

## Social and Economic Impact of Climate Change in Nigeria

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### Abstract

The objective of the study is to interrogate the social and economic impact of climate change in Nigeria. The variables that are used are burning fuel (oil, coal and natural gas), droughts, flood, landslide and loss of forest and forest fire. This research work makes use of both the primary and secondary data. The data is sourced from the library, documentary, journals, books, newspaper etc while the primary data is sourced by giving questionnaires to respondents to know how parameters of variables such as the burning of fossil fuel, droughts, floods, landslides, loss of forest and forest fires, and acid oceans actually cause climate change in Nigeria. The research methodology deployed involves administration of questionnaires in Kaduna and Lagos. The population of research is 150 indicating that 75 questionnaires are given to respondents in each of the two cities named above. Only 60 questionnaires are returned in both cities. The findings indicates that burning fuel consisting of oil, coal and natural gas and loss of forest and forest fire which received 87.5% and 80% respectively are majorly responsible for the climate change in Nigeria. Invariably, this has affected the production of major food crops in Nigeria and more essentially responsible for loss of lives and properties. Thus, we hereby recommend that all the stakeholders: Federal Government, State Government and Local Government, people generally residing in Nigeria should take seriously the issue that will lead to burning of fuel, forest fire and deforestation. Having said that drought, flood and landslide should equally be addressed.

**Keywords:** *Coastal Region, Aridity, Rainfall, Drought and Desertification, Inundation, Greenhouse gas, floods, Offshore, Inshore, sea level.*

### **Background to the Study**

Geographically, Nigeria is a country that shares land borders with the Republic of Benin in the West. The country equally shares borders with Chad and Cameroon in the East and Niger in the North. As a country in West Africa, it is between Latitude 40 to 140 North and between Longitude 202' and 14030' East. Its Coasts lie on the Gulf of Guinea in the South and shares borders with Lake Chad to the northeast precisely. Nigeria is a country of marked ecological diversity and climatic contrasts. The lowest point is the Atlantic Ocean at sea level while the highest point is the Chappal Waddi at 2419m. It has diverse biophysical characteristics, ethnic nationalities, agro-ecological zones and socio-economic conditions(Aregheore,1995).

The geographical features of Nigeria include Jos Plateau, Obudu Plateau, Mambilla Plateau, the Niger River, river Benue, Niger Delta and Adamawa highlands. Nigeria is a tropical country characterized by seasonally climatic dampness and high level of humidity. The typology of climate in Nigeria is succinctly differentiated as one experiences different climatic condition in the southern part of Nigeria, middle belt and northern part of Nigeria. According to all posts by Rushalmn, dated July 2, 2012, Nigeria has 371tribes including the three major tribes, namely Igbo, Hausa and Yoruba.

According to the World Bank report, Land Area (Sq.km) in Nigeria was last measured at 910770 in 2014. In 2015, Land Area is 351649 Sq ml (910.771sq km), total area is 356667 sq mi (923, 768sq km). This land area excludes inland water bodies, national claims to continental shelf and exclusive economic zones. Nigeria has 36 states, 774 local governments and a Federal Capital Territory, Abuja. According to the National Bureau of Statistics, the population of Nigeria as at 2014 is 177,155,754 (growth rate: 2.47%); from 45.2 million in 1960. Birth rate is 38.03/1000; Infant mortality rate: 7409/1000; and life expectancy: 52.62. Some parts of Nigeria, the northern part to be precise is noted for its aridity while the southern part is characterized by heavy rainfall. These varied climatic experience(s) have socio-economic, implications on the country, society and the people.

According to Adams, Williams and Mortimore (1997), agricultural sustainability in northern Nigeria requires flexibility in both ecological management as well as economic activity. In the northern Nigeria, rainfall occurs only seasonally while dry season is well pronounced. To buttress the foregoing, Keay, R.W.J (1994) posits that the vegetation of northern Nigeria is predominantly marginal or short grass savannah and the region is characterized by a relatively hot climate with seasonal rainfall and a marked dry season. The sandy soils in the northern Nigeria contains 85% sand and have pH values range between 6.0 and 7.0 and their bulk densities are about 1.4g/cm<sup>3</sup> (Sonneveld, B.G.J.S. 2005).

