unimpeded to the Earth and heats its surface (Olaniyi et al. 2013). The atmosphere acts like the glass in a glass greenhouse, allowing much of the shortwave solar radiation to travel through unimpeded, but trapping a lot of the long wave heat energy trying to escape back to space. The greenhouse gases transfer the energy to the surface and lower atmosphere and it is reradiated in all directions, including down towards the Earth's surface. This process makes the temperature rise in the atmosphere just as it does in the artificial greenhouse.

The Earth's natural greenhouse gases in their natural state of occurrence do not pose any danger to the environment and these gases transfer energy to the lower atmosphere and Earth's surface which is the abode of life (Olaniyi et al. 2013). This process warms the earth at about  $33^\circ\text{C}$  and allows the earth to be habitable by living organisms. The percentage of the major natural greenhouse gases that causes the green effect and the global warmth are as follows: 36%-70% for water vapor, 9%-26% for carbon dioxide, 4%-9% for methane and Ozone with 3%-7%. Ozone content in the atmosphere (ozone layer) is under constant destruction by the emission of chlorofluorocarbons (CFCs) which are synthetic compound that are of industrial origin (kelechi et al. 2021). Anthropogenic human – induced greenhouse gases have been described to be the main cause of today's global warming and climate change which is more linked to the increase in the carbon dioxide level from these anthropogenic activities of man (Ani et al. 2022). These activities include: fossil fuel combustion used in energy generation and transportation, deforestation as a result of agricultural activities, industrialization and urbanization. The global carbon dioxide level will continue to increase as a result of the continuation of these activities.

**EFFECTS OF CLIMATE CHANGE IN**

**NIGERIA:** Climate change is visible in Nigeria as reflected in drought occurrence, rising sea levels, erosion, rising temperature, frequent floods and extreme weather condition. Gullies have taken over about 6000km<sup>2</sup> leading to infrastructural destruction in rural and urban centers in the country. The gullies have removed significant areas of land meant for Agricultural land and a big threat to constant availability of food (food security). Sediment run-off from eroded gullies due to deposition of sand has greatly contributed to water quality decline, silting of water bodies and destruction of natural riparian vegetation. Destruction of natural riparian according to Ani (2023) reduces its ability to filter, metabolize and bio-accumulate nutrients and pollutants. Drought and shortage in rainfall in the arid and semi-arid regions of northern Nigeria is a factor that affects crop production in the agro-ecological zone. (Oyinloye, O.D., Akinola, O.O., Akande, Y.O., Akinyele, A.A. and Mosimabale, M.M., 2018). The southern part of Nigeria experiences excessive precipitation that leads to flooding and severe erosion. The southeastern part of Nigeria is a hotspot for massive gully erosion causing properties destruction and disturbance of large expanse of land that is meant for crop production.

Climate change variability and changing trends in Nigeria such as increase in temperature, increased rainfall in the southern part of Nigeria and increased dry spells, increased aridity and drought in the dry

lands and northern part threatens agricultural sustainability in the country (Climate Risk profile, 2021). The sector is already faced by problems of increasingly variable rainfall limited infrastructure substantial post-harvest losses and lack of access to inputs and finance. Nigeria tops production of rice and cassava in Africa but increased emissions of carbon dioxide are projected by several studies to reduce nutrient in rice up to 17% and increased variability in rainfall and higher temperatures will likely reduce rice yields in the sector (Climate Risk Profile, 2021). Cassava will adapt to hot and dry season conditions but highly susceptible to water logging reducing quality and yield if rainfall is too heavy. The southern agro-ecological zones are highly prone to flooding, erosion and soil loss leading to reduction in food production (CCKP, 2021). The Northern part of Nigeria known for massive animal production is regarded as the livestock production zone in the country. The decreasing precipitation and increase in temperatures experienced in the zone adversely affects livestock productivity causing about 60% of livestock productivity in the country (USAID, 2022). Increased rainfall variability has resulted to flooding and massive erosion in some humid/coastal areas of the southern part of the country while a reduction in precipitation have resulted in droughts and reduction of surface water resources in the Northern savanna belt in the country causing serious negative consequence on food production. Figure I. show flood risk, water scarcity, wildfire and extreme heat in Nigeria adapted from World Bank (2021).

