

Historicizing Climate Change and Environmental Degradation in the Niger-Benue Confluence Area of Nigeria

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Abstract

Since the pre-colonial and colonial eras, the term commonly used to describe the phenomenon we now refer to as “climate change” was often called “global warming.” During that time, scientists and researchers primarily focused on the observed increase in global average temperatures and its potential impact on the Earth’s climate systems. The Niger-Benue region plays host to the confluence of the two main rivers in Nigeria which contributed to its fame and socioeconomic development since the pre-colonial era. The growth of the population, increase in agriculture, and construction of infrastructures during the post-colonial period contributed to the environmental degradation of the Niger-Benue Confluence region. These environmental concerns include land degradation, water pollution, deforestation, erosion, water pollution, flooding, and biodiversity loss. This article historicizes the effect of global warming and climate change in the Niger-Benue Confluence region which encompasses Lokoja and its environs. Flooding which has become a recurrent phenomenon in the region has led to the loss of many lives and properties, and an increase in crime rates. Using contemporary works and oral interviews, it is argued that despite the development that occurred in the region to forestall the effects of climate change, the region continues to suffer its devastating effects.

Keywords: Climate Change, Environment, Degradation, Flooding, Niger-Benue Confluence

Introduction

The Niger-Benue Confluence area is an important ecological region in Nigeria where the Niger and Benue rivers meet. It is prone to climate change and environmental challenges that have historical roots. Climate change has led to metamorphoses in rainfall patterns, increased temperatures, and fluctuating river levels, impacting agriculture, water availability, and livelihoods in the area. Environmental degradation, including deforestation, soil erosion, and pollution, also poses significant challenges. Human activities such as population growth, unsustainable farming practices, and unregulated industrial activities have contributed to these issues over time.

Many scholars have attempted to examine the causes and effects of climate change and environmental degradation in the region using several approaches. To effectively assess climate change and its effects, there is an urgent need for a better understanding of the changing climate patterns and how they affect extreme weather events. Enhancing knowledge of climate change is

critical for improving projections of future climate change. Adequate knowledge and awareness of the effects of climate change will help make communities join forces in reducing the vulnerability of societies to climate-related risks both now and in the future. Understanding attitudes and the potential impacts of global environmental change is the first step in modelling what will happen when any one of them is changed as a result of possible global warming and a prerequisite for defining appropriate societal responses (Itojie-Akpokiniovo and Lilian, 2022).

The biggest obstacle to climate change mitigation, according to Itojie-Akpokiniovo and Lilian (2022), is the lack of knowledge in developing countries like Nigeria. They state that Africa is one of the most vulnerable continents to climate change; yet, most studies conducted in Africa and specifically in various Nigerian universities show that there was either little or complete lack of knowledge about climate change or change programs in these universities. This influences the attitude toward climate change and its effects on affected areas in the country (Itojie-Akpokiniovo and Lilian, 2022).

Climate, History, and the Modern World written by H. H. Lamb published in 1995 explores the connections between climate and human history. The author uses the historical method of data collection and analysis to examine how climate fluctuations have influenced societies throughout different periods (Lamb, 1995). As a renowned climatologist, Lamb delves into the interactions among climate, culture, and civilizations, providing insights into the impact of climate change on human affairs. The book offers a comprehensive historical perspective on climate and its influence on human societies, making it a valuable resource for understanding the relationship between climate and history. This goes to show that the History discipline and its method are important in understanding issues like climate change and environmental degradation, although other disciplines such as Climatology and Geography will help in the scientific analysis of climate conditions and change over time for a more robust understanding. I must point out here, however, that works in Mathematics and other hard sciences have developed models to counter the doomsday apocalypse or end-of-the-world proclamation about “climate change” and “global warming” (for example, see Prosvirina and Spurr, 2011).