By contrast, in the Southern part of Nigeria where heavy rainfall normally occurs, fishing company operated from the coastal waters of Lagos long before 1915. In furtherance of this, Gov. Wike of Rivers state made a speech posted by admin on Feb. 1st, 2015 that many states in the south are blessed with fertile types of crops. From Rivers to Bayelsa, Cross River to Akwa Ibom, Delta to Edo and down to the South East and South West states. He said further that there was enough fertile land and population that can produce enough food for the whole

Nigeria and beyond. He posited further that until the discovery of oil in Nigeria in 1958, agriculture was the country's economic mainstay. This paper would interrogate both the positive and otherwise socio-economic impact of climate change in Nigeria. As a matter of illustration, in 2013 and 2014 at Apete, a suburb of Ibadan in Southwestern part of Nigeria was seriously flooded with heavy rainfall that led to loss of lives and properties.

## **Definitional Issues**

### **Coastal Region**

In Nigeria, the most prominent coastal region is Niger Delta which is an amalgamation of a variety of ecosystem such as beach, lagoon, fluvial, creek, estuary, offshore, mangrove swamp and surf zones. Coastal region provides sanctuary and habitat for different types of biological life. no doubt, the rich biodiversity of the inshore and offshore are vulnerable to climate change. Global warming and higher temperature cause beach erosion and coastal flooding. It equally makes the mangrove adjoining estuaries to recede due to beach breaching and wave incursion. With global warming and higher temperature integrity of coastal engineering and industrial facilities are undermined by storm wave which could result into high job turnover. The 20 to 60cm tidal excursion length and the receding shoreline around the Niger Delta cause an increasing sanitization of upland ground water.

The sea-level rise causes land inundation causing untimely land loss, groundwater salinization, infrastructural destruction and biodiversity loss. Very often, it often results in astronomical increase in the level of poverty, destruction of property and biological resources. The only advantage one can deduce is that sea surface and storminess often enhances the productivity of offshore waters and nutrient circulation and enrichment, (BNRCC),2008).

### **Aridity**

Aridity means being without moisture, extremely dry. Aridity index (AI) is a numerical indicator of the degree of dryness of the climate at a given location. Aridity gives explanation to the regions that suffer from a deficit of available water, a condition that can negatively affect the effective use of land for stock farming or agriculture. The northern region is classified into four aridity zones based on the aridity indices as slightly humid zone (Kaduna and Zaria areas), moderately arid areas (Yelwa, Gusau, Kano and Bauchi), Semi arid zones (Sokoto, Potiskum, Maiduguri) and the arid zone (areas around Nguru, Hadejia and Kano).

### **Drought and Desertification**

Drought and desertification are problems that affect many, countries in Africa including Nigeria. According to Oladipo (1993), drought and desertification are twin environmental hazards that since the catastrophic Sahelian drought of 1968-1973, have forced the international community to look more closely development programmes in the arid and semi-arid areas of the world.

Wells and Burke (1990) posit that a recent analysis of NASA orbital photographs indicates that between the early 1960s and 1986, about 900 000km<sup>2</sup> (about the size of Nigeria) of former Savanna grassland in the Sahelian zone were displaced by desert or became severely

degraded. Northern Nigeria occupies about 70% of the surface area of the country and it lies within latitudes 6°27'N to 14°0'N and between longitudes 2°44'E and 14°42'E. It economically constitutes the grain basket of Nigeria, producing a great proportion of the grains, such as maize, sorghum, millet, and wheat that provide the main staple diet of the people.

The region is known to be vulnerable to the hazard of drought which has been affecting it, especially north of latitude 12°N, in a continuum since the scourge of the 1970s. In this region, when there is rainfall, the agricultural products are plenty, unlike when there is a decline in rainfall people suffer from hunger, famine and death. According to Ibe (19), during the 1972-1973 drought about 300,000 animals, representing about 13% of the total livestock population of the northeastern part of Nigeria were estimated to have died while agricultural yields ranged between 12 and 40% of the annual averages were destroyed.