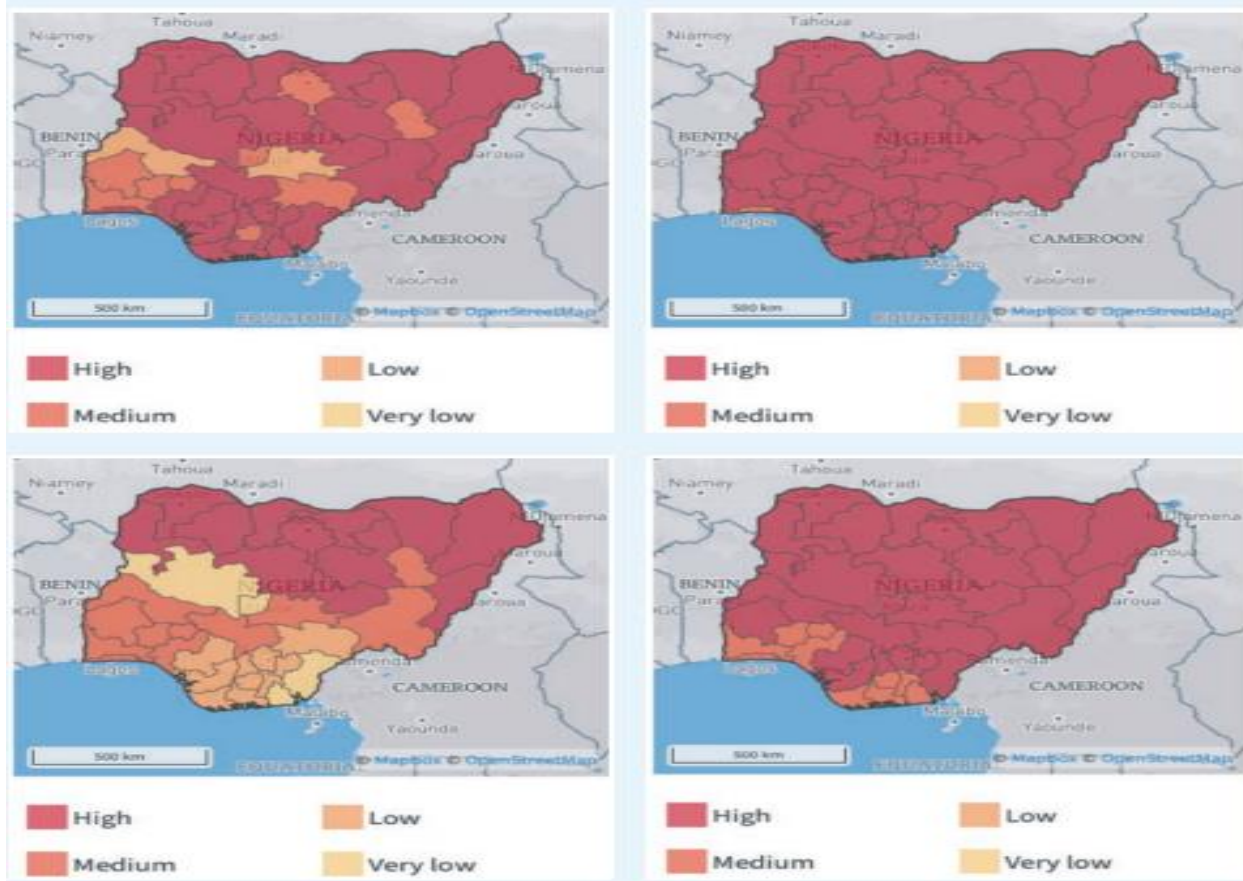


Fig. 1: Risk of Urban Flood (top left); Risk of Wildfire (top right); Risk of Water Scarcity (bottom left); Risk of Extreme Heat (bottom right).

