



Climate Change and Human Security in Nigeria and Niger Republic

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Abstract. To a number of Nigerians climate change is a fiction or a phenomenon that is peculiar to developed countries. Some Nigerians that are now aware of it feel it is restricted to the field of Science. This study aims at broadening the knowledge of climate change in Nigeria and Niger Republic. Climate change will be shown to be a reality particularly in the Sahelian States of Northern Nigeria and that it has human security implications for the country in its relations with the Republic of Niger, its neighbor to the North. The qualitative approach was used for this study. The research is carried out using relevant secondary sources such as textbooks, journals, and materials on the Internet. The study found out that climate change has critical human security impact on the countries under study and it is not a problem that one country can solve on its own as floods and droughts know no national boundaries. Therefore, the study recommends concerted effort and cooperation between Nigeria and Niger Republic in tackling the issues associated with climate change.

Keywords: Climate, Desertification, Food security, Health and Contiguity

1. Introduction

From time immemorial, Nigeria and Niger have been closely linked by history and geography. Geographically speaking, the area of Niger is a natural continuity of Nigeria. Needless to state the fact that greater portion of their territories and their peoples were part of the empires that succeeded one another in West Africa, particularly: the Mali, the Songhay, the Kanem-Bornu empires and the Hausa states. The 1,500-kilometre boundary covering the territories of Dosso, Tahoua, Maradi, Zinder and Diffa in Niger; Kebbi, Sokoto, Zamfara, Katsina,

Jigawa, Yobe and Borno States in Nigeria are under the influence of the same geographical factors of climate and therefore, belong to the same geographical belt (Okali, 2004). For this reason, the peoples experience similar influences of climate and therefore their lives are shaped by the same factors of climate and environment. This influences the types of cultures that emerged and largely explains their similarities.

Like other countries of the Sahel, Nigeria and Niger are affected by the phenomenon of climate change, characterized by drastic reduction of rainfall, increase in the rate of dryness and heat, depletion in the amount of water, plant and animal resources—all resulting in a fast-developing arid environment. All or parts of twelve countries in West Africa are being affected: Mauritania, Senegal, The Gambia, Mali, Burkina Faso, Niger, Nigeria, Chad, Sudan, Ethiopia, Eritrea and Djibouti.

Climate is the synthesis of the weather in a given place over a period of about 30 years. The main elements of weather itself include temperature, rainfall, humidity, wind, sunshine, mist, haze and cloud. It is the collective expression of these elements over time that is described as the climate of a place. Climate change is thus a change in this collective pattern of expression, not just in one element of weather (Okali, 2004). Climate change is caused by the increasing concentration of greenhouse gases in the atmosphere. Greenhouse gases include any gas that is capable of absorbing heat. These gases serve as a source of insulation for the earth and without them the earth would be too cold to sustain life as we know it. The greater the concentration of these gases, the more heat they retain around the earth causing the earth to be warmer than it would otherwise have been. The result of this is different climatic events in

different places such as higher average surface and ocean temperatures, more rapid evaporation and rainfall, more variability and severity in floods and droughts, rising sea levels, and an extended range of tropical diseases (Melinda, 2005).

The main gas responsible for the most warming is carbon dioxide. It is emitted when fossil fuels like coal and oil are burned. Since the Industrial Revolution, fossil fuel use has increased significantly and this has added more and more of this gas into the atmosphere. For instance, the concentration of carbon dioxide in the atmosphere has increased by around one-third from 280 parts per million (ppm) in 1750 to 368ppm in 2000, an increase that was unprecedented (Aalst, 2006). Other greenhouse gases include water vapour, methane, nitrous oxide, ozone, chlorofluorocarbons (used in air conditioners, refrigerators, foams) and haloes (used in fire extinguishing equipment), significantly contribute to global warming by accelerating the depletion of the ozone layer meant to shield the planet from excessive heat (Onuoha & Ezirim, 2010).

If climate change is taking place as a result of human-induced increases in atmospheric concentrations of greenhouse gases leading to global warming, there are certain consequences that should arouse concern. Over the 20th century, global mean surface temperature increased by $0.6 \pm 0.2^\circ \text{C}$ (0.7°C in Africa), more than any other century in the last 1,000 years. More so, the average temperature of the Earth rising at least $1.4 - 5.8^\circ \text{C}$ is faster than known for any previous period. The question is whether the planet Earth can adjust rapidly enough to this rate of change (Okali, 2004).

