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CLIMATE CHANGE AND ITS IMPLICATIONS ON HUMAN EXISTENCE IN NIGERIA: A REVIEW

***Abdulkadir, A. ,Maryam Lawal A., Muhammad T.I.**

Federal College of Education, Zaria, Kaduna State, Nigeria.

*Corresponding author: aatsaure09@yahoo.com; 08036304236, 08027082812

ABSTRACT

As the world's climate changes, largely due to the spade of industrial "progress" and increase in human number, the emission of Green House gases into the atmosphere has grave implications on human health globally. Within this context, 'third world' countries, including Nigeria are the worst hit by the immediate impact of climate change, even though they contribute least to the cause of the problem - emission of Green House gases, in comparison with their counterparts in the global North. Greenhouse gases (GHGs) have been proven to be responsible for global warming with the consequent threat to climate change. This paper contends that climate change is a major threat facing human health and existence in Nigeria and attempts a critical analysis of the roles of both developed and developing countries in contributing to the problem. It raises empathetic tone for the world's less privileges and future generation. The paper focuses on the impacts of climate change on Nigeria's economy, agriculture, health, security as well as environmental impacts. The paper submits that for the effects of climate change to be effectively resolve or managed in Nigeria and indeed globally, there should be, among other things, a sustained commitment on the part of the developed economies towards assisting developing countries in tackling the problem; attitudinal change and reorientation on the part of the populace towards environmental security and green-friendly initiatives, adaptation to climate change requires public health strategies and improves surveillances. The paper ends with way forward on how causes of climate change can be adapted as well as mitigated.

Key words: Climate, Generation, Implication, Human Existence.

INTRODUCTION

Climate change has been described as a statistical variation that persists for an extended period, typically for a decade or longer. It includes shift in the frequency and magnitude of sporadic weather events as well as the slow but continuous rise in global average surface temperature (IPCC, 2001). Climate change is the greatest challenge facing man's existence on earth in this century. It is a process of global warming, in part attributable to the 'greenhouse gases' generated by human activity. The impacts of climate change are being felt by both developed and developing countries. These impacts are likely to be felt more by developing countries not necessarily because they are the highest contributors to climate variations but because they lack economic, social and political infrastructures to respond adequately to the effects of climate change (Blessing *et al.*, 2011). The German advisory council on climate change noted that climate change is a threat already having substantial impact on human beings and the natural eco-system both in developed and developing countries but at varying degrees (German Advisory Council on Global Change (GACGC, 2003). For the developed countries, the impact of climate change has been perceived to be less severe due to natural advantage, high adaptation techniques, high technology, mechanized agricultural system and wealth status. These factors have enabled the developed economies to curtail the adverse effects of climate change. For developing countries like Nigeria,

the impact of climate change is of great importance given the high temperature level, poor adaptation capacity, and lack of early warning system (GACGC, 2003).

Nigeria is experiencing adverse climate conditions with negative impacts on the welfare of millions of people. Persistent droughts and flooding, off season rains and dry spells have sent growing seasons out of orbit, on a country dependent on a rain fed agriculture. Alarm bells are ringing with lakes drying up and a reduction in river flow in the arid and semi arid region. The result is fewer water supplies for use in agriculture, hydro powergeneration and other users (Oladipo, 2009).The main suspect for all this havoc is Climate Change. Africa will be worst hit by the effects of Climate Change which Nigeria is part of it (Olaniyi *et al.*, 2014).Climate change impacts are felt on agricultural production, health, biodiversity, social and economic conditions and affect peopleand the environment in general. Climate change is predicted to worsen the incidence of drought and desertification and millions of people will become refugees as a result (Anuforum,2009).Climate Change is indeed the most potent catastrophic challenge that humanity faces in the contemporary world. At the twilight of the 20th century and the dawn of the 21st, we are confronted with the "fierce urgency" of a crisis that links today and tomorrow and easily be understood as a by-product of globalization (Oladipo, 2009).

Concept of Climate Change and Global Warming

According to Nenibarini (2007) climate refers to the long time (about 35 years) average weather conditions of a region including typical weather patterns, the frequency and intensity of storms, cold spells and hot weather. The climate is the manifestation of a highly complex system consisting of five interacting components: the atmosphere (air), the hydrosphere (water), cryosphere (frozen part of the earth), the land surface, and the biosphere (part of the earth where life exists) (De Chavez and Tauli-Corpus, 2008).