Lake Chad shrinking from 45,000km<sup>2</sup> in 1960 to less than 3,000km<sup>2</sup> in 2007 has been attributed to climate change causing agricultural and serious conflicts of resources issues in the chad basin (Nigeria 2018). Long drought periods have resulted in failure of crops and death of livestock with consequent increase in food insecurity and potential famine in these areas (Ani, et al. 2022). The northern savanna region of Nigeria is at risk of extreme temperatures and reduces rainfall. Changes in hydrology as a result of reduction in river flows and other surface water bodies such as lakes ponds and reservoir are regular occurrences in this region as a result of climate impact (CCKP, 2021).

Energy used in Nigeria both domestically and exported is derived from oil and gas, energy is an important sector that drives economic development in the country but is also feeling the impact of climate

change. The coastal production is vulnerable to sea level rise, storm surges and coastal flooding which are elements of climate change (World Bank, 2021). In 2012, \$630 million incurred in losses from the 2012 flood event due to lost production and infrastructural damage. Energy demand in Nigeria will increase due to evaporation rates a reduced supply of biomass may be available for fuel (USAID, 2022). An increased frequency of heavy rainfall events may increase the frequency and intensity of flooding and storm surges, consequently damaging and disrupting energy production infrastructures, including generation transmission (Nigeria, 2018). Extreme weather condition and changing characteristics of annual and seasonal precipitation is a factor the disrupt river flow regimes, that affects hydroelectric power supply within the country that affects electric power supply in the country.

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## EFFECTS OF CLIMATE CHANGE ON HUMAN HEALTH IN NIGERIA

The USAID (2022) categorized observed climate impacts on health in the following ways highlighted below:

**DIRECT IMPACTS:** Increased frequency and severity of extreme weather events, including, heat can lead to physical injuries, death and mental health challenges. Hot weather due to climate change will reduce human comfort by causing profuse sweating, heat rashes, restlessness and other heat-related illnesses with heat waves increasing the risk of excess morbidity and mortality (Ekpo and Bassey, 2016). Hot working environments created by climate change will reduce human ability for physical or mental tasks and, prolonged exposure to heat may lead to heat exhaustion or heatstroke (Nerlander, 2009). For instance, epidemiological studies of death during heat wave have revealed that the most obvious health effect is directly from the heat itself as reported by USEPA (2007), heat wave killed more than 700 people in Chicago area alone in July 1995. Higher temperatures in the cities termed Urban Heat Island (UHI) causes increase in the ground-level concentration of noxious gases and smoke particles, which accelerates chemical reactions that generate other pollutants, thereby increasing air pollution problems. Problems of Elevated air temperature according to scientists can lead to breathing polluted or dirty air resulting to heart attacks, respiratory diseases, lung cancer and cardiovascular disorders (Ekpo and Bassey, 2016).

A study conducted on air quality and human health impacts of greenhouse gas emissions globally revealed the following frightening statistics: 6,500 premature deaths, 4,000 hospital admission cases for respiratory diseases, 3,000 hospital admission cases for cardiovascular diseases, 3,500 asthma attacks, 2,000 asthma-related emergency room visits, and numbers of reduced lung function growth rate in children. Chronic exposure of people to air pollution increases the prevalence of cough, phlegm, rhino-rhea, dry/sore throat, sinus congestion, wheezing, eye irritation and bronchitis (Hickson, 2000).

Research has shown that Vector borne diseases (VBD) are presently posing major public health threats in many parts of the world, especially sub-Saharan African some of these diseases are referred to as neglected tropical diseases (WHO, 2016). These diseases are transmitted via insects or other arthropods which include malaria, Onchocerciasis, Schistosomiasis, Trypanosomiasis and Dracunculiasis, to name but a few. As climate change increases global temperatures, regions that had never recorded VBDs in the past due to cold climates, will see migration of these vectors into new regions with increased global temperatures. Heat resulting from climate change could allow insects and pests to migrate up to 550 kilometers from their endemic regions, with the result that 50 to 80 million cases of malaria annually will be added to the current level (Epstein, 2007). The destruction of the ozone layer (ozone depletion) will lead to increased ultra-violet radiation reaching the earth, thereby increasing the incidence of skin cancer, cataracts and river blindness (Ekpo and Bassey, 2016).