The countries of the Sahel are particularly vulnerable to the consequences of this warming. The vegetation cover of the Sahel is composed of bushes, grasses and stunted trees that increase in density as one moves southward. These countries not only share similar climatic conditions (the Sahelian climate), but their inhabitants also have a lot in common in terms of cultures and livelihood systems. These livelihood strategies include agriculture, livestock herding, fishing, short and long-distance trading, and a variety of urban occupations. Dryland crops such as millet, sorghum and cowpea constitute the staple foods of the populations while groundnut and cotton are the major cash crops. Farming in this region is almost entirely reliant on three to four months of summer rainfall, except along the banks of the major rivers, lakes, and other seasonal water courses, where some irrigation activities are undertaken. Livestock herding is a very important aspect of life and constitutes the

major source of income in some areas (Kandji, Verchot & Mackensen, 2004)

The climatic events to be highly influenced in the Sahel region are the temperature-based and the rainfall-based events. The degree of temperature in the Sahel is projected to increase. Days with the temperature reaching 38°C or more could increase and the number of days with heat waves—prolonged period of abnormally hot weather—could increase as well. More so, a warmer climate in the Sahel would decrease the atmospheric moisture thereby reducing the chance of cloud formation and rainfall. A shorter rainfall season and less rainy days are also projected for the Sahel region (The Guardian, 2011).

Climate change is not new to West African Sahel and climatic variability became particularly pronounced in the twentieth century. The Sahel region experienced three major drought periods including 1910–1916, 1941–1945 and the long period of sustained declining rainfall that spanned the 1970s and most of the 1980s and continued with some interruptions into the 1990s (Thébaud & Batterby, 2001). The drought was a dramatic episode for the young Sahelian nations. The annual rainfall values of 1983 and 1984 were among the lowest ever recorded in the history of the Sahel, but severe droughts also occurred in 1972, 1973 and 1977. In 1984, drought severely affected all countries from Mauritania to Ethiopia, including several bordering countries on the southern edge of the Sahel. In contrast, the 1973 drought was more localized and affected mostly Mali, Niger and Chad. This had devastating effects on local populations and livelihoods. An estimated 500,000 people died across the Sahel (Brown & Crawford, 2008).

Nigeria and Niger are contiguous countries that are under the influence of the same geographical factors of climate. Both countries experience drought that is caused by successive years of poor rainfall. The combined effects of overpopulation, poverty and unregulated border can exacerbate this climate-induced drought. As land becomes unproductive and previous settlements become unlivable as a result of harsh environmental condition, people are forced to compete for available arable land or migrate to new settlements. With the growing population, more land is being cultivated and less is available for grazing. The zone's vulnerability to conflict is heightened by unregulated border crossing between Nigeria and its equally dry neighbor to the north, Niger. Pastoralists from Niger, whose welfare depend on the protein and money provided by their livestock, often let the animals encroach on Nigerian farmland. As a result,

pastoralists relocate their herds in search of sustenance, often finding it in Nigeria. The natural result of this pressure on land is conflict between pastoralists and sedentary farmers.

Climate change and its impact have dominated international policy agenda and public attention in recent times reaching a peak at the United Nations Conference in Copenhagen, December 2009. The focus on the security implications of climate change has helped to bring climate change to the realm of international policymaking by placing it as a key threat to state and global stability. Building on his 2009 report on Climate Change and its Possible Security Implications, the then UN Secretary-General Ban Ki-moon declared in the Security Council in July 2011 that “climate change not only exacerbates threats to international peace and security; it is a threat to international peace and security (UNEP, 2011)

Climate change does not fit into the mode of traditional threats to national security, such as war, terrorism, insurgency, espionage or sabotage. Yet, its non-violent and gradual dynamics of manifestation serve only to disguise its impact on livelihoods, social order, peace and stability. Thus, there is a need for a transition from the narrow concept of national security to the all-encompassing concept of human security. Human security is a change from an exclusive stress on territorial security to a much greater stress on people’s security and “from security through armaments to security through sustainable human development. More specifically, human security is considered in seven main categories: Economic, food, health, environmental, personal, community, and political security (UNDP, 1994).

Economic security requires jobs to secure an assured basic income. Food security means that all people at all times have both physical and economic access to basic foods. Health security is to provide healthy environment and health services to meet the challenges of poor nutrition, infectious diseases, and so on. Environmental security is concerned with lack of access to clean water, deforestation, sanitization, air pollution, natural disasters, and so on. Personal security is to protect human lives from threats of various kinds of violence by states and other groups. This includes categories like crimes, industrial and traffic accidents, threats to women, abuse of children. Community security is about threats like oppressive practices and ethnic clashes in traditional communities. Political security means the protection of human rights and democratization. Furthermore, as “global human security,” the UNDP Report refers to

unchecked population growth, disparities in economic opportunities, migration pressures, environmental degradation, drug trafficking and international terrorism (UNDP, 1994).