Although Climate Change and Global Warming are often used interchangeably the two terms differ slightly. Global warming is closely associated with climate change especially as a co-traveler in the interplay of the equilibrium between the natural and man-made components of the Green House Gases (GHGs) that have been eminently adjudged of globally as the culprit for the warming of the Earth's atmosphere and oceans (Ayoade, 2004). Climate change refers to a change in climate that is attributable directly or indirectly to human activities; it affects the atmospheric conditions of the earth thereby leading to global warming (Wheeler, 2011).

Climate change has the potential to affect all natural systems thereby becoming a threat to human development and survival socially, politically and economically. Global warming refers to the increase in the average temperature of the earth's near surface air and oceans in recent decades and its projected continuation (Muhammad and Mohammed, 2008). Climate change refers to some observable variations in the climate system that are attributable to human (anthropogenic) activities, especially those that alter the atmospheric composition of the earth and ultimately lead to global warming (Ayoade, 2004). Mastrandrea and Schneider, (2008), have defined both Global Warming and Climate Change as the measurable increases in the average temperature of Earth's atmosphere, oceans, and landmasses due to increase in heat-trapping gases called Greenhouse gases (GHGs) including Water vapor, CO₂, Methane, Nitrous Oxide, and synthetic chemicals. On the other hand, Climate Change encompasses Global Warming and other reversal changes that may imply the antithesis of warming, i.e. a cooling world. Global warming is one of the key aspects of climate change (De Chavez and Tauli-Corpus, 2008). This prompted Ayoade (2004) to state that secular variations in climate occurring over a period of 100 to 150 years may not qualify as a climate change if conditions will quickly reverse later, but a change in climate usually takes place over a long period of time of at least 150 years with clear and permanent impacts on the ecosystem. Climate change is different from the generally known terms like climatic fluctuations or climatic variability. These terms denote inherent dynamic nature of climate on various temporal scales. Such temporal scale variations could be monthly, seasonal, annual, decadal, periodic, quasi-periodic or non-periodic (IPCC, 2007).

Causes of Climate Change

Climate change results from the increase in the average temperature on Earth. As the earth is getting

hotter, disasters like hurricanes, droughts, floods, land degradation, accumulation of wastes and wastes decomposition are getting more frequent. Human activities have led to large increases in heat-trapping gases over the past century. The climate change in the past 50 years or more is due primarily to human-induced increase (Markham, 2009).

Carbon Dioxide (CO₂): Emission from fossil fuel burning power plants: Man's increasing addiction to electricity has led to establishment of several coal burning power plants which release enormous amounts of carbon dioxide into the atmosphere (EPA, 2010, Markham, 2009). With the increasing demand for modern means of transportation and distribution of globally sourced goods, automobiles are increasing in number yearly (EPA, 2010).

Methane (CH₄): Emissions from animals, agriculture, and from Arctic seabed: When organic matter is broken down by bacteria under oxygen-deficient conditions (anaerobic decomposition) as in rice paddies, methane is produced. A similar process takes place in the intestines of herbivorous animals, and with the increase in livestock production, the levels of methane released into the atmosphere as such the rate of global warming significantly (Boden *et al.*, 2012, EPA, 2010).

Deforestation Process: Rapid deforestation for agricultural, commercial and industrial purposes: Man's quest for urbanization, industrialization as well as production of food crops has led to increasing deforestation in the tropics. Forests remove and store carbon dioxide from the atmosphere. Deforestation releases large amounts of carbon, as well as reduces the amount of carbon capture on the planet (Marcoux, 2000).

Increase in Usage of Chemical Fertilizers on Croplands:

In recent times, due to rapid population growth, especially in the underdeveloped nations, there is increasing demand for food and higher crop yields. This has led to more use of chemical fertilizers than animal manure. It has been established that nitrogen oxides have up to 300 times more heat-trapping capacity per unit of volume than carbon dioxide. Also the run-off of excess fertilizers creates 'dead zones' in our oceans. In addition to these effects, high nitrate levels in ground water due to over-fertilization calls for human health concern (Action Aid, 2006).