Most of the current debate is about flood, one of the effects of climate change which has become a common natural disaster that has claimed many lives, displaced millions, and destroyed properties and degradation of contiguous farmlands. According to Nkeki, Hanah and Ojeh (2013), flood is the most frequent and devastating natural disaster in the world. It is widely distributed, thereby leading to significant economic and social damages than any other natural disaster. There are three major types of flood: (1) river flood, (2) coastal flood, and (3) urban flood. River flooding is a function of rainfall and runoff volumes within the river valley. Coastal flooding is typically a function of storm surge, waves (driven by wind), and heavy rainfall. Urban flooding results when development is concentrated within or along stream floodplains or channels (Nkeki, Hanah and Ojeh, 2013).

Studies have shown that the aforementioned basic flood types are the major and frequent flood disasters that have occurred in Nigeria over the years. Among these, river flooding is the most enormous and destructive. Unlike coastal and urban flooding, river flooding is much more widespread concerning its catchment area. For instance, the prominent rivers found in Nigeria are Niger and Benue and they flow through numerous large urban centers. River flooding occurs in the floodplains of the larger rivers, while sudden, short-lived flash floods are associated with rivers in inland areas where heavy rainfall can change them into destructive torrents within a short period (Nkeki, Hanah and Ojeh, 2013).

The fundamental cause of river flooding is excess runoff induced by heavy rainfall. This runoff is often obstructed by anthropogenic factors which involve the concentration of developmental activities along a river's natural flow path (river valley). River flooding is a function of humans' interaction with the environment and, consequently, this interaction has left humans susceptible to flooding hazards which are outcomes of humans' interactions with the environment involving designing and locating infrastructure, exploiting natural resources, concentrating of population, etc.

In 2012, a widespread devastating flood hit Nigeria cutting across major cities in about 14 states that border the Niger-Benue River. The worst affected states were Adamawa, Taraba, Benue, Kogi, and Anambra in the east-central part of the country. This flood incident has been characterized as the most devastating in the last 40 years. The flood submerged houses and severed transportation routes throughout the affected areas. It is, however, strange that many citizens living in the affected areas did not attribute this occurrence to climate change rather they believe it is a supernatural phenomenon.

It is important to note that climate and environmental change constitutes changes or disturbances in the ecological balance of a given ecosystem. It includes changes in the components of the environment as represented by a significant reduction in its quantity or quality. Changes in the environment can be induced by natural ecological processes or human influences. Nonetheless, Jack and Uzobo posit in their study that human interferences into the ecological balance have accounted for a larger contribution to the contemporary global environmental changes, including emission of greenhouse gases, global warming and climate change, desertification, sea level rise, flooding, deforestation, and so on (Jack and Uzobo, 2017). In their analysis of contemporary global environmental changes, they also argue that the quest for economic and technological advancement has unintended consequences such as pollution and global environmental destruction, hence man moving towards a risk society (Jack and Uzobo, 2017). Before getting into the analysis of the historical findings of this research, I first provide a brief background of the region studied and a conceptual clarification of climate change and environmental degradation in the next two sections to provide a context for doing so.

Brief Background of the Niger-Benue Confluence Region

The Niger-Benue Confluence region is located in the north-central zone of Nigeria. The region is within the present-day Kogi State, established from old Kwara and Benue States, with Lokoja as its capital. It is the most centrally located state in Nigeria, situated on longitude 7° 30' N and latitude 6° 42' E and with a total area of 29,833km² (11,519 square meters). The climate of the region or Kogi State has an average maximum temperature of 33.2°C and an average of 22.8°C. Lokoja is generally hot throughout the year. The state has two distinct kinds of weather: (1) the dry season, which lasts from November to March; and (2) the rainy season, which lasts from April to October. Annual rainfall ranges from 1,016 mm to 1,524 mm. The region comprises the Igala, Ebira, Kabba, Nupe, Bassa, Yoruba, and Kogi divisions of the former Kabba Province (Daryll, 1970). It shares common boundaries with Niger, Kwara, Nassarawa, and the federal capital Territory to the north; Benue and Enugu State to the east; Enugu and Anambra State to the south; and Ondo, Ekiti, and Edo States to the west (Daryll, 1970).