### **Climate Change**

Climate change means an increase in average global temperature. It also connotes global warming, or climate crisis. Human beings and nature engage in activities that are believed to be contributing to an increase in average global temperatures. Fundamentally, it is caused by increase in greenhouse gases such as carbon dioxide (CO<sub>2</sub>). Climatic conditions in Nigeria have adverse effects on the welfare of millions of people. As a matter of illustration, off season rains and aridity, persistent droughts and flooding, have sent growing seasons out of orbit, on a country dependent on a rain fed agriculture. Oladapo avers that alarm bells are ringing with lakes drying up and a reduction in river flow in the arid and semi arid regions. Consequently, the outcome is fewer water supplies for agricultural use and hydro-power generation. Climate change is an unprecedented threat to food security. Arid and semi-arid areas in northern Nigeria are becoming drier, while the southern part of the country are getting wetter.

According to Tunde Akingbade, ([channelstv.com](http://channelstv.com) on 22 March, 2010) last Monday, over 90 percent of all the flights at the nation's airports were cancelled or delayed. There was a thick fog in the atmosphere. The visibility was poor. It was less than 500 metres and this posed danger for aircraft all over the region. To buttress the foregoing, a passenger aircraft that was to land in Nigeria's airport ended up in Cotonou, Benin Republic because of poor visibility. In the same report, incidences of meningitis have been on the increase in Nigeria due to erratic change in weather patterns and excessive heat. This has claimed the lives of more than 200 people both in Nigeria and Niger Republic in one week. The disease attacks more people during the dry season because of dust, wind and cold nights. Dr. Victor Nkom, climate change expert and consultant to the Federal Ministry of Environment warned in Abuja that the dusty and hazy weather would trigger certain ailments amongst the populace who would be caught unaware.

According to Dr. Ngozi Okonjo-Iweala, Minister Finance and Coordinating Minister for the Economy, "Climate change poses both immediate and long-term threats to the life-support systems upon which we all depend—food, water, habitat, health, ecosystem services and critical infrastructure such as energy, transport and coastal protection. As former US Vice President, Al Gore, puts it, "As human beings, we are vulnerable to confusing the

unprecedented with the improbable". She said further that the 2012 floods which affected 21 states of the Federation led to the displacement of thousands of our fellow citizens, the destruction of homes, farm lands and infrastructure, particularly roads, electric poles and pipelines resulting in some loss in food production in the second half of 2012. The timely government intervention of N21.6 billion flood relief fund help to reduce the impact of the flooding on agricultural GDP.

### Methodology

One hundred and fifty questionnaires were given to the elites teaching science subjects both at the University and Secondary School Levels and officials of the ministry of environment in Kaduna and Lagos. One hundred and twenty questionnaires were returned and adequately answered. 60 questionnaires were administered in each of these cities.

Questions Categories of Response Kaduna (in percentage ) Lagos (in percentage) Total (in percentage)

1. Is the burning of fossil fuel is the main cause of climate change in Nigeria?

Yes 50/60 = 83.8% 55/60 = 91.1% 105/120 = 87.5%  
No 10/60 = 16.7% 5/60 = 0.083% 15/120 = 12.5%

2. Are droughts bringing about climate change in Nigeria?

Yes 40/60 = 66.7% 20/60 = 33.3% 60/120 = 50%  
No 20/60 = 33.3% 40/60 = 66.7% 60/120 = 50%

3. Is flood equally responsible for climate change in Nigeria?

Yes 20/60 = 33.3% 40/60 = 66.7% 60/120 = 50%  
No 40/60 = 66.7% 20/60 = 33.3% 60/120 = 50%

4. Do landslides cause climate change in Nigeria?

Yes 10/60 = 16.7% 20/60 = 33.3% 30/120 = 25%  
No 50/60 = 83.8% 40/60 = 66.7% 90/120 = 75%

5. Do loss of forest and forest fire cause climate change in Nigeria?

Yes 40/60 = 66.7% 40/60 = 66.7% 80/120 = 66.7%  
No 20/60 = 33.3% 20/60 = 33.3% 40/120 = 33.3%

6. Do acid rains cause global warming or climate change in Nigeria?

Yes 10/60 = 16.7% 20/60 = 33.3% 30/120 = 25%  
No 50/60 = 83.3% 40/60 = 66.7% 90/120 = 75%

Analytically, 87.5% responded affirmatively both in Kaduna and Lagos depicting that the main cause of climate in Nigeria is the burning of fossil fuel consisting of oil, coal and natural gas. Only 12.5% responded negatively.