Implications/Impacts of Climate Change

Increasing temperature (global warming) and decreasing precipitation in most parts of the world are the greatest impacts of climate change. These bring about either negative or positive ecological impacts in different parts of the world. (Hengeveld and whitewood, 2005). The cumulative and the resultant effect of unchecked emission of greenhouse gases and the continuous depletion of the protective ozone layer cause deleterious changes in global climatic conditions and are characterized by increases in earth's temperature. An increase in global temperature is expected to cause increase in intensity of extreme weather events, threatening of natural habitats, and change in the amount and pattern of precipitation, general rise in sea level and consequent flooding of coastal land.

Bajopas Volume 10 Number 2 December, 2017

Other include changes in agricultural yields due to climate change; reduced stream flows, species extensions as ecological niches disappear and increases in the ranges of disease vector. (Nwanakoala and Osigwe, 2013).

Similarly, our forests which help to filter the air, our wetlands which are good nesting grounds for many biodiversity and our water bodies which are rich in biodiversity would be put at risk. Bush and forest fires may become more frequent and more intense (Watson, 2000).

Health Impacts

Climate change affects human health directly or indirectly in many ways. For instance, increasing temperatures, rising sea levels and increasing storm frequencies have great implication on human health in the area of injury and illness (Ayoade, 2004). During rainy season, there is a rise in the sea and ocean levels as a result of global warming. Hence, flooding may result which is likely to increase the vulnerability of the poor to malaria, typhoid, cholera and pneumonia. Temperature and rainfall dynamics may increase the distribution of disease vectors such as dengue, malaria and incidence of diarrheal diseases (Haines *et al.*, 2006). Urban floods experienced by people can make them suffer mental disorders and spread diseases. Harsh weather conditions especially in the northern part of Nigeria often lead to different diseases (More, 1992).

Stagnated water as a result of heavy rainfall often breeds mosquitoes which cause malaria to the people living around the area. The indirect effects although difficult to specify may include: Diseases carrying vectors, increased psychological stress and depression, feeling of isolation amongst displaced people due to natural disasters (Olorunfemi and Adeyemi, 1994). Extreme weather events amplifies the spread of pests and diseases and whenever temperature is high there is tendency for increased ailments such as meningitis, measles, chicken pox to mention just a few (More, 1992, Olorunfemi and Adeyemi, 1994). The asthma information guide.com (2000) agreed that weather and the environment play an important role in asthma attack and temperature influences asthma more than any weather factors. The attack can be direct infection (Deaths and illness due to thermal extremes injury resulting from floods and storms) as well as indirect (More widespread vector – borne infections increase in other infectious diseases Respiratory effects of worsening air pollution poor nutrition due to agricultural disruption Ill-health due to social dislocation and migration (More, 1992).

Agricultural Impacts

There is a growing consensus in the scientific literature that in the coming decades the world will witness higher temperatures and changing precipitation levels. The effects of this will lead to low/poor agricultural products such as poor crop yields (Deressa *et al.*, 2008). This is particularly true in low-income countries, where climate is the primary determinant of agricultural productivity and adaptive capacities are low (Apata *et al.*, 2009). Many African countries, which have their economies largely based on weather-sensitive agricultural productions systems like Nigeria, are particularly vulnerable to climate change (Dinar *et al.*, 2006). This vulnerability has

been demonstrated by the devastating effects of recent flooding in some part of the country and the various prolonged droughts that are currently witnessed in some parts of Northern region (BNRCC, 2008). About 80% of Nigeria's population depends on rain-fed agriculture and fishing as their primary occupation leading to a high risk of food production system being adversely affected by the variability in timing and amount of rainfall, frequent outbreaks of crop pests and diseases and heat stress. Food shortages will increase and many farmers could lose their sources of livelihood due to climate change (Idowu *et al.*, 2011).

Climate change has started to, and will continue to impact negatively on agriculture and food security because greenhouse gas emissions would increase the risk of hunger by additional 80 million people by 2080 in Africa (DeWeerd 2007). There is already undeniable evidence that animals, birds and plants are being affected by climate change in both their distribution and behaviours. Unless greenhouse gas emissions are severely reduced, climate change could cause a quarter of an animal, bird life and plants to become extinct (UN 2010). Odjugo (2008) shows that climate change has led to a shift in crops cultivated in some part of the country. Moreover, the frequent droughts and lesser rains have started shortening the growing season thereby causing crops failure and food shortage due to climate change impacts (Odjugo and Ikhuori 2003, Ayuba *et al.* 2007). Pest and disease incidences which become varied and uncontrollable under extreme weather events continue to cause decline in crop harvests. Drought and flood extremes feature prominently north wards of the country, affecting crops farming and harvests as well as livestock production, the feed of which are mostly crop-based. (Adams *et al.*, 1990).