**INDIRECT IMPACTS:** Heavy rainfalls that are induced by climate change would cause a lot of disruption in the transportation sector through reduced visibility and slippery surfaces of roads/aircraft runways, which may lead to increased automobile/aircraft accidents that can result in bodily injury or death. Heavy rainfalls have caused severe flooding in both northern and southern part of Nigeria with consequent displacement of many communities causing increase in numbers of internally displaced people in such scenarios. During flood episodes, domestic water sources and sewage systems mixed together contaminating water sources. Situations of potable water scarcity with related sanitation issues leading to rise in the spread of water borne diseases like typhoid, dysentery, cholera and other gastrointestinal diseases are experienced.

Climate change will cause increased presence of atmospheric pollutants (aerosols and noxious gases) into open water supply systems such as streams and rivers (acid precipitation). This comes with serious health implications such as high levels of bronchial and pulmonary illness, for people who depend on such

water sources for consumption and other domestic uses (Ekpo, 2009). Ground-level Ozone, has been shown by study that when precipitated into water sources, rapid respiration in the lungs and blood stream can be triggered, causing asthma like symptoms in consumers (Epstein, 2007). Three ways climate influences emerging diseases include according to USAID (2022) includes: (i) Increased transmission of novel pathogens attributed to changes in land use and loss of biodiversity as humans encroach on forests and increase their contact with animals. (ii) Increased cases of vector-borne disease due to warming weather and variable precipitation; Changes in geographic regions vulnerable to contagion due to shifts in climate. (iii) Re-emergence of old viruses, or zombie contagions, specifically bacteria and viruses preserved for centuries in the frozen ground as the Arctic's permafrost starts to thaw.

Phenomenon such as melting ice and sea water intrusion is another ecosystem mediated impact on health, increased global mean temperature due to climate change results in the melting of a significant quantity of the Arctic and Antarctic ice sheets which have already commenced. The rising case of melting ice will lead to sea level rise, which could cause saltwater to intrude into freshwater sources with serious health implications for coastal dwellers. Wind Storms as a result of Climate change is expected to increase not only the frequency of wind storms but also their intensity. Severe windstorms such as tornadoes, hurricanes, typhoons and thunderstorms have caused massive deaths and property damage in several parts of the world. Climate change induced windstorms will cause more damage and death through massive flooding of low-lying coastal areas, falling trees and power lines, direct mangling of objects (as with tornadoes). Nerlander (2009) reported that mental health effects such as depression and anxiety have been reported after extreme weather events (tornado, hurricane or intense thunderstorm events). Drought is already a frightful phenomenon in arid and semi-arid regions of the world and indeed in the dry lands of Nigeria because it is further contributing to existing food insecurity in Nigeria (Kelechi et al. 2021). Climate change heat and desiccation may extend the influence of drought from

semi-arid regions into previously wet, productive regions of the earth, with the attendant consequences of crop failures, food shortages, hunger and malnutrition.

**SOCIALLY MEDIATED EFFECTS:** These impacts on social and human systems includes; increased poverty as a result of occupational displacement like destruction of farmlands and businesses by some climate change incidences like flooding and storms. Migration from climate change impacted areas results in resource struggle and conflict among immigrants and residents. These are evident in farmer herder clashes/ conflicts of interest in some areas in the north central, northeastern and southern part of Nigeria, which had been traced to loss of biodiversity and other ecological resources in the area (Ani et al. 2022). Regular conflicts in an area can negatively impact the ability to access health care and other social welfare facilities (Ekpo and Bassey, 2016).

#### **ADAPTATION AND MITIGATION STRATEGIES**

USAID (2022) describes Adaptation and mitigation as two important strategies in addressing climate change and encouraged the use of the two in concert. Mitigation is generally termed as strategies adopted to reduce emission sources or enhancing the sinks of greenhouse gases. Adaptation refers to making adjustments in natural or human systems in response to expected or unexpected climatic events and their effects. For example, implementing early warning systems and preparedness plans for extreme weather events, ensuring flexibility in current policies and practices to cope with contextual changes such as prevalence in disease, demographics, or responding to large scale emergencies; and integrating disease surveillance into existing information systems to improve responsiveness and ensure availability of required commodities and medical products (Ekpo and Bassey, 2016; IPCC, 2014; Nkang, 2023). These two strategies require strategic planning through sound policy formulation, provision of regulatory and institutional frameworks. To achieve success in the fight against climate change, an all-inclusive effort, from policy makers to household levels is very important.

