

“Slow Response to Climate Change in Nigeria: Need for Urgent and Comprehensive Action”

Imo Jackson Ekpoh¹

Abstract

This paper discussed the state of climate change in Nigeria by considering critically the issues and challenges involved. Serious effort was made to present the reader with empirical evidence on the onset of climate change in Nigeria. Issues such as policy responses, together with challenges such as devastating floods and sea level rise in the coastal south, as well as, incessant droughts and desertification in the Sahelian north were examined. Accordingly, climate change impacts and existing responses to those impacts in Nigeria were thoroughly scrutinized. The implications of not making proper choices on climate change issues and challenges were highlighted. The paper concluded that although some effort has been made to mitigate the impacts of climate change in the country (such as the restriction placed on logging in the Cross River High Forest and nationwide afforestation schemes), such efforts are largely fragmentary and much remains to be done especially in the area of strategic planning and capacity building (for instance, dredging of inland rivers and lakes, construction of sea defenses, etc.) to mitigate climate change and adapt to potential and real-time impacts.

Keywords: Climate Change; Issues and Challenges; Nigeria’s Preparedness; Way Forward

1. Introduction

Fluctuation has always been a trademark of weather and climate. However, while the fluctuation that characterizes the day-to-day, month-to-month, or even year-to-year variabilities around the mean-state may be seen as normal, the fluctuation in climate which seeks to change the long-term mean and standard deviation (i.e., a change in the central tendency) of the climate of a place is an abnormal situation and is referred to as climate change. Thus, climate change has been defined as a shift in the long-term mean values of a climatic parameter or statistic, where the mean is taken on a specified interval of time scales varying from a number decades to millions of years (Parry, 1986; Adejuwon, 2004; Ayoade, 2004; Ekpoh, 2009).

Much of the apprehension that greeted the onset of climate change in the 1980s and 1990s have largely been put to rest, thanks to the untiring work of the Intergovernmental Panel on Climate Change (IPCC). Today it is no longer news that the earth is warming due largely to human activities, primarily fossil fuel combustion, industrial processes and deforestation, which causes the release of greenhouse gases such as carbon dioxide, methane, nitrous oxide and chlorofluorocarbons into the atmosphere. From a pre-industrial level of 280 parts per million by volume (ppmv), carbon dioxide, for instance, has increased to 380 ppmv in recent times; an increase of about 40 per cent. It should be stated here that the preponderance of greenhouse gases in the earth’s atmosphere is responsible for the formation of a gas layer in the troposphere called the greenhouse gas layer. It is this gas layer which has caused global warming of the earth’s atmosphere by allowing short-wave solar radiation to pass through it to the earth’s surface while restricting the spaceward journey of some of the long-wave terrestrial radiation, thus causing a surplus heat budget in the lower atmosphere. Global warming has already resulted in an increase in the global mean temperature of the atmosphere by about 0.6⁰C, and a continuation of the historical trends of greenhouse gas emissions under the “business- as-usual” scenario of human activity will lead to a further rise in air temperature throughout the

¹ Department of Geography and Environmental Science, University of Calabar, Calabar, Nigeria

21st century (IPCC, 2007). Already, current predictions from General Circulation Models (GCMs) suggest a global temperature rise of between 1.1^oC and 6.4^oC by 2100.

As communities try to improve their living standards, with its concomitant modernization of urban and rural environments through the provision of infrastructures, there will always be pressure on earth's resources, especially fossil fuel and forest resources. Carbon dioxide, a major bi-product of fossil fuel consumption and forest clearance has been implicated, alongside other greenhouse gases such as methane, nitrous oxide and chlorofluorocarbon, as being largely responsible for the current global warming.

Climate change, whether in the form of frequent and intensified thunderstorms, incessant droughts, severe floods, destructive hurricanes, or monstrous tornadoes, can adversely affect the lives of millions of people around the world. Recent examples of some of these devastating climatic events include: the 2010 Pakistani floods which directly affected 20 million people through the destruction of property, livelihood and infrastructure, as well as, killing about 2,000 people; the 2010 Sokoto floods which washed away 20 villages, displaced 130,000 people, killed 6 persons, destroyed the Goronyo Dam, devastated farmlands, collapsed the major bridge linking UsumanuDanfodio University to Sokoto town; the March 2010 abnormal dust storm which enveloped Nigeria for about one week and led to multiple cancellation of flights nationwide; the July 10, 2011 extreme rainfall in Lagos which saw non-stop downpour for 14 hours that produced 231 mm of rainfall; the 2011 floods in Lagos, Ibadan and Calabar that destroyed property, killed and rendered many people homeless; the 2012 floods in Makurdi, Lokoja, Yenogoa, etc., the historic Mississippi river floods of April/May 2011 (the likes of which has not been seen since 1937); the deadly tornado that struck Joplin, Missouri, U.S.A on May 24, 2011, killing 116 people in 20 minutes, injuring 400 others, and damaging some 2,000 homes, businesses, churches and a hospital; this was the worst tornado in 60 years.