Economic Impacts

Economic development is the utilization of human and natural resources endowed a State for purpose of nation-building. It entails increase in quality of life through provision of social amenities to the people. World Bank report (2008), on the threat of climate change, it is estimated that by 2020 the world will need to feed 3 billion more people at a time when countries are dealing with a harsher climate, with sea storms, droughts and floods. The impact of climate change is almost felt in all facets of the economy. The costs of global warming are so tremendous that the estimates of the costs vary from country to country but most figures put out are in the trillions (Dinar *et al.*, 2006). Climate change could disrupt UN goals to halve global poverty and hunger because of the impact on agriculture and food prices. The Report stated that countries in Africa could permanently lose as much as 4 to 5 percent of their Gross Domestic Product (GDP) if the earth's temperature increases to 2 degrees Celsius as opposed to minimal losses in rich countries. Again, the Report project that mitigation measures in developing countries to curb carbon emissions could cost around \$400 billion a year by 2030. (The Guardian, 2009:24). The longer the delay in seriously addressing climate change issues the harder it alters infrastructures, economies and lifestyles.

(Sanusi, 2013) stressed that some people benefit financially from global warming while other people suffer from the adverse effect of global warming. Some companies that benefit financially are those that are in the higher lands that will not become flooded, those that can easily adapt to the needs of the Earth and of Earth's population, and people whose job it is to study the environment. "Green" companies are already reaping financial benefits from global warming. (Agbu, 2009) emphasized that many businesses and types of jobs become obsolete and quickly go bankrupt.

In Nigeria, climate change also affects forestry due to erosion and excessive wind which resulting in decline in forest produce such as wood and cane. Consequently, it leads to reduction in forestry produce and low income, as well as an increase in the costs of building and furniture materials. Onuoha (2009) estimated the cost of deforestation and losses in non-timber forest products in the last 5 years in Nigeria at N120 billion per year, which is equivalent of 1.7% of gross domestic product (GDP). Gebreegziabher *et al.*, (2011) examined the economic effect of climate change on agriculture productivity the study observed that the impact of overall climate change will be relatively begin until approximately 2030, and thereafter worsen considerably and may lead to about 30% less average income, compared with the possible outcome in the absence of climate change. Policies to curb the climate change by reducing the consumption of fossil fuels like oil, gas or carbon, have significant economical impacts on the producers or rather the suppliers of these fuels. The Nigerian national economy would be massively affected by a sustainable reduction of fossil energy consumption (Brett, 2009).

Environmental Impacts

The concept Environment refers to the totality of extreme condition affecting the life and development of organisms whether on land, air or water. It is the total surrounding of man, including air water, land, natural resources, humans etc as well as their interaction. (Fatile, 2012) defines environment as a system within which living organism interact with the physical elements. Nigeria is one of the African countries that are vulnerable to the adverse consequences of climatic change. It has been noted that Nigeria will suffer from climate-induced drought, desertification, and sea level rise as a result of climate change (Podesta & Ogden, 2007).

Desert Encroachment and Drought: Climate change is exacerbating drought and aridity with consequences for Nigeria. The northern part of the country, especially the northeast zone, has been the worst hit by these environmental trends (Onuoha, 2008). Climate-related drought in the region is hastening desert encroachment, which is gulping most states in the north. Further southwards, fast moving desert conditions have caught up with Adamawa, Gombe, Kwara, Kogi, Nasarawa, Niger, and Plateau states. This has significantly affected vegetation and

pastures in the north. Consequently, desertification has virtually affected the entire savanna landscape of the country (The Guardian, 2008).

Soil Erosion/Flooding: Many communities in Nigeria, especially the southeast zone, erosion and the associated flooding constitute serious environmental hazards. Different types of erosions, such as sheet, rill, and gully, are pervasive in the zone. However, gully erosion constitutes the most significant threat to the survival of individuals and communities in this area (Jimoh, 2006). Human activities, such as bush burning, deforestation, improper farm practices, and, more importantly, construction activities (building of house, industries), that undermine natural landscape or drainage systems account for much of the erosion menace plaguing the region (IPCC, 2007). However, given the unconsolidated underlying geologic formations in these areas, rainfall intensity and duration is the most important natural cause of soil erosion. (Onuchukwu, 2008). Increase in the frequency of heavy rains and flooding had lead to widespread erosion and siltation with more dramatic impact on these areas. Its impacts include destruction of valuable property, loss of livelihood, loss of soil nutrients and biodiversity, productivity collapses, and loss of flora and fauna (e.g. fishes in rivers and streams) due to the transportation of sand deposits or pollutants to other natural ecosystems. Loss of productivity and valuable property undermine food security, personal security, and social order in a community with consequences for internal displacement (Onuchukwu, 2008).