The confluence region is an open savannah or “orchard bush,” and agriculture dominates the economy. It includes the cultivation of crops such as guinea corn and yam, which are commonly grown in the northern and southern parts of Nigeria, respectively; thus, the term “middle belt,” which is frequently applied to the Niger-Benue region (Udo, 1980). The Middle Belt, however, has a transitional climate between north and south; therefore, it stands as a zone with mixed culture in which the food crops of the south are cultivated side by side with those of the far north (Udo, 1980).

The Niger-Benue Confluence region is mountainous with sedimentary rocks, which served as a defensive post for the people in the region against the advent of Fulani Jihadists in the 19th Century (Olufemi, 2011). Also, the presence of the waterways makes the area a place where there is a free flow of communication and movement via the rivers as the principal channels. Geographical location thus contributes a great deal to the prominence of some ethnic groups in the region such as the Igala and Nupe.

The geographical description of the Niger-Benue Confluence area has remained fluid, but it generally covers the region around the meeting point of the Rivers Niger and Benue.

Within this region, some states flourished in terms of socioeconomic and political development before colonial rule. These included Nupe to the extreme north, Igbalo to the northeast on the Benue, and Igala Kingdom to the east. The Lokoja settlement developed on the merging point of the two rivers, while Ebira Tao is situated in the southwest of the confluence. Other ethnic compositions within the Niger-Benue Confluence region include the Bassa-Komo, the Idoma, the Afo or Eloyi, the Alago, the Tiv, the Gede, and the northeasternmost Yoruba (Mohammed, 2011).

The land areas in the region rise from about 300 meters along the Niger-Benue Confluence to the heights of between 300 and 600 meters above sea level in the uplands. Agbaja Plateau, which ranges from 335 to 366 meters above sea level, and the much higher Okoro-Agbo hills at Ogidi in Ijumu LGA are some of the predominant landforms of the region. The general terrain is undulating and characterized by high hills, plateaus, and numerous inselbergs and elongated ridges (Mohammed, 2011).

Climate Change and Environmental Degradation: A Conceptual Clarification

The climate, on the one hand, is a concept popularly expressed by geophysicists, meteorologists, climatologists, geographers, and other scientists for expected temperature, rainfall, and wind conditions based on historical observations. "Climate change," on the other hand, is an alteration in either the average climate or climate variability that persists over an extended period.

Climate change occurs as a result of transformations in the Earth's orbit, the energy output of the sun, volcanic activity, the geographic distribution of the Earth's land masses, and other internal or external processes that can influence climate. Scientists refer to this type of long-term climate change as "natural climate change" (Riedy, 2016). This change has led to regular cold periods (or ice ages) in the past when glaciers covered large parts of the Earth's surface. The Earth has also experienced warmer periods; this is demonstrated by the rise of sea levels which were much higher than they are. In the Earth's long-term history, the 21st Century is characterized by a relatively warm, stable climate that has lasted since the end of the last ice age (Riedy, 2016).

According to the National Aeronautics and Space Administration (NASA), as stated by Jameel (2016), the Earth's average temperature has increased by about one-degree Fahrenheit during the 20th Century. The increase in the Earth's temperature has an enormous effect on the environment. The impacts of this small change in the temperature are many, ranging from longer drought seasons and heat waves to more aggressive hurricanes (Jameel, 2016).

Since the 1850s, scientists have known that CO₂ is one of the main greenhouse gases of importance to Earth's energy balance. Direct measurements of carbon dioxide CO₂ in the atmosphere and air trapped in ice revealed that atmospheric CO₂ increased by more than 40% from 1850 to 2019. Measurements of different forms of carbon (isotopes) reveal that this increase is due to human activities. Other greenhouse gases (notably methane and nitrous oxide) are also increasing as a consequence of human industrial activities.