The concept of human security supplies “early warning indicators” to signal “the risk of national breakdown.” Such indicators consist of deteriorating food consumption, high unemployment and declining wages, human rights violations, incidents of ethnic violence, widening regional disparities and an overemphasis on military spending. The Military Advisory Board in Virginia, in a report titled “National Security and the Threat of Climate Change” (2007) aptly interprets climate change as a “threat multiplier of instability.” In this sense climate change is a threat to national security to the extent that it exacerbates tenuous security situations or induces new shocks, which significantly alter social order, constrict national revenue and unsettles the political system. Hence, climate change does not significantly constitute a threat in itself but when it interacts with other socioeconomic and physical factors existing in a state such as poverty, illiteracy, overpopulation, unregulated border, among others it can undermine the security of a country.

In an increasingly interdependent world, the ramifications of climate change for national security could be interpreted from two principal dimensions: internal and external. In terms of the internal dimension, the sources of the challenge posed by climate change are inherent in the environmental trends that are occurring in such a state and their impacts are limited to the state. For example, increasing drought in one part of a country as a result of climate change may lead to crop and livestock failures and loss of livelihoods; thereby exacerbating food insecurity and causing people to migrate to new areas for survival or to evolve other means of survival. Such adaptive behavior, which could be criminal at times, undermines national security just as resource-conflicts generated by the arrival of migrants in new areas of settlement pose threats to the stability of the host communities. In this sense, the impact of the drought generated or exacerbated by climate change occurred largely within the confines of the territorial limits of the state (Onuoha and Ezirim, 2010)

In terms of the external dimension, the threat may result from territorial contiguity (regional borders). For instance, prolonged drought in Niger Republic and the Republic of Chad, which share international borders with Nigeria, has generated effects that impinge on Nigeria’s national security. Climate-

induced drought in Niger or Chad has caused food insecurity and unfavorable living conditions in some parts of these countries, forcing their nationals to migrate into Nigeria (Onuoha and Ezirim, 2010).

Understandably, when people no longer have access to basic necessities of life, such as water, food, shelter, or physical security critical for survival, they adapt by switching livelihood systems or migrating to greener pastures. In this context, the national security challenges emerge when the capacity of the receiving communities are stretched to a tipping point where interactions and relations become conflictual rather than cooperative. Consequently, this has to do with the carrying capacity of the recipient communities or states to accommodate high influxes of people for any given period of time. Under such circumstances, climate change-related cross-border migrations tend to cause instability and conflicts as demographic changes shift political, ethnic, or religious balances (Maybee, 2009). In this case, the impacts of climate change for national security in Nigeria are external and are made possible due to contiguous boundaries or territorial proximity.

2. Analytical Framework

The risks that climate change pose to human security arise from multiple and interacting processes. Those processes also operate across diverse spatial and temporal scales. High levels of complexity mean that no conceptual model or theory captures the full extent of the interactions between all of climate change, livelihoods, culture, migration, and violent conflict. However, the framework that will be used to analyze the relationship between ecology and security is the idea of a politics of scarcity (Dyer, 1996; Kegley and Wittkopf, 1997). This idea is very similar to the state-centric view of security. According to the theory of the politics of scarcity, scarcity may develop into international conflict when there is restricted access to vital nonrenewable and renewable natural resources such as oil, coal, water as well as food.

Thomas Homer-Dixon is representative of this school of thought (Homer-Dixon 1991, 1994). Other prominent environmentally concerned theorists and policy advocates who base their arguments in this conception of ecological security are Lester Brown and Jessica Mathews (Brown 1986; Mathews 1989). They stress that global environmental threats or social and/or political disorder can be caused by “environmental refugees” moving across national borders. Richard Ullman extends this concept of

security to include natural disasters including earthquakes (Ullman 1983).

Homer-Dixon and other neo-Malthusian scholars rooted their perspective in the “ecoviolence” maxim that “shrinking resource pie” is supposedly fuelling violent civil conflict by aggravating strained social relationships among different groups sharing common natural resources. They posit that conflict is generated by the scarcity of natural resources in at least two primary ways. First, is the product of total population in the region and physical activity per capita and second, the vulnerability of the ecosystem in that region to those particular activities. For instance, desert encroachment on landmass may produce large-scale migration, which could create ethnic conflicts as migratory groups clash with indigenous (settled) populations. Within this paradigm, we must be aware of the role of population growth, demographic structure, and patterns of population distribution. (Simon, 1981; McNicoll, 1984; Ehrlich and Ehrlich, 1990).

According to Dixon (1994), the sources of environmental scarcity often interact in two distinct patterns namely resource capture and ecological marginalization. Resource capture depicts a situation where a fall in the quantity and quality of renewable resources can combine with population growth to encourage powerful or advantaged groups within a society to shift resource distribution in their favor. This usually produces acute environmental scarcity for poorer and weaker groups whose claims to resources are opposed by more powerful groups. On the other hand, unequal resource access can combine with population growth to cause migration to regions that are ecologically fragile, such as steep upland slopes, areas at risk of desertification, and tropical rain forests. High population densities in these areas, combined with a lack of knowledge and capital to protect local resources, causes severe environmental damage and chronic poverty. The second process is usually called ecological marginalization.