The second variable, 'Drought' had 50 – 50 percentage positively and negatively. The implication is that on the average, drought causes climate change in Nigeria.

The third parameter, 'flood' is just like 'drought'. It equally had 50 – 50 percentage on both positive and negative side. Of course, it causes climate change in Nigeria.

Landslide, the fourth variable is hardly responsible for climate change in Nigeria. The reason being that both in the cities of Kaduna and Lagos 25% responded Yes while 75% responded No. Based on the overall response of the respondents to the penultimate variable, the question whether loss of forest and forest fire cause climate change or not. It was gathered that 80% ticked Yes option while 20% ticked No option. Based on the foregoing, no doubt, loss of forest and forest fire cause climate change in Nigeria.

The last parameter, acid oceans is insignificant and marginally contributed to climate change in Nigeria. Altogether, 25% of respondents was positive to acid oceans being a responsible factor contributing to climate change in Nigeria. 75% says No to confirm it.

### **Findings**

Based on the analysis of the respondents to the six variables that could possibly cause climate change in Nigeria, namely: (1) burning of fossil fuel, (2) drought, (3) flood, (4) landslide, (5) loss of forest and forest fire and (6) acid oceans, it was unequivocally asserted that the first variable burning of the fossil fuels (oil, coal and natural gas) was the main cause of climate change in Nigeria. The fifth variable loss of forest and forest fire was the second factor responsible for climate change in Nigeria. Both the second (drought) and third (flood) variables on the average basis equally caused climate change in Nigeria. Acid oceans, the sixth variable marginally contributed to the climate change in Nigeria. Socio-economically, all the variables that are well disposed to climate change in Nigeria reduces the availability of food stuffs, and renders many people homeless, cause loss of lives and properties, and equally responsible for land, water and air accidents among others hazards.

### **Socio-Economic Impact of Climate Change in Nigeria**

According to Ibe (1988), the Nigerian coast consists of four distinct geomorphological units, namely- the Barrier Lagoon complex; the mud coast, the Arcuate Niger Delta and the strand coast. This coastal area contains mangrove forests, rainforest, and brackish swamp forest. For instance, it is a matter of record that Nimet's 2012 SRP predicted flooding for that year, which eventually visited US some months later and deluged more than 20 Nigerian states (Anuforom A, 2015). Ozobia (1988) posits that Nigeria coastal zone is rich in oil and gas. He said further that Nigeria crude oil reserve is over 25 billion barrels, while the crude oil production per day is estimated at 2.2 million barrels. Being that oil production activities increases in Nigeria, Nigeria Government aimed at increasing the reserve capability from 25 billion barrel to 30 million barrel in 2008.

According to Ntukekpo (1996), oil spillage in Nigeria occurs as a result of sabotage, corrosion of pipes and storage tanks, carelessness during oil production, operations and oil tanker accidents. Oil spills incidents have occurred in various parts and at different times along our coast. A total of 5724 oil spill incidents occurred between 1976 and 1988 which resulted in the spill of approximately 2,571,113.90 barrels of oil into the environment. .

Most importantly, the socio-economic impacts of oil spill are destruction of plants and animals in the estuarine zone, killing organism and marine animals like crab, fish and other crustaceans, contamination of marine shorelines. As a matter of fact, climate change is global in its causes but it has negative consequences in the developing countries such as Nigeria. Despite the low contribution to global greenhouse gas emissions, sub-saharan proneness to the effect of climate change is more accentuated than most of the other regions of the world Socioeconomically, climate change depicts serious challenges for Nigeria to achieve its developmental projects. It becomes more complicated because Nigeria's status as a fossil-fuel dependent country has a large climate sensitive economy. Renewable energy provides an opportunity for Nigeria to generate adequate energy from a mix of sources for Nigeria to generate adequate energy from a mix of sources for rapid socio-economic development without significantly increasing the country's GHG emissions. The huge opportunities in embracing renewable energy, however, must come with attendant reform of its energy sector.

Oladipupo posits that incentives to encourage investors must be provided and as well as a policy framework to encourage the development of renewable energy technology must be in place. Nigeria can achieve a lot through switching its energy source to renewable energy technology must be in place. Apart from greatly reducing the impact of climate change, it creates employment and investment income.