Between 1950 and 2000, increasing frequency and intensity of storms caused enormous damages estimated at \$87 billion in property losses, \$19 billion in crop losses and 12,000 in human lives in the United States of America alone. Hurricane Katrina which struck the United States of America in August 2005 and virtually submerged the city of New Orleans is said to be the costliest tropical cyclone worldwide, causing \$81.2 billion in property damage and killing 1,836 people. The overall damage caused by Katrina exceeded \$100 billion (Changnon, 2001; Gambrell, 2010; Ekpoh and Ekpoh, 2011; next, 2011; newscm, 2011; huffpost green, 2011; the moment, 2011).

Developing countries, in general, are said to be the most vulnerable to climate change due to their low adaptive capacity and growing dependence on resources that are sensitive to changes in climate. Paradoxically, the same developing countries are also least prepared to tackle climate change. Nigeria, of course, is one of the developing countries in sub-Saharan Africa that is currently experiencing more than its fair share of climate change impacts and is expected to be even more seriously affected by climate change largely due to its lack of preparedness and partly due to its low level of technology, widespread illiteracy and massive poverty. General Circulation Models (GCMs) prediction for Nigeria suggest that climate change will affect the country through sea level rise along its coastline as well as alterations in the local climate which may witness more extreme rainfall in the south (leading to severe cases of flooding, erosion and mass wasting) and intensified aridity in the north (causing incessant droughts and desertification). These projections are consistent with current, real-time weather observations in Nigeria (Adesina and Odekunle, 2011; Odjugo, 2010; Ekpoh and Nsa, 2011; Ward, 2009). This paper therefore considers the issues and challenges created by climate change in Nigeria.

2. Climate Change in Nigeria

Recent catchy banner-headlines in popular media that make climate change a dreaded phenomenon in Nigeria are worth repeating as introduction to this section.

“Nigeria’s 2012 floods affected 7.7 million people, killed 363, displaced 2.1 million” – Nation Newspaper, 20 July, 2012.

“31 States to Experience Devastating Floods in 2013” THISDAY Newspaper, 1 June, 2013.

“Climate Change Worsens Hunger Problem in Nigeria, Others” thisday newspaper, 8 April 2013.

“Governor of Lagos State, Mr. BabatundeFashola has described the ravaging climate change as the biggest war of our time” Tribune Newspaper, 10 November 2012.

These comments point to the fact that Nigeria is already in the thick of climate change (Ekpoh and Nsa, 2011; Odjugo, 2009; Chindo and Nyelong, 2004; Mshelia, 2005; Adefolalu, 2007). In a study that involved 30 meteorological stations and 105 years of observation, Odjugo (2010) carried out long-term temperature analysis and the result showed that the mean temperature for Nigeria since 1901 remained steady until the late 1960s when it started a gradual rise that has continued to the present time, in response to global warming. The experiment was repeated for rainfall in Nigeria from 1901 to 2005 and the result showed a general decline, with a loss of 81 mm of rainfall during the period. Another study also showed that rainfall in Sokoto for the period from 1968 to 2008 declined by 8.8 percent of the long-term (1915-2008) mean, while other rainfall characteristics such as late onset, early cessation and long breaks within the rainy season were noticed to have become more frequent (Ekpoh and Nsa, 2011). A further scrutiny of instrumental data for the country also revealed that climate change impact on rainfall in Nigeria does not translate to a general decline in total amount for all regions but could be quite erratic in amount and pattern of distribution from area to area. Indeed, it is this erratic nature of climate change that poses the greatest problem to planning and adaptation. As Adefolalu (2007) observed, Nigeria’s locational factor (i.e. Nigeria lies between latitudes 4⁰N and 14⁰N; and longitudes 2⁰E and 14⁰E) suggests perennial humid conditions in the southern states with annual rainfall of 1000mm – 2500mm but exceeding 3000mm in parts of the Niger Delta and the southeast corner; the extreme drought-prone parts which may receive anything from 250mm to 700mm. Superimposed on this spatial diversity are the inter- and intra-seasonal variations which are common due to regular transient atmospheric flow patterns and systems and are responsible for localized and regional variations exceeding 50 percent. For instance, many coastal locations in Nigeria such as Lagos, Ibadan and Calabar have received excessive rainfalls recently which resulted in historic floods that caused substantial loss of lives and property, while locations in northern Nigeria had deficit rainfall budget. (Ekpoh and Nsa, 2011; Odjugo, 2010; Baudi and Ahmed, 2006). Thus, Nigeria is considered to be one of the most climatologically vulnerable countries in Sub-Saharan Africa with respect to climate change.