Depletion of Biodiversity: Biodiversity relates to the diversity of ecosystems, species, and genetic traits within species which exists in a particular area: wetland, rainforest, savanna grasslands, plant and animal diversity, and various primate sub-species (Okorodud-Fubara, 1998). The biodiversity of any country is part of its natural assets critical for human survival and national development. This is essentially because biodiversity provides the reservoir for genetic materials, which can be used for pharmaceutical development, wood for fuel and furniture, and food security. New analyses suggest that about 15-37 percent of a sample of 1,103 land plants and animals would eventually become extinct as a result of climate changes that are expected by 2050 (Thomas, 2004).

Coastal Erosion/Flooding: Coastal erosion and flooding is the most important environmental problem pervasive in the south-south zone of Nigeria – commonly referred to as the Niger Delta. Nigeria has a coastline of approximately 853 km, and the Niger Delta accounts for about 450 km of the coastal zone. Over 75% of the 30 million inhabitants of the Niger Delta region live along the coastal area and survive mainly on fishing and agriculture. The problem of coastal erosion/flooding due to sea-level rise and storm surges constitute a significant source of threat to life, property, livelihoods, and infrastructure in the region (Ezirim, 2008, UNEP, 2006).

Impacts on Human and National Security

The issue of security is one of the basic pre-occupations of every individual, community, or state. In this wise, it is common, therefore, to see references being made to human security, community security, state security, societal security and national security, among others (Freedom and Gerald, 2010). The relationship between climate change and security has become a subject of growing public debate and academic inquiry, leading to the outpouring of scholarly literature (Garcia, 2008). States, as well as international and regional organizations, are equally engaging with issues surrounding the relationship between climate change and security. Familiarity with extant literature suggests that one dominant way of interpreting the ramifications of climate change for national security is to view climate change basically as a stressor factor in the matrix of security challenges to a state. A report interprets climate change as a "threat multiplier of instability" (Military Advisory Board, 2007). In this sense, climate change constitutes a threat to national security to the extent that it can exacerbate tenuous security situations or induce new shocks, which significantly alter social order in a society, constrict national revenue, and unsettles the political system. The threat to national security is the combined assault on societies, economics, and governments by the different global climate change effects (Maybee, 2008). Increasing drought in one part of a country as a result of climate change may lead to crop and livestock failures and loss of livelihoods; thereby exacerbating food insecurity and causing people to migrate to new areas for survival or to evolve other means of survival (Wheeler, 2011). Such adaptive behavior, which could be criminal at times, undermines national security just as resource-conflicts generated by the arrival of migrants in new areas of settlement pose threats to the stability of the host communities.

Response to Climate Change

To protect the environment and evaluate the cultural heritage of every society, The available options are: mitigation to reduce further emissions and adaptation to reduce the impact of climate change on the environment and human life(IPCC, 2007).

Adaptation and Mitigation Measures

Mitigation and Adaptation Measures: The two key words are frequently used. Mitigation is the slowing down that is the reduction of global warming through the level of green house gases in the atmosphere (WIPO, 2008). According to IPCC (2007), the mitigation options includes reduction in burning of fossil fuels and reduction of greenhouse gases and soot from the energy sector; reduction of deforestation; increase in reforestation and afforestation; modification of agricultural practices to reduce emissions of greenhouse gases and build up soil carbon.

Adaptation is the dealing with the existing damage or the effects of climate change, particularly by the developing scientific and natural devices. Also means taking measures to reduce the adverse impact of

climate change on human life and the environment. Some of the options that are available include: changing the cropping patterns; stopping further development on wetlands, flood plains, and close to sea level; developing crops that are resistant to drought, heat and salt; strengthening public health and environmental engineering defense against diseases; designing and building new water projects for flood control and drought management; construction of dykes and storm surge barrier against sea level rise (WIPO, 2008, Holdren, 2010).