The observed global surface temperature rise since 1900 is consistent with detailed calculations of the impacts of the observed increase in atmospheric greenhouse gases (and other human-induced changes) on the Earth's energy balance (The Royal Society and the US National Academy of Sciences, 2020). Studies revealed that greenhouse gases are the main contributor to climate change (The Greenhouse Effect). They are very efficient in trapping heat into the atmosphere; therefore, it results in the greenhouse effect. According to Jameel (2016), solar energy is absorbed by the earth's surface and then reflected in the atmosphere as heat. Then as the heat goes out to space, greenhouse gases absorb a part of the heat. After that, they radiate the heat back to the earth's surface, to another greenhouse gas molecule, or space (The Greenhouse Effect).

This effect has affected the conditions of living things on the earth with developing

nations of the Global South suffering from the consequences. Climate change has been studied by many authors such as Micheal Mann (2021), Tim Jackson (2009), Elizabeth Kolbert (2014), David Wallace-Wells (2014), Naomi Klein (2014), and many others. Their works discuss the fight against climate change, its causes, and its effects on the planet. It is no doubt that climate change is a phenomenon that has to be approached collectively irrespective of the degree of its severity.

“Environmental degradation” refers to the deterioration of the environment through the depletion of natural resources, the destruction of ecosystems, and the compromise of the overall quality of the environment. This process is often a result of human activities, including deforestation, pollution, over-exploitation of natural resources, and industrialization (Millennium Ecosystem Assessment, 2005). Understanding the concept of environmental degradation requires a multidisciplinary approach, encompassing ecological, social, and economic perspectives.

Environmental degradation involves various interconnected processes that harm the environment. It includes (a) deforestation—a major driver of environmental degradation that contributes to the loss of biodiversity and disrupts ecosystems; (b) the clearing of forests for agriculture, logging, or urbanization that leads to the destruction of habitats for countless plant and animal species (FAO, 2020). Pollution, another significant factor in environmental degradation, involves the introduction of harmful substances into the environment. Air pollution from industrial emissions, water pollution from untreated wastewater, and soil pollution from pesticides and chemicals all contribute to the degradation of ecosystems and pose risks to human health (World Bank, 2019). Loss of biodiversity occurs when the variety and abundance of species in a given area decline. This can result from habitat destruction, pollution, climate change, and over-exploitation of natural resources (Millennium Ecosystem Assessment, 2005). Climate change alterations in the Earth’s climate patterns are often induced by human activities such as the burning of fossil fuels (UNEP, 2021).

Causes of environmental degradation are driven by both direct and underlying causes. Direct causes include activities like industrial emissions, agricultural practices, and urbanization. Underlying causes are often linked to socioeconomic factors such as population growth, consumption patterns, and policy decisions. Rapid population growth can lead to increased resource demand and environmental stress. Unsustainable consumption patterns also contribute to resource depletion and pollution. Industrial activities as a result of industrial development release pollutants and contribute to habitat destruction.

The consequences of environmental degradation are far-reaching and affect both the natural world and human societies. Some of the effects are include reduction in the ability of the ecosystems to provide essential services like clean water, air purification, and pollination. Human health risks due to pollution and environmental changes can have direct and indirect impacts on human health. Social and economic disparities as vulnerable communities often bear the brunt of environmental degradation lead to inequalities and underdevelopment (World Bank, 2019).

Addressing environmental degradation requires a combination of regulatory measures, conservation efforts, and sustainable practices. Environmental policies such as stringent regulations can help control pollution and resource exploitation. Conservation initiatives aimed at protecting and restoring ecosystems through conservation programs can be effective (Millennium Ecosystem Assessment, 2005). Sustainable practices which include adopting environmentally friendly practices in agriculture, industry, and daily life will help in combating some of the effects of environmental degradation.