Other studies also show that the number of rain days during the last 30 years have dropped by 53 percent in north-eastern parts of Nigeria while the coastal areas have experienced a drop of about 14 percent in the number of rain days. Furthermore, the areas experiencing double rainfall maxima has shifted southwards while the short dry season called “August Break” is being experienced more in July as against the usual occurrence in August prior to 1969 (Odjugo, 2010; Ekpoh 2009). While the desiccation which started in the Sahel of West Africa in the late 1960s is implicated as being responsible for the recession of Lake Chad from 25,000 km² in 1963 to a paltry 1,250 km² in recent times, a loss of about 90 percent of its previous size (Ekpoh and Nsa, 2011; Awake, 2009; Odjugo, 2009; Bomford, 2006; Chindo and Nyelong, 2004), the 2010 Sokoto floods which destroyed Goronyo dam and swept away the only bridge linking UsumanDanfodio University main campus to Sokoto town was attributed to an extreme rainfall event caused by climate change. Droughts in northern Nigeria used to have a rhythm of 25 to 30 years cycle. However, since the 1972/73 drought episode which signaled the beginning of climate change in sub-Saharan Africa, the recurrence of drought has become a game of lottery with no predictable cycle. From these observations, it sounds reasonable to submit that climate change is already altering the climate of Nigeria substantially.

3. Issues and Challenges of Climate Change in Nigeria

Climate change that is characterized by global warming has become a new reality, with deleterious effects, such as changes in weather patterns and seasonal cycles, disruption of ecosystems, depressed agricultural output, disruption of water needs and supply, food insecurity, human health problems, and energy disruption. Especially in a developing country like Nigeria, where about 70 percent of the population are engaged in agriculture and other income generating ventures that have strong reliance on the biophysical

environment such as animal rearing, hunting, fishing, forestry and lumbering, a change in climate is bound to have enormous impact on the livelihood and smooth functioning of households and communities.

To drive home the enormity of challenges placed on Nigeria by climate change, a few of the potential and real impacts will be highlighted. However, for a comprehensive and detailed documentation of all the impacts of climate change in Nigeria, the reader is advised to consult Nigeria's First National Communication under the United Nations Framework Convention on Climate Change. Some key economic sectors such as Ecology and Ecosystems, Agriculture, Water Resources, Mining (oil and gas), Energy, Transportation, Outdoor Sports and Recreation, Human Comfort and Health, are most vulnerable to climate change and they merit brief discussion.

Ecology and Ecosystems

The impact of global warming in melting the Arctic and Antarctic ice sheets has already resulted in serious coastal flooding in Lagos recently. It is estimated that a warming of 0.6⁰C has caused a sea level rise of 0.2 metres and the rise is projected to reach one metre by the year 2100 under the "business-as-usual" scenario (Hengeveld et al., 2002). With a sea level rise of 0.2 metres, it is estimated that Nigeria has already lost some 3,400 km² of its coastal lands to climate change, and if the sea level rise attains the projected one metre on or before 2100, then some 18,400 km² of Nigeria's coastal lands may be inundated, submerging coastal settlements that are less than 10 meters above sea level such as Lagos, Bonny, Forcados, Warri, Port Harcourt and Calabar (NEST, 2003; Odjugo, 2010). Any sea incursion into Nigeria's coastal lands due to sea level rise means salt water intrusion into fresh water ecosystem, invasion and destruction of mangrove ecosystems, pollution of coastal wetlands and coastal beaches. Sea water incursion into land will also lead to population displacement which may result in refugee crisis. Perennial inundation and coastal erosion, together with their associated population displacement are currently major environmental problems in coastal towns such as Awori, Egun, Isekiri, Izon, Nembe, Degema, Ibeno, Andoni, Mbo and Ikang. It is estimated that a metre rise in sea level will displace about 14 million people from the coastal areas of Nigeria (Abu, 2007).

Agriculture

Agriculture is one important economic sector where climate change is expected to impact negatively through incessant droughts and desertification in the north and severe flooding in the south. About 70 percent of the population is engaged in this sector and lack of proper preparedness for climate change will lead to serious disruptions in this sector, with severe consequences for Nigeria's ability to feed her population. Already the number of beggars on our streets has increased and climate change-related crop failures and food shortages will worsen that situation, with many people being afflicted by malnutrition and Kwashiorkor. Studies suggest that about 80 million additional people will suffer hunger by 2080 in sub-Saharan Africa as a consequence of climate change (Nwafor, 2007; DeWeerd, 2007).