## POLICY AND LEGISLATIVE FRAMEWORK IN NIGERIA

The government of Nigeria has initiated a number of measures to address the challenge of climate change. Some of these policies are been carried out by relevant agencies, committee and inter-ministerial committee. Some of these polices are highlighted below;

- i. Climate change institutional framework; The Department of Climate Change (DCC) in the federal ministry of Environment drives the national response to climate change at the national and international levels. The department is the nation's focal point to the UNFCCC and also the Designated National Authority (DNA) for the clean development mechanism and works with other ministries through inter-ministerial committee on climate change.
- ii. Enabling climate change policies; the government of Nigeria rolled some projects as tools to fight climate change in the past with many of them now modified or transformed to further meet target beyond the duration periods. Some of these projects are the Vision 20:2020; The Transformation Agenda (2011-2015) and Economic Recovery and Growth Program (ERGP) (2017-2020).
- iii. Nationally Determined Contribution (NDC); Nigeria developed its NDC in 2015 towards the ratification of the Paris Agreement on climate change. It intends to reduce its Greenhouse gas emissions intensity of GDP by 20% by 2030 relative to the emissions intensity of GDP in the base period 2010-2014. On an unconditional basis as well as further 45% on a conditional basis consequent upon receiving climate finance, technology transfer and capacity building from the developed countries. If delivered upon, the NDC will improve standard of living, promote clean energy access and food and water security for all and make the country more resilient to

climate impacts, as well as enable Nigeria to be able to contribute to the goal of keeping the global temperature increase to well below 2<sup>0</sup>C.

- iv. Climate Change Financing; the government of Nigeria launched and issued Green Bonds as innovative means and alternative way of raising climate finance, and has released the guidelines of the Green Bonds that target about \$250 million in climate finance to support national projects in key areas that include environment, agriculture, power and energy efficiency and transportation.
- v. Global and Regional cooperation; Nigeria is strongly committed to the achievement of an effective and equitable international agreement on climate change, it recognized, its leadership role in Africa and sub-regional levels. Nigeria is meeting up and participating in different regional and international parleys and meeting up to its obligations to the United Nations Framework Convention on Climate Change (UNFCCC) and supporting the implementation of climate change initiatives of ECOWAS and African Union.
- vi. Emerging Issues; some global and climate – relate development issues that have emerged after the formulation of the NCCPRS (2012) and would influence the current policy direction includes; Paris Agreement and NDC, Agenda 2030 and 2063, Economic Recovery and Growth plan 2017-2020/40.

## ALREADY ORGANIZED RESPONSE FOR DISASTER

There should be disaster preparedness activities at all levels and at all times both in the national, state and local or community levels. This readiness is termed strategic planning with the advantage of efficient system of response which will not only provide relief



materials but will also tackle root causes of the problem and create a pathway for prompt response. The health sector should already have a prepared strategy for instance response to avoid any record of casualties. The preparedness strategy will be a shift from what is termed as fire brigade approach in doing things to a more effective way and good result yielding method. The serious concern about this approach of emergency response (fire brigade) which is more common in many cases in Nigeria is that it keeps the impacted community in perpetual cycle of fear, misery and poverty, while making the government to look insensitive and incompetent (Ekpo 2015). Policy responses to the 2010, 2011 and 2012 flood disasters in Nigeria are still unforgettable, the unending suffering and complaints by impacted individuals and communities can best attest to the inefficiency of emergency response system in such situations.

#### Vulnerability Mapping/Assessment

Constant vulnerability mapping and assessment should be carried out in order to have accurate data for areas that are prone to climate change disaster. The health sector should have data of areas prone to disasters like flooding for instance and have predicted possible outbreaks of diseases or contaminations that can cause break down of human health. This will help in instant response whenever such climate change impact becomes a disaster and there is need for an instant response.