It is evident that mitigation alone cannot work because global warming is already occurring and cannot be stopped. Equally adaptation alone will not work because adaptation will get costlier and less effective as global warming grows. Therefore what is needed is enough mitigation to avoid the unmanageable consequences of global warming, and enough adaptation to manage the unavoidable. Both mitigation and adaptation will not totally eliminate the impacts of global warming; there will still be some of the impacts which cannot be treated under mitigation and adaptation, which humans have to suffer. Therefore to avoid the amount of suffering, a lot of effective mitigation and a lot of adaptation have to be done IPCC(2007).

Preventive and Remedial Measures/Way Forward

Nigerian government, in partnership with environmental groups and local communities, should undertake a national greening program to help protect and preserve the environment. The program should emphasize aggressive tree planting in the country, as well as the combating of bush burning and deforestation(IPCC, 2007).The Nigerian government must begin to enforce stringent legislation for promoting environmental best practices in natural resource exploitation, such as ending gas flaring that contributes significantly to carbon emission. The federal government should strive to institutionalize good governance in the country through the strengthening of institutions, such as the Independent Corrupt Practices and other Related Offences Commission (ICPC) and the Economic and Financial Crimes Commission (EFCC), which promote transparency and accountability in the management of public resources(Freedom and Gerald, 2010).

The federal government should move quickly to strengthen all environmental regulatory institutions and agencies in the country through enhanced capacity building, greater funding, and inter-agency collaboration to improve their effectiveness in preserving and monitoring environmental trends throughout the country.Improved presence of local government personnel to promote enlightenment/campaigns on public health needs of the communities, provision of insecticide Treated Nets (ITNs) and screened windows for households in the affected communities, provision of revolving drugs fund for meeting the public health needs of stakeholders in the communities(Miller, and Lachow, 2008, Garcia, 2008).

Conclusion

In conclusion, it is possible to promote and actualize the strategies for limiting and adapting to the impacts of climate change in Nigeria and globally provided cost-effective and sustainable collaboration between governments, development partners and stakeholders can be assured for mitigating the consequences of incessant climate change on the environment and the livelihoods of all. There is agreement among scholars that the social and economic impacts of climate change on developing countries like Nigeria are greater. The effect of climate change has led to poverty, poor health, increased migration and could possibly increase the occurrence of violent conflicts.

REFERENCES

- Action Aid (2006). Climate Change, Urban flooding and the rights of the urban poor in Africa: key findings from six African cities. Action Aid, October, 2006.
- Adams, R. M., Rosenzweig, C., Peart, R. M., Ritchie, J. T., McCarl, B. A. Glycer, J. D., Curry, R.
- Agbu, O. (2009). Global Warming: An Overview of the Implication for Nigeria, Paper presented at NIIA International Conference on Climate Change and Human Security, November 24-25:1.
- Ahmad, Y. A. (2012). Potential Impacts of Climate Change on Waste Management in Ilorin City Nigeria. *Global Journal of Human Social Science Volume 12 Issue 6 Version 1.0*
- Anuforum, C. A. (2009). Climate change impacts on different agro-ecological zones of West Africa humid zones.
- Apata, T.G., Samuel, K.D., and Adeola, A.O, (2009). Analysis of Climate Change Perception and Adaptation among Arable Food Crop Farmers in South Western Nigeria. Contributed Paper prepared for presentation at the International Association of Agricultural Economists' 2009 Conference, Beijing, China, August 16-22, 2009.
- Ayuba, H.K, Maryam, U.M., Gwary, D.M. (2007). Climate change impact on plant species composition in six semi-arid rangelands of Northern Nigeria. *Nigerian Geographical Journal* 5(1): 35-42.
- Ayoade, J. O. (2004). Introduction to Climatology for the Tropics. Spectrum Books Ltd., Ring Road, Ibadan.
- Blessing, K.F., Chukwudumebi, L.E., Yusuf, L.I., Victoria, C.A. (2011). Climate Change and Adaptation Measures in Northern Nigeria: Empirical Situation and Policy Implications. African Technology policy Studies, Network working paper series/No. 62.
- Brett, H. (2009). Food and Agriculture, Features, Climate Change Threat to Food Security. Available at <http://www.people and planet.Net/doc. Php? Id=>
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- Boden T.A., Marland, G. Andres, R.J., (2012). Global, Regional, and National Fossil-Fuel CO₂ Building Nigeria's Response to Climate Change (BNRCC), (2008). Annual Workshop of Nigerian Environmental Study Team (NEST): The Recent Global and Local Action on Climate Change, held at Hotel Millennium, Abuja, Nigeria; 8-9th October, 2008.
- De Chavez and Tauli-Corpus (eds.) (2008). Guide to climate change. Retrieved, June, 2017.
- Dinar, A., Hassan, R., Kurukulasuriya, P., Benhin, J., Mendelsohn, R. (2006). The policy nexus between agriculture and climate change in Africa. A synthesis of the investigation under the GEF/WB Project: Regional climate, water and agriculture: Impacts on and adaptation of agro ecological systems in Africa. CEEPA Discussion Paper No. 39. Centre for Environmental Economics and Policy in Africa, University of Pretoria
- Deressa, T., R. Hassen, T. Alemu, M. Yesuf, and C. Ringler. (2008). Analyzing the determinants of farmers' choice of adaptation measures and perceptions of climate change in the Nile Basin of Ethiopia. International Food Policy Research Institute (IFPRI) Discussion Paper No. 00798. Washington, DC: IFPRI
- DeWeerd, S. (2007). Climate change coming home: Global warming effect on populations. *World Watch*, 2(3):6-13.
- Environmental Protection Agency (2010). Global Warming: Executive Summary.
- Ezirim, G.E. (2008). Petropolitics and Environmental Criminality in the Niger Delta: Advocacy for Enforcement of Global Conventions. *University of Nigeria Journal of Political Economy*, 2(1&2).
- Fatile J.O. (2012). Climate Change, Environment and Conflicts in Nigeria. *British Journal of Arts and Social Sciences*. Vol.6 No.1 (2012).
- Freedom C.O., Gerald E.E. (2010). Climatic Change and National Security: Exploring the Conceptual and Empirical Connections in *Nigeria Journal of Sustainable Development in Africa*. Volume 12(4), 2010.