Water Resources

This is another sector where climate change will impact seriously, through frequent droughts in the north and sea-water intrusion in the south. Climate change will affect the hydrological regime and thus impact the recharge capacity of surface streams and lakes.

Mining (Oil and Gas Sector)

Nigeria is practically a mono-economy with about 80 percent of government's income, 90-95 percent of export earnings and more than 90 percent of foreign exchange revenues coming from the oil sector. Strong thunderstorms are expected to accompany the south-west winds that wash the Guinea coast. These hurricane-force winds will rake havoc on oil and gas installations along the coast as well as off-shore platforms if adequate preparedness is not made to confront climate change. Sea level rise will also inundate many oil infrastructures and facilities along the coast.

Energy (Power Production and Distribution)

Nigeria depends to a large extent on hydro-electric power generation for her power supply. Without proper preparedness, climate change will significantly affect hydro-power generation through reduced rainfall in northern Nigeria. Strong thunderstorm winds will also affect electricity poles, power transmission lines and transformers. Increased cloudiness will affect solar power.

Transportation (Aviation)

Air, land and sea travel will be affected by climate change. The aviation sector where heavy and frequent rains in the south may cause flash flooding of the runway, while dust storms in the north will induce poor visibility during landing; Flooding of highways and reduced visibility will also affect land travels by cars and trucks;

Outdoor Sports and Recreation

Climate change will affect outdoor sports and recreation through the occurrence of frequent and heavy thunderstorms. Flooding of football pitches and other outdoor playing fields will be more commonplace.

Human Settlement

Sea level rise will affect coastal settlements while desertification will affect northern settlements. Already, studies have shown that the Sahara desert is expanding in all directions at a rate ranging from 1 to 10 metres per annum (Odjugo and Ikhuoria, 2003; Yaqub, 2007). Areas north of latitude 12⁰N in Nigeria are under severe threat from desert encroachment through the action of mobile sand dunes which are direct outcomes of climate change. These migrating sand dunes have buried and destroyed many rural settlements, as well as, productive arable lands and grazing rangelands in Sokoto, Zamfara, Kebbi, Katsina, Kano, Yigawa, Yobe and Borno states of northern Nigeria. This has caused the degradation of farmlands and rangelands, diminished crop yields, population displacement and loss of productive lands which often result in clashes between farmers and herdsmen. It has been reported that about 186 people lost their lives between 1998 and 2006 as a result of such clashes (Yugunda 2002; Yaqub, 2007, Odjugo, 2010). Further implications of a dislocated family include loss of income, broken homes, destitution and all the social vices that go with them, such as begging, banditry, prostitution, hooliganism, robbery, stealing, and so on.

Human Comfort and Health

Global warming will raise mean sensible temperature leading to heat stress, profuse sweating, and possible spinal meningitis/stroke. Excessive heat will also cause health problems such as skin rashes, skin cancer, heat exhaustion and respiratory diseases. Widespread water shortages due to increased evaporation will engender unsanitary environmental conditions with rampant cases of diseases such as diarrhea, cholera, typhoid and river blindness. Indeed, evidence on the physical basis of climate change, together with the associated impacts in Nigeria is sufficiently compelling to warrant serious and urgent attention.

4. Nigeria's Existing Response to Climate Change

Despite mounting evidence-based research findings on the imminent threat that climate change portends for the nation, responses from government and civil society in Nigeria remain inadequate. For instance Nigeria has not been able to develop a structured approach to climate change adaptation, and has not been able to undertake detailed vulnerability assessment of the various sectors of the economy. Responding to climate change from both mitigation and adaptation dimensions require strategic planning through sound policy formulation, provision of regulatory and institutional frameworks, as well as, the building of robust human and material capacities. Nigeria has many policies, strategies and plans that are intended to address general adaptation measures in many climate change vulnerable sectors such as agriculture, water resources, health, energy, transportation, forests and ecosystems, and coastal marine environment. However, the policy framework to align human development and climate change efforts through adaptation remain largely undeveloped in the country. The country also boasts of many climate change actors but there is no platform

within which they can operate in a coordinated manner for meaningful progress. Therefore, the country's institutional capacity to respond effectively to climate change is weak. As Ibe (2011) rightly observed, developing countries in general lack the capacity in terms of both the knowledge of the processes, as well as, in the technology to combat the effects of climate change. In Nigeria, apart from the Special Climate Change Unit (SCCU) in the Federal Ministry of Environment, Abuja, and a few institutions at the national level, such as the National Environmental Management Agency (NEMA), the Nigerian Meteorological Agency (NIMET), the Climate Centre at the Federal University of Technology, Minna; the Energy Centre at UsumanDanfodio University, Sokoto, there is no comprehensive institutional structure at the national, state or local levels to address climate change issues (Oladipo, 2011; Madzwamuse, 2011). Worst still, studies have shown that SCCU has neither the capacity nor the resources to drive and coordinate national climate change response because there are very few experts in the unit and facilities remain grossly inadequate, together with poor funding (Oladipo, 2011, Faturoti, 2011).