Climate Change and Environmental Degradation in the Niger-Benue Confluence Region of Nigeria

During Britain’s colonial rule in Nigeria (1900-1960), climate change began to manifest in the Niger-Benue Confluence area, which had both direct and indirect effects on the region. These

effects were mainly experienced through changes in rainfall patterns, temperature, and river levels.

Some key effects include agricultural disruption as climate change altered the agricultural practices of local communities such as Bassa, Egbura Koto, Bodom, and Idah. Changes in rainfall patterns affected crop yields and planting seasons, leading to food shortages and economic difficulties.

Next, livelihood challenges involved the changing climate in the 1930s which led to challenges for fishing and livestock farming, which were important economic activities in the Niger-Benue Confluence area. Fluctuating river levels and water availability impacted fishing activities, while changes in vegetation and water availability affected grazing lands for livestock.

Another effect was health risks as climate change-related factors such as increased temperatures and altered rainfall patterns contributed to the spread of diseases and health challenges. Malaria, waterborne diseases, and malnutrition became more prevalent due to changes in ecological conditions, especially among the people living close to the waterways.

Also, climate change influenced social dynamics and cultural practices in the region. For example, changing weather patterns disrupted traditional festivals and ceremonies tied to agricultural activities. Migration and conflicts over resources also increased as communities sought alternative livelihood options (Ologunorisa and Olajuyigbe, 2017).

It is important to note that during the colonial period, natural resource exploitation and land management practices imposed by colonial powers exacerbated the vulnerability of local communities to climate change impacts. These practices often prioritized extractive industries and disregarded sustainable resource management principles, thereby intensifying the effects of climate change on the environment and communities (Ologunorisa and Olajuyigbe, 2017). To mitigate some of the effects, the colonial government launched the Public Works Department to carry out the dredging of the rivers to keep them deep and protect the region from flood.

Climate change continues to have significant effects on the Niger-Benue Confluence area in the post-independence era despite the efforts of the government and the Inland Waterways Department. From 1960 to 2010, the effects of climate change continued to degrade the environment of the region with devastating effects on the people and the environment. Some of the effects included increased flooding as climate change led to more frequent and intense rainfall events, resulting in increased flooding in the Niger-Benue Confluence area. Flooding disrupts communities, damages infrastructure, and causes displacement of people.

Also, changes in agricultural practices resulted in changes in rainfall patterns and temperature which affect agricultural practices in the region. Farmers faced challenges in crop selection, planting seasons, and water management, all of which led to reduced agricultural productivity and food insecurity.

In addition, water scarcity occurred in the Niger-Benue Confluence area. Fluctuations in river levels and reduced rainfall contributed to water scarcity, impacting domestic water supply, irrigation, and livelihoods that depended on water resources. Erosion and soil degradation also increased due to rainfall intensity; this negatively affected agricultural productivity, as fertile topsoil was washed away, leading to reduced crop yields and land degradation (Adejuwon and Adeniyi, 2019).

Biodiversity loss was also attributed to climate change impacts on the ecosystems and biodiversity in the Niger-Benue Confluence area. Changes in temperature, rainfall, and water availability disrupted habitats and threatened plant and animal species, leading to a loss of biodiversity. Furthermore, climate change also contributed to health risks in the region. Increased temperatures and changing rainfall patterns impacted the prevalence and distribution of diseases such as malaria and waterborne illnesses (Adejuwon and Adeniyi, 2019).

In 2012, the region witnessed heavy rainfall and the release of water from the Ladgo dam in Cameroon and the Kanji and Shiroro dams in Nigeria which led to the flooding of many communities in the Confluence region. The National Emergency Management Agency (NEMA)

and National Inland Waterways Authority (NIWA) embarked upon the evacuation and rescue of communities located along the waterways. They carried out sensitization of people on the dangers of building houses along the waterways as well as dumping refuse on the water channels (FGN, 2013).