According to the IPCC Assessment report, Africa will be worst hit by the effects of climate change which Nigeria is a part. The agricultural sector contributes some percentage of the Nigerian Gross National Product and majority of the rural populace are employed in this sector. Due to the overarching effects of Agriculture, minor climate deteriorations can cause devastating socio economic consequences. Nigeria is the eighth largest oil supplier in the world and ninth largest deposits of gas. No doubt, the Nigerian national economy would be massively affected by a sustainable reduction of fossil energy consumption. Nigeria is practically a monoculture: about 80% of the government income, 90-95% of the export earnings and more than 90% of the foreign exchange revenues gotten from the oil sector.

In Kaduna, just like any other parts of northern Nigeria, the socio-economic implications of climate change continues to reverberate in the forms of rising temperatures and sea levels leaving behind its trail disasters like floods, desertification and other environmental degradation and serve drought. According to Max Lock Centre (2000), Kaduna is the third largest state in Nigeria with over 6million people living within the state, (Nigerian Population Census, 2006). Kaduna is located near the geographical centre and benefits from close proximity of a running horizontally across the territory. The Area is characterized by a medium-low population density. These altogether have made a great reduction to

agricultural outputs. Even very many were homeless because of floods and environmental degradation which has continuously causing erosion that destroy roads.

In Lagos on the 13th February, 2012, the heavy rainfall and wind experienced in that city caused lots of damage to public and private property. The heavy rain in 2013 and 2014 in Ibadan led to the destruction of the locally made Apete Bridge. This was the reason why many people got drowned and died with their valuables. Nigeria on the whole, has suffered from the climatic change. According to Awosika (1992), the most vulnerable is the coastal region of the country. A large percentage of Nigeria's urban population lives in coastal cities. Estimates put the total population living along the coastal zone to about 20 million people which translates into 22.6% of the national population. Most of the economic activities that form the backbone of the national income are located within the coastal zone. Offshore and inshore areas, estuaries, and lagoons support industrial fisheries accounting for more than 75% of fishery landings in the region. Socio-economically, food security is threatened by the displacement of population due to excessive flooding, even the climatic and vegetation belts migrate away from the place of origin. Other socio-economic implications include fuel wood shortages, reduction in water resources to generate electricity, inundation which makes lands at risk etc.

### **Conclusion**

Basically, it is a fact, that climate change has negative socio-economic impact on Nigeria. It reduces the percentage of fishery production along the coastal zone, rendering people homeless and become refugees in their own country as a result of incessant flooding. It sometimes it leads to loss of lives and properties, reduction in the production of maize, millets, etc in the arid zones. Due to the preceding, people should embark on deforestation and continually engage in planting trees. According to the 2015 SRP presentation in Abuja by the Director General of Nimet, Dr. Anthony Anuforum, there will be less rainfall this year, and as such, the year may be dryer than normal in most parts of the country with delayed onset of rainfall and early cessation of rain. In effect, the major socio-economic consequence for the country will be in the agricultural sector because the growing season is expected to be shorter.

As a panacea, he suggested that the following sectors: agriculture, water resources, power, transport (land and air), maritime, health, communication and emergency response should take strategic steps through their ministries, agencies and departments. HAQe stated further that government should silos for grains storage and provides drip irrigation. Most importantly, government should deploy renewable energy to enhance electricity supply in both the rural and urban cities in Nigeria (Punch Newspaper, 25<sup>th</sup> September, 2015).

Professor Emmanuel Oladipo, a United Nations Development Programme (UNDP) Consultant, in one of his treatise, Nigeria/Niger Project, Niamey, confirmed that climate change is a serious threat to efforts at poverty eradication and sustainable development in Nigeria and Niger because the countries have large rural population directly depending on climate sensitive economic and development sectors of agriculture and fisheries. Governments should enhance space technologies and earth observation systems in

monitoring and understanding the influence of environmental parameters on vector biology and disease transmission cycles. Environmental degradation of the Niger Delta region and increasing desertification in the northern and other parts of the country occasioned by the climate change should equally be addressed by all the stakeholders including the Federal Government.

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