- Garcia, D. (2008). The Climate Security Divide: Bridging Human and National Security in Africa. *African Security Review*, 17(3).
- Gebreegziabher, Z., Stage, J., Mekonnen, A., Alemu, A. (2011). Climate Change and the Ethiopian Economy: A Computable General Equilibrium Analysis. *Environment for Development, Discussion Paper Series, EFD DP 11-09*.
- German Advisory Council on Global Change (GACG). (2003), *Climate Protection Strategies for the 21st Century: Kyoto and Beyond*. Special Report. Berlin, Germany: WBGU. p1.
- Haines, A., Kovats, R. S. D., Campbell-Lendrum, C., & Corvalan, C. (2006). Climate Change and Human Health: Impacts, Vulnerability and Public Health. *Journal of the Royal Institute of Public Health*, 120, 585-596.
- Hengeveld H, Whitewood B. (2005). Understanding climate change 2005: A synthesis of climate change science Canada. Environment Canada. pp. 31-35.
- Holdren, J. P. (2010). Climate Change Science and Policy: What Do We Know? What Should We Do? Keynote Address, Kalvi Prize Science Forum, International.
- Iidowu, A.A., Ayoola, S.O., Opele, A.I. Ikenweuwe, N.B. (2011). Impact of Climate Change in Nigeria. *Iranica Journal of Energy & Environment* 2 (2): 145-152, 2011. ISSN 2079-2115.
- IPCC.(2001), *Impact, Adaptation and Vulnerability. Contribution of Working Group II of the Intergovernmental Panel on Climate Change to the Third Assessment Report of IPCC*. London: Cambridge University Press
- IPCC.(2007). *Climate change (2007). The fourth assessment report (AR4). Synthesis report for policy makers*.
- Jona, B., J. W.,(1990). Global climate change and US agriculture. *Nature*, Lond. 345, 219-224
- Jimoh, I.H. (2006). Pattern of Environmental Degradation and Development Efforts. In H.A.
- Markham, D. (2009). Global Warming – effects and causes: a top 10 list. Retrieved from <http://planetsave.com>
- Marcoux, A. (2000). Population and Deforestation. SD Dimensions. Sustainable Development Department. Food and Agriculture Organization of the United Nations (FAO).
- Mastrandrea, M. & Scheider, H. (2008). *Global Warming* Microsoft Encarta 2008 DVD, Redmond W.A. Microsoft Corporation 2008.
- Maybee, S.C., (2008). National Security and Global Climate Change. *Joint Force Quarterly*, 49(2), 98.
- Military Advisory Board. (2007). *National Security and the Threat of Climate Change*. Virginia: CNA Corporation, 3.
- Miller, R.A. & Lachow, I. (2008). Strategic Fragility: Infrastructure Protection and National Security in the Information Age. *Defense Horizons*, 59.
- More, G. (1992). Epidemiology and Treatment of Cyclosporine Cayetanesis Infection in Peruvian Children. *Clinical Infectious Diseases*, 24(5), 977-981.
- Muhammad, M.A., Muohammed, M.A. (2008). Global warming and ozone layer depletion on climate change and desertification. *Journal of Nigerian Environmental Society*, Vol.1(2): 109-123
- Nenibarini, Z. (2007). Climate change and flooding: fate of riverine communities in the Niger Delta. Conservation Programme Centre for Environment, Human Rights and Development (CEHRD), Eleme.