Since 2012, heavy rainfall in the Niger-Benue Confluence area has led to severe erosion which has affected farmlands. In most farmlands, rill, splash, and gully erosions have devastated the lands as well as crops. Most farmlands have also been turned into “badlands.” Sheet erosion in particular washed the top soil and nutrients, thereby exposing the subsoil which is very poor in nutrients, hence leading to a drastic reduction in crop yield. Erosion removes the topsoil, the zone of plant nutrients, and, thus, causes the reduction of soil fertility, resulting in a reduction in agricultural production. Flooding has also led to the submergence/washing away of crops, farmlands, and livestock, the deaths of some people, and causing crop failure, poor yield/harvest, and shortage of food as well as poverty.

The incidence of pests and diseases in the region is very common and it is becoming worrisome because the environment is becoming warmer, dryer, and more conducive for them. Migratory birds (birds that were not found in the precolonial and colonial eras) are now very common, as are insects and pests.

It is of note that climate change has altered the natural hydrological calendar to the extent that the life cycle of most insect pests which were controlled or disrupted with the onset of rainfall which is now inconsistency has resulted in the strengthening of the lifespan of those biological pests and further destruction of forest and crops. Pests and diseases reduce crop yield, quality, and value. In addition, when heavy rain is concentrated within a few days or weeks, well-drained lands become water-lodged; and if animals especially cattle graze within the area, they develop foot disease which can easily kill them (Audu et al., 2013).

The temperature in the region has been increasing steadily and this has made the area very hot during the dry season. The heat period is occasioned by many diseases such as heat rashes, measles, meningitis, diphtheria, and cholera. Some of the affected people are treated while those who cannot afford to get medical help from the government and private health care suffer the consequences.

Fishing which is one of the major occupations of the people in the region has been adversely affected. According to Premium Times, “fisherman in Kpata, Lokoja Local Government Area of Kogi State, Abdullahi Gimba depends on the resources of the River Niger to provide for his two wives and 13 children. It is how he has earned his income for the past 30 years; by taking to the waters for several hours every day” (Olorunyomi, 2021, 1).

Since 2021, the waterways are low and yield became increasingly low in the last decade, forcing Mr Gimba and other fishermen in the region to travel longer distances in search of fish for a good catch. This is making the livelihood of fishermen and fish traders more difficult and unreliable. Olorunyomi notes the following:

We don't get as much fish as we used to in the past. We only get the most in the rainy season when the water levels are high and the water is deep but sometimes it [water levels] increases so much causing flooding, which is another problem we've faced almost every year since 2012,” Mr. Gimba said. “It's worse in the dry season because fishermen who don't have enough money to buy mechanized boats have to paddle far into the waters for many hours before getting some catch (2021, 1).

Also, in communities like Kpata, families are forced to either survive with less or come up with strategies to adapt to the changes they are experiencing (Olorunyomi, 2021).

The effects of climate change continued to affect the people because in 2022, the Niger-Benue Confluence region was among the worst-hit flood areas in Nigeria. The affected residents

are still battling its devastating impact in myriad ways. It has become increasingly more challenging if not virtually impossible to access accurate data due to the dearth or lack thereof or the unwillingness of the relevant authorities to provide them. Thus, it has become difficult to estimate the scale of climate-sensitive health risks accurately. Communities in the region have continued to suffer a rise in heat waves, water-related diseases (such as typhoid, cholera, and water diarrhea), skin infection, malnutrition caused by low food quality, malaria, and psychological issues leading to trauma. The National Centre for Disease Control (NCDC) Cholera Situation Report, Epidemiological Report-10, posted on January 5, 2023, states that Kogi or the Niger-Benue Confluence area is one of the 32 states that have reported suspected cholera cases in 2022 (see Balogun, 2023).

Thus, addressing the effects of climate change in the Niger-Benue Confluence area requires adaptation and mitigation strategies. These may include improved water management, sustainable agriculture practices, early warning signs for floods, and the promotion of renewable energy sources to reduce greenhouse gas emissions. The Kogi State government, through its Ministry of Environment, has embarked upon the assessment of the level of environmental damage and design, as well as implement restoration and rejuvenation measures to halt further degradation of the environment (see Figure 1).