Thus, in times of adversity such as severe flooding or back-to-back drought, Nigeria has often resorted to "fire brigade" approach of making ad hoc plans to respond to each environmental disaster as they occur. There are no institutional arrangements to provide the framework for responding to such situations. Every action taken is handled in an emergency fashion of providing some relief materials such as food, water and blankets on a temporary basis, which NEMA does. Thereafter, the entire crisis is swept under the carpet without attending to the underlying factors that might have caused the problem in the first instance, and there is no concerted effort to prevent a reoccurrence. The serious concern about this approach of emergency response is that it keeps the impacted community in perpetual cycle of fear, misery and poverty, while making the government to look insensitive and incompetent. Policy responses to the 2010, 2011 and 2012 flood disasters in Nigeria are still very fresh in our minds. The unending suffering and complaints by the impacted individuals and communities can best attest to the inefficiency of emergency response system in such situations. It would therefore be appropriate if a robust, efficient system of response that would cater not only for the relief materials needed by the people, but also provide the strategy for tackling the underlying causes of the problem through the creation of a systematic framework of doing things.

Although Nigeria is a signatory to the United Nations Framework Convention for Climate Change (UNFCCC) and has ratified the Kyoto protocol, the government seems to have rested on its oars as there are little strategic efforts put in place to combat the rigors of climate change. For instance, Nigeria is one of the few African countries that lack a coherent policy framework for climate change adaptation. In this regard, the country is yet to prepare a National Adaptation Programme of Action (NAPA) or the National Climate Change Response Strategy (NCCRS) (Madzwamuse, 2011). As a country beset by many environmental challenges including severe floods, erosion, landslides, recurrent droughts, gas flaring, oil spills and general land degradation, Nigeria should be in the driving seat of Africa's initiative at the UNFCCC (Faturoti, 2011; Nigerian, 2010; Paehler, 2007).

5. The Way Forward

Adaptation to the real and potential impacts of climate change is globally imperative because, even if the various UNFCCC interventions were to bring about significant reduction in emissions of greenhouse gases, the lag time in the climate system and the life-span of these gases in the atmosphere will imply that global warming would not be reversed automatically (Ken, 2001; Parry and Duncan, 1995). It is therefore crucial and urgent that every region, country and community begin to build and re-engineer existing capacities for mitigating and adapting to the challenges of climate change. So far, Nigeria lags behind other countries in building appropriate capacity to adapt to climate change impacts and this can be seen in poorly managed emergency response measures after extreme weather events such as the 2010, 2011 and 2012 Nigerian floods which affected many settlements such as Lagos, Ibadan, Calabar, Makurdi, Lokoja, Bayelsa and so on. A proper strategy for combating those floods would not only focus on the provision of relief materials, but will also consider the drainage system in terms of apparent need for de-silting of gutters, possible expansion of existing gutters and the construction of new ones where necessary, so as to prepare for

the containment of future storm-water runoff. Inland rivers and lakes should also be properly dredged while sea defenses should be constructed along the country's coastlines to contain sea level rise.

Confronting the threat of climate change would require strategic planning that entails a systematic, centrally coordinated effort that should bring leading scientists, technologists, engineers, economists, social scientists, and other experts together in an ongoing interaction with a wide range of policy makers and managers at all levels of society, with the main object of diagnosing the real and potential implications of climate change for society and to develop measures necessary to adapt and or mitigate those impacts (Climate Science Watch, 2008; Robert, 2011). It will also require a strong national policy and institutional framework that coordinates climate change activities at the national, state and local levels. Not too long ago, it seemed as if all was going well when the Bill establishing the National Climate Change Commission was passed by the National Assembly. Regrettably however, the bill seems to have been lost in the Presidency where it went for assent. The import of this delay has already manifested as Nigeria seems to be relegated to the background in most international discourse on climate change. Whether it is COP 15 in Copenhagen or COP 16 in Cancun or even COP 17 in Durban, without a national climate change plan we cannot make any meaningful contribution to climate change issues, except being one of the largest contingents at such meetings. Therefore, to arrest this ugly situation the following suggestions are made:

Establish the National Climate Change Commission

The commission will drive and coordinate climate change issues and activities nationwide. This will bring to a halt the current sense of drift on issues concerning climate change, as the necessary leadership would have come on board.