- Nwanakoala, H.O., Osigwe, O. (2013). Implications of Global Warming for Sustainable Economic Development in Nigeria. *International Journal of Sustainable Energy and Environment* Vol. 1, No. 8, September 2013, PP: 158 - 166.
- Olaniyi, O.A., Funmilayo O.A., Olutimehin I.O. (2014). Review of climate change and its effect on Nigeria ecosystem. *International Journal of Environment and Pollution Research* Vol.2, No.3, pp.70-81
- Odjugo P.A.O., Ikhuoria A.I. (2003). The impact of climate change and anthropogenic factors on desertification in the semi-arid region of Nigeria. *Global Journal of Environmental Science*, 2(2): 118-126
- Odjugo PAO (2008). Quantifying the cost of climate change impact in Nigeria: Emphasis on wind and rainstorms. *Journal of Human Ecology* (In Press).
- Oladipo E.O. (2009). Climate Change Overview, Paper presented at the Policy Dialogue on Climate Change: The Way Copenhagen, August 20.
- Okpara, E.E. (1993). Environmental Watch: How much do Nigerians know? *Nigerian Forum*, 13(5-6), 156.
- Onuchukwu, B. (2008). Anambra Security Operatives halt 3000-man Protest in Awka. *Daily Trust*, 25 March, 10.
- Onuoha, C.M. (2009). Climate Change and Sustainable Development in Nigeria: The Mitigating Role of Green Wall Sahara Nigeria Programme. African Institute for Applied Economics (AIAE), Enugu Forum Policy Paper 10.
- Olorunfemi, J. F., Adeyemi, A. S. (1994). Climate and Mortality in Ilorin (1983-1992). *Ilorin Journal of Business and Social Sciences*, 4 .
- Okorudud-Fubara, M.T. (1998). *Law of Environmental Protection: Materials and Text*. Caltop Publications Limited: Ibadan, 242.
- Podesta, J. & Ogden, P. (2007). *Global Warning: The Security Challenges of Climate Change*. Retrieved from: <http://www.americanprogress.org>.
- Sanusi, O. (2013). Climate Change: the Impacts and Potential Benefits for the Developing Nations. *International Journal of Agricultural Research and Review* Vol. 1, pp 002-012.
- The asthma information guide.com.(2000). Asthma.
- The Guardian Newspaper.(2010). Heat, Dusty Weather Raise Health Concerns. *Climate Change Effects in Nigeria*. 30th March, 2010.
- Thomas, C.D (2004). "Extinction risk from Climate Change. *Nature* 427 (6970):138 -145.
- United Nations (UN) (2010). Panel on Climate Change/Conference Report. The way forward Retrieved from www.hg.org/climatechange.htm (2017).
- UN Environmental Programme (UNEP).(2006). *New Report Underlines Africa's Vulnerability to Climate Change*. Nairobi, 5 November.
- Watson, R.T. (2000). Report of the Intergovernmental Panel on Climate Change. Presented by the Chair of IPCC at the Sixth Conference of Parties to the United Nations Framework Convention on Climate Change, 13 November, 2000, pp1 -20.
- WIPO Magazine (2008). *Climate Change: The Technology Challenge*, Geneva, December, pp.56.
- Wheeler, D. (2011). "Quantifying Vulnerability to Climate Change: Implications for Adaptation Assistance" (Washington, DC: Center for Global Development, 2011).
- World Bank. (2008). *World Bank development report: Agriculture for development*. Washington DC. World Health Organisation (2004). In de Chavez and Tauli-Corpuz. (eds.) (2008). *Guide to climate change*.