#### PARTNERSHIP

There should be a constant and impactful collaboration between policy makers and climate change actors in the space of non-governmental organizations in the development of adaptation and mitigation strategies to fight climate For instance, early warning signs put forward by Meteorological Agencies should be coupled into plans of action. Thus, there should be regular synergy between weather scientists and medical/humanitarian experts. Data from relevant government agencies should be considered in designing health response to climate change impact.

#### PROPER CITY PLANNING, DESIGN AND LANDSCAPE

To reduce the heat associated with climate change in urban centers, buildings should be built and designed

in such a way that they will have access to natural breeze and free flow of fresh air. Buildings should have lawns and enough green spaces for plants to allow mopping out of carbon dioxide and supply of oxygen. Trees should be considered as part of the landscape, so tree planting should be part of the planned layout. Forest zones in Peri-urban and places marked as forest zones should be well protected, tree replanting and replacement should be a routine operation. Proper planning of city centers with proper aeration will reduce problems of climate change associated with respiratory and general discomfort as a result of rising temperature.

**END TO GAS FLARING AND OTHER**

**EMISSIONS** :Nigeria is an oil and gas producing country with so much flaring that contributes to the destruction of the ozone layer and the greenhouse effects that increases the temperature and hence the global warming phenomenon. Industries and domestic energy used in the country are largely dependent on fossil fuel whose combustion contributes a lot of carbon dioxide into the atmosphere adding to the climate change issue. Legislation and professionalism should be applied to ensure that gas flaring should be put to an end. Cleaner sources of energy from options like solar and wind should be an alternative to fossil fuel energy to reduce emissions and its consequent negative health impacts as a result of climate change.

**MASSIVE PUBLIC CAMPAIGN AND**

**ADVOCACY** : Public enlightenment on climate change effects and ways to tackle climate change effect should be a regular activity from relevant stakeholders. The media and regular public talks should be put in place in both urban and rural areas. The education curriculum should include climate change topics in relevant subjects so that from tender age climate change awareness is already achieved.

**FUNDING** :Funds are always the wheels of achieving the goal of a project therefore funds should be made available for climate change protection projects from policy makers and non-governmental organizations. This will encourage more contributions from different hands that may be financially incapacitated.

**CONCLUSION**

This paper has discussed climate change, some of the identified causes and its implication on human health in Nigeria. Some of the impacts include rising temperature, excessive rainfalls that leads to flooding and erosion, droughts that leads to poor agricultural performance was also identified in this paper review. This review also agreed that human influence through various anthropogenic activities such as fossil fuel combustion, agricultural practices and industrialization amongst many others as the major causes. It is also evident that climate change impacts have caused so many negative impacts that can affect

human health directly or indirectly. Some of the identified effects include heat impacts, cancers, cataracts, river blindness and general discomfort. Some other health issues attributed to climate change in this paper are respiratory tract infection, cholera, diarrhea, dysentery and some other gastro-intestinal disease outbreaks. Spread of novel diseases and survival of pathogens in new areas are also attached to the effects of climate change. The paper has also reviewed some mitigation and adaption strategies that can help tackle the impacts of climate change. This paper therefore concludes that if climate change can be mitigated and some adaptation strategies are employed, the negative impact of climate change on human health and other facet of the economy can be managed or prevented. Conclusively for the protection of our health we need to protect our environment by mitigating the causes of climate change and devising various adaptation techniques and strategies to guard against the impacts of climate change.

**RECOMMENDATION**

This paper recommends the following points towards the fight against climate change: The fight against climate change should involve stakeholders at all levels ranging from policy makers to household units; National and international Policies designed to mitigate climate change should be strictly adhered to; assessment and vulnerability mapping should be carried out regularly to gather sufficient data to challenge impacts of climate change; frameworks should be designed to combat the negative effect of climate change; Early preparedness, proper city planning and climate resilient designs should be done; collaboration and strong partnership in providing alternative energy sources such as wind and solar are also recommended in this review and adequate funding should be made available for climate change mitigation and adaptation projects' implementation.

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