Undertake detailed Vulnerability Assessment of various Sectors

This will identify the most vulnerable sectors such as agriculture, water resources, energy, transportation (aviation), health, wildlife, tourism, sports, etc., for appropriate allocation of resources and attention. It will thus allow for appropriate strategic planning and capacity building.

Develop a National Climate Change Policy

This will provide the focus and align human development efforts with climate change response initiatives through adaptation. It will also integrate global environmental concerns and commitments in National policy, while ensuring environmental sustainability.

Develop a National Climate Change Adaptation Strategy

This will make Nigeria to be taken seriously in international climate change discourse because it will present the country's current and future efforts to address climate change vulnerability and adaptation. Nigeria's 1st and 2nd National Communications under the UNFCCC are steps in the right direction.

Undertake a National Climate Change Preparedness Process

Green-house Gas (GHG) inventories and trends in GHG emissions will be undertaken. This will fashion a way of dealing with climate change intelligence, risk assessment, risk management and preparedness that is efficient and effective, with scientifically sound decisions on climate change. It will also strengthen early warning system.

Climate Change should be integrated into Development Plans

There should be mainstreaming of climate change into National Development Plans in order to ensure integrated adaptation responses, sustainable funding and monitoring.

Widen Climate Change actors' space:

So far, the development of adaptation policies and strategies is largely dominated by government actors. It will be helpful to incorporate Non-Governmental Organizations (NGOs), Civil Society Organizations (CSOs) and Community-Based Organizations (CBOs). Their active participation will engender concrete adaptation activities at the local level.

Increased Advocacy and Public Education on Climate Change Issues

Many policies of government succeed when the public is carried along. It is therefore very important that climate change policies and programmes be made known to the public than is currently the situation. Serious public education is needed on the causes and consequences of climate change for both the policy makers and the public at large. This will assist the domestic and international communities in developing practical and effective strategies for tackling climate change as well as create strong support from the society as they become better informed. The annual Lagos Summit on climate change is a step in the right direction.

Encourage Research into Climate Change Opportunities

There are opportunities as well as challenges in climate change. Massive research should be sponsored into areas that climate change presents opportunities for Nigeria. In England, as far back as the early 1990s, research stations such as Rothamsted in northern London and Long Island in Bristol were already experimenting on new crops that will take advantage of the expected warmer climate in southern England. Results indicated that with a warmer climate equivalent to that of southern France, it would be possible to cultivate maize in London and receive optimum yield.

Provide Adequate funding for Climate Change Issues

All the suggestions made so far might not materialize without proper arrangement for adequate and sustainable funding. Therefore, there is need for proper funding, transparency and close monitoring of climate change programmes.

Tackling climate change should be everyone's business and not left for government alone. As a developing nation with abundant natural resources, Nigeria can sustainably manage her forests such that they serve us today and remain for tomorrow. Massive tree planting throughout the country and, especially in areas of the country that have already been degraded, should be undertaken. The Federal Government is already doing commendable work in this direction as it undertook the raising of 37 million tree seedlings during the 2011 planting season across the 36 states of the federation, and Abuja. One could only hope that government will follow up the project by undertaking proper transplanting and management of the seedlings so that the afforestation scheme does not end-up as one of those "white elephant" projects of the past, such as Operation Feed the Nation or the "Green Revolution". Individuals and communities should also undertake tree planting in their neighborhoods and farms. Additionally, indiscriminate forest clearance and bush burning should be discouraged by everyone.

Nigeria is an oil and gas producing country. Taking appropriate steps to end gas flaring in the Niger Delta region will be a big plus on Nigeria's effort to contribute towards mitigating climate change. In the same vein, the country can further contribute to reducing global warming by de-emphasizing "second-hand" motor cycles, cars and trucks from overseas. These "partly junk" autos emit noxious gases as they criss-cross from one part of the country to the other, polluting the environment and enhancing global warming. In addition to doing away with "tokunbo" cars and trucks, government should find an acceptable manner to shift away from the culture of unrestrained fossil fuel consumption while pursuing renewable sources of energy, such as solar and wind power. To conserve energy and reduce the amount of fossil fuel consumed at Nigeria's numerous thermal power stations, individuals should always switch-off their appliances and lighting points when not in use. This will reduce the pressure on energy production and hopefully, the volume of greenhouse gas emissions from Nigeria.