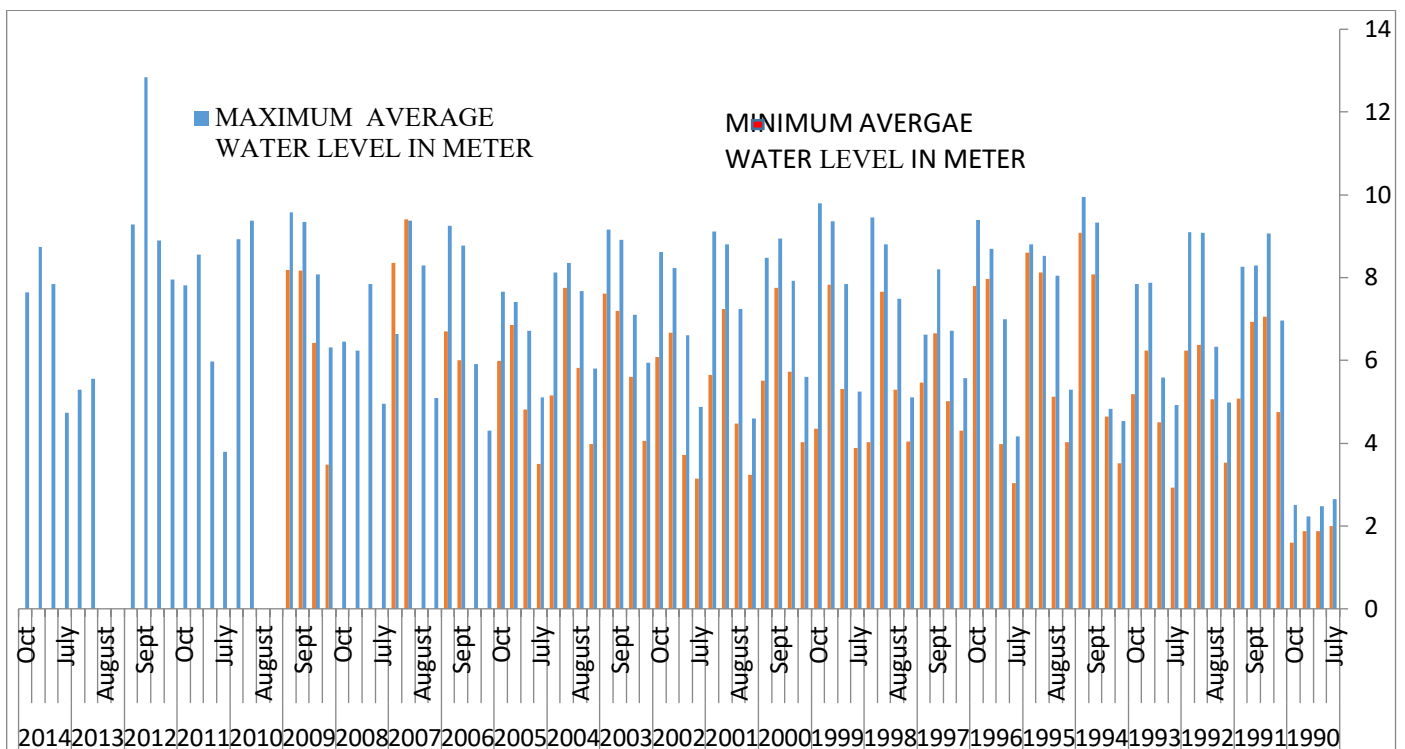


Figure 1: The Volume of the River Niger since 1990-2014, Station: Lokoja, River: Niger, Mile: 581.3km², Area Drain Basin: 750, 790, km²

Source: National Inland Waterway Authority, Lokoja Area Office Record, 1990-2014.

Conclusion and Recommendations

The presence of any natural resources is considered a blessing to its host community which, if utilized effectively, can spur rapid socioeconomic and political development; however, the Niger-Benue Confluence area which hosts the two great rivers in Nigeria has continued to suffer from climate change and environmental degradation, which has hindered the rapid development of the region since independence. This paper revealed that climate change is a very serious enemy to any community in Africa, and indeed the Niger-Benue Confluence area where the temperature is

high. It has been discovered that climate change has affected the crops growing seasons and animals, and likewise aquatic creatures. The impact of climate change is severe in the region due to the over-dependence on rain-fed agriculture and natural water fishing that does not encourage commercialization of agriculture and aquaculture in the region.

Economic development in the region has been affected since the colonial era and post-colonial era as the effect of climate change restricted rapid development because of extreme weather conditions such as erosion and flooding, among others. Socio-culturally, the effect of climate change has led to the displacement of people from their residential areas with properties and lives lost. Criminal activities have become rampant due to lack of security, adequate electric power supply, and displacement of people in periods of flood disasters. Post-disaster effects contribute to the traumatic suffering of the people as most displaced citizens find it difficult to resettle in their previous locations because of the fear of re-occurrence, and diseases such as cholera, typhoid, and malaria are often associated with the post-disaster period coupled with renovation and restructuring of former residences, farmlands, schools, churches, mosques and other affected infrastructures.

The federal and state governments have put some measures in place to combat the adverse effects of climate change on agriculture, infrastructure, and health in the region. These measures can be characterized as short-term measures such as irrigation, cloud seeding, use of insecticides, cover cropping, growing of hybrid crops, changing of the micro-climate by introducing windbreaks, shading to reduce heat, and so on. Long-term measures such as afforestation, controlled grazing, population control, establishment of more forest reserves, and construction of more multi-purpose dams just to mention have been put in place, albeit they are few. In the area of infrastructure, the government and residents in the area developed houses away from river banks for affected people, but this measure has not yielded a positive impact, as the number of houses constructed by the government is not many while affected and displaced citizens outnumbered the houses. Indigenes of the region defy the National Inland Waterways Authority's warnings and erect buildings close to the waterways. In addition, large drainages that will ensure the flow of water in the right channel have not been constructed, despite the reoccurrence of floods and other climate change effects in the region.

Given the critical importance of climate change and environmental degradation in the Niger-Benue Confluence Area of Nigeria, it is recommended that a comprehensive and multidisciplinary approach to research and documentation of the effects of climate change in the region be undertaken. This recommendation is based on the recognition that understanding the historical context of environmental changes in the region is essential for informed policy formulation, sustainable resource management, and the development of effective adaptation and mitigation strategies.

Next, research institutes and government parastatals such as NIWA, NEMA, and NIMET should support initiatives that delve into archival records and oral histories to reconstruct the historical climate patterns, land-use changes, and traditional ecological knowledge in the region. This approach can provide valuable insights into past environmental conditions and human interactions with the landscape.

Also, there should be community engagement and indigenous knowledge integration which should involve the local communities in the research process to integrate indigenous knowledge systems into the historical analysis. This collaboration will not only contribute to a clearer understanding of the region's environmental history but also empower local communities to actively participate in sustainable development initiatives and forestall future flood damages.

In addition, awareness of and advocacy for mitigating the effects of climate change and environmental degradation should be included in local, state, and federal government policies. These efforts should highlight resilient strategies that address the specific challenges faced by the Niger-Benue Confluence Area.

Furthermore, facilitating collaboration with international research institutions and

organizations to leverage global expertise and resources will enhance the capacity for comprehensive research and ensure that the findings are contextualized within broader global environmental narratives. By adopting these recommendations, stakeholders can contribute to a more nuanced and historically informed approach to addressing climate change and environmental degradation in the Niger-Benue Confluence area. This, in turn, will support the development of sustainable and context-specific strategies for mitigating the impacts of environmental changes on both the ecosystem and the communities that depend on it.

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