6. Conclusion

Climate change is serious business; therefore, addressing it is no simple task. It requires a fundamental shift away from the manner in which we have been doing things to ways that will dramatically reduce emissions of carbon dioxide and other greenhouse gases. In this way, we will not only protect ourselves, our economy and our land against the adverse effects of climate change, but will further guarantee a better and secure future for generations yet unborn.

The increasing frequency of climate change-related disasters in Nigeria demands that appropriate plans be made to contain the menace. There is no doubt that some effort has been made at different levels to combat the effects of climate change. At the Federal level, the current effort at afforestation nationwide, as well as, the creation of the green belt in the frontline states of northern Nigeria is commendable. At the state level, Lagos for instance has created a yearly Environment Summit for the last five years while Cross River has placed a ban on logging in its Rainforest. However, these efforts are largely independent and fragmentary as there is at present no National Policy or Adaptation Strategy on climate change. Focused researches that attempt to understand the specific impacts of climate change on different sectors of the economy and different regions of the country, so as to prepare appropriate mitigation or adaptation strategies, are lacking. When we consider that climate change impacts (whether in the form of severe floods or droughts) are occurring and will continue to occur within the context of many systems that are collapsing in the country, (e.g. decaying infrastructures such as bad roads and bridges; incessant power outages; perennial water shortages; air pollution; etc), it can be seen that the nation is least prepared for present and potential climate change challenges.

The syndrome of “fire brigade” approach seems to have taken root in everything about Nigeria. Whether in sports or elections, Nigeria prefers ad hoc approach to tackling serious and demanding issues. We should not allow the vicious circle of “emergency response” to becloud our sense of reasoning in a serious national and international issue like climate change. Our actions today will determine the climate we have tomorrow. By choosing to take appropriate action today, we limit the damage for tomorrow. Failure to do so may result in environmental catastrophe of monumental proportion. “Prevention”, they say, is better than “cure”. In the words of Francis Bacon “He that will not apply new remedies, must expect new evils, for time is the greatest innovator”.

References

- Abu, B. (2007) Sea level rise and the Niger Delta of Nigeria. *J. of Wetland*, 3(1): 44-52.
- Adebimbe, R. U. (2011) Climate change-related disasters and vulnerability: an appraisal of the Nigerian policy environment. *Environ. Research Journal*, Volume 5(3) 97-103.
- Adefolalu, D. O.(2007) Climate change and economic sustainability in Nigeria. Paper presented at the International Conference on Climate Change. NnamdiAzikiwe University, Awka, 12 – 14 June 2007.
- Adejuwon, S. A. (2012) Global Warming and Climate Change. Climate Change Workshop, University of Ibadan Conference Centre, Ibadan, February 2012.
- Adesina, F. A. and Odekunle, T. O. (2011) Climate change and adaptation in Nigeria: Some background to Nigeria’s response. 2011 International conference on Environmental and Agriculture Engineering. IPCBEE, Vol. 15: 134-137.
- AWAKE (2009) Are we running out of water? January 2009 Issue, pp 3–7.
- Ayoade, J. O. (2004) Climate Change. Ibadan: Vintage Publishers, pp. 45-66.
- Baudi, P. V. and Ahmed, A. N. (2006) The impacts of wind related hazards in Southern Cameroon. *Journal of Physical Sciences*, 3(2): 82-88.
- Building Nigeria’s Response to Climate Change (BNRCC) (2008) Climate change information on Nigeria.<http://www.nigeriaclimatechange.org/ccinfo.php>
- Bomford, A. (2006) Slow death of Africa’s Lake Chad: BBC News, Lake Chad. <http://news.bbc.co.uk/2/hi/4906692.stm>
- Changnon, S. A. (2001) Thunderstorms across the nation. Mahomet, Illinois: pp59-76.
- Chindo, A. and Nyelong, P. N. (2004) Lake Chad: From mega-lake to mini-lake. *Arid Wetland Bulletin*, No.6: 24-27.

- Climate Science Watch (2010) National Climate Change Preparedness Initiative. <http://www.climate science watch.org/2008/03/21/>
- Cox, J.D. (2002) Storm Weathers. John Wiley & Sons, Inc. New York. p. 210.
- DeWeerd, S. (2007) Climate change coming home: global warming effect on populations. *World Watch*, 2(3): 6-13.
- Ekpoh, I. J. (2009) *Climate, Society and Environment*. St. Paul's Publishing Co. Calabar.
- Ekpoh, I. J. and Nsa, E (2011) Extreme climatic variability in north-western Nigeria: an analysis of rainfall trends and patterns. *Journal of Geography and Geology*, 3(1) 51-62.
- Ekpoh, U.I. and Ekpoh, I. J. (2011) Assessing the level of climate change awareness among secondary school teachers in Calabar, Nigeria: implication for management effectiveness. *International Journal of Humanities and Social Science*, 1(3): 106-110.
- Ekpoh, I. J. (2014) Recent Severe Flooding in Calabar, Nigeria: Causes, Consequences and Possible Remedies. *International Journal of Sciences*, Volume 3 (1): 102 – 105.
- Ewah, O. E. (2011) As we prepare for Durban climate talks. <http://www.boell.org/web/cop17-786.html>
- Faturoti, G. (2011) Nigeria: Stop paying lip service to climate change. <http://allafrica.com/stories/201101270329.html>
- Gambrell, J. (2010) *Late dust storm covers Nigeria*. Associated Press, Lagos
- Hassan, T. A (2011) Nigeria: Paying lip service to climate change negotiations. <http://allafrica.com/stories/printable/201111100737.html>
- Hengeveld, G. H; Bush, E and Edwards, P. (2002) *Frequently asked questions about climate change science*. Environment, Canada.
- Huffpost Green (2011) Mississippi River Flooding: Images of 2011 Historic Floods. <http://www.huffingtonpost.com/>
- Ibe, A. C. (2011) Capacity building imperatives for combating climate change impacts in Nigeria's large marine ecosystem. Being a Public Lecture delivered at the University of Calabar, Calabar. University of Calabar Press.
- Ipcc (2001) *climate change 2001. Working group 1: the scientific basis*. Geneva, switzerland.
- Ipcc (2007) *climate change 2007. synthesis report*. far of ipcc. Geneva, switzerland. P. 104
- Ken, r. A. (2001) Global Warming: Rising Global Temperature, Rising Uncertainty. *Science*, 292(5515): 192-194.
- Madzwamuse, M. (2010) *Climate Governance in Africa-adaptation strategies and institutions*. <http://www.boell.de/worldwide/africa/>
- Mshelia, A. D. (2005) Adaptation strategies to climate change. *Journal of Energy and Environment*, 18(3): 74-81.
- Nigerican (2010) Nigeria's Climate Action Network: It's time for action. <http://www.coalitions4change.org/new/index.php>
- Nest (2003) why should Nigeria be concerned about climate change? http://www.nestinteractive.org/climate_change.htm
- Next (2011) Floods displace 130.000 people in Sokoto. <http://234next.com/csp/cms/sites/Next/Home/5618415-146/floods>
- Newscom (2011) Search for Survivors Continues after Devastating US Tornado. <http://www.printthis.clickability.com/>

- Nwafor, J. C. (2007) Global climate change. A paper presented at the International Conference on Climate Change and Economic Sustainability. NamdiAzikiwe University, Awka, Nigeria.
- Odjugo, P.A.O. and Ikhuoria, A.I. (2003) The impact of climate change and anthropogenic factors on desertification. *Global Journal of Environmental Science*, 2(2) 118-126.
- Odjugo, P. A. O. (2009) Quantifying the cost of climate change impact in Nigeria: Emphasis on wind and rainstorms. *Journal of Human Ecology*, 28(2): 93-101.
- Odjugo, P. A. O. (2010) General overview of climate change impacts in Nigeria. *Journal of Human Ecology*, 29(1): 47-55.
- Oladipo, E. (2011) Towards enhancing the adaptive capacity of Nigeria: a review of the country's state of preparedness. <http://www.boellnigeria.org/web/113-227.html>
- Olorunfemi, F. (2009) Risk communication in climate change and adaptation: policy issues and challenges for Nigeria. *Earth and Environmental Science*, 6: 412036
- Paehler, h. K. (2007) Nigeria in the dilemma of climate change. <http://www.kas.de/nigeria/en/publications/11468/>
- Parry, M.L. and Duncan, R. (1995) *The Economic implications of Climate Change in Britain*. Earthscan publications Ltd. London.
- Robert, O. (2011) How to save the environment. <http://www.thenationonlieng.net/>
- The Moment (2011) Nigeria: Flooding – Need for proper planning. <http://allafrica.com/stories/printables/201107261825.html>
- Ward, T. (2009) Supporting integrated and comprehensive approaches to climate change adaptation in Africa: - Nigeria. <http://www.adaptationlearning.net/project>
- Yaqub, C.N. (2007) Desert encroachment in Africa: extent, causes and impacts. *Journal of Arid Environment*, 4(1): 14-20.
- Young, J. (2006) The growing global threat of rising seas and bigger hurricanes. *World Watch*, 19(5): 26-31.
- Yugunda, B.S. (2002) Socio-economic and cultural impacts of desert encroachment in Nigeri