It is clear that many of the renewable resources that sustain life in Sub-Saharan Africa will come under increasing threat as a direct consequence of climate change. As temperatures increase and rainfall decreases, the availability of cropland, forests and water supplies will decline. As local demand for these resources outstrips the available supply, scarcities will ensue which could lead to social breakdown and violence. Resource scarcities can lead to violence because they create cleavages between groups competing over access to, or control over, the scarce resource. If this competition yields an

inequitable distribution of resources, aggrieved parties may turn to violence.

Climate change may exacerbate another underlying cause of violent conflict when viewed in the context of poverty. A large proportion of the population in Sub-Saharan Africa is employed within the agricultural sector of the economy. With rising temperatures and reductions in rainfall, growing seasons and crop yields will likely diminish thereby reducing employment prospects in the sector. Coupled with food shortages and lack of water, it is likely that the rates of poverty will increase. The role that poverty plays in violent conflict can largely be seen as a motivating factor at the individual level. Studies have shown that as people face the risk of poverty or a lack of economic opportunities, the likelihood of them joining an armed struggle increases. The decision to do so can ultimately be viewed as rational given that an armed group may provide them with some level of social status or personal enrichment. As such, they can be preferable alternative to impoverishment

3. The Threat of Climate Change in Nigeria and Niger Republic

3.1 Climate Change and Food Security

Globally, about 821 million people still go to bed on an empty stomach. Even more—one in three—suffer some form of malnutrition (World Food Programme, 2018). The Sustainable Development Goal of Zero Hunger by 2030 is becoming more difficult to reach. Africa's food security situation is particularly worrisome. Of the 36 countries worldwide currently facing food insecurity, 21 are African. More than 300 million Africans are chronically hungry — nearly a third of the continent's population. Of this number, at least 235 million are in sub-Saharan Africa, making it the region on the planet with the highest proportion of chronically hungry people (Kabasa & Sage, 2009). The unimpeded growth of greenhouse gas emissions is raising the Earth's temperature leading to more and more extreme weather events. Extreme weather events, such as high temperatures, heavy rainstorms, and droughts, disrupt crop production. Such climate changes, as well as the loss of land to desertification and increasing ocean temperatures are all elements impacting agriculture. Agriculture is highly dependent on water availability, and temperature change alters rainfall, evaporation, and soil moisture storage. With increasing temperature there has been an increase in water evaporation from the soils with no replenishment, as a result of a decrease in water table. The accelerating pace of climate change,

combined with population and income growth, threatens Africa's rain-fed agricultural economy and food security.

Food security is defined as “when all people at all times have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary and food preferences for an active and healthy life” (Barnett, 2007). According to the 2005 assessment of the International Food Policy Research Institute (IFPRI), food security is achieved when households can reliably obtain food of adequate quality and quantity to support a healthy and active life for its members. International Human Rights law recognizes the right of all people to adequate food. Eradicating hunger also stimulates economic growth, as undernourished people have a reduced capacity for productive work. Large numbers of hungry people that are marginalized from work can also create social instability and conflict (Ugwuanyi, 2010).

Climate change will affect all four dimensions of food security: food availability, food accessibility, food utilization and food system stability. Availability relates to the production of food, in terms of its physical presence in a region. Crop productivity and food stocks, for example, relate to food availability. Access is characterized by the ability of an individual or household to obtain food. This depends on food prices, market accessibility, employment, and distribution of wealth. Utilization is the ability of humans to derive full biological benefits from food, based on nutritional value, socio-cultural value, and food safety. Food insecurity occurs when food systems are stressed such that food is not available, accessible, or utilization is constrained (Thompson et al. 2010). People who are already vulnerable and experiencing food insecurity are likely to be the first affected.

Sahelian northern Nigeria and the Niger Republic are regions highly vulnerable to climate change due to their geographic location at the southern edge of the Sahara Desert. Sahelian production systems are heavily dependent on rainfall: food crop production which is mostly rain-fed and livestock rearing. This dependence is further heightened by the fact that livelihoods in the Sahel are dominated by agricultural activities. Around two thirds of the population depend on agriculture for its livelihood with little or no diversification of other revenue sources. The recurrent droughts of the 1970's and 1980's led to massive losses of agricultural production and livestock; loss of human lives to hunger, malnutrition and diseases; massive displacements of people and shattered economies (Kandji et al., 2004). For

instance, during the 1972-1973 drought in northern Nigeria, about 300,000 animals died and farm yields dropped by up to 60% in Nigeria (Obioha, 2009).

In a study carried out by Ikuomola (2010) a common submission about climate change shows that staple foods of the people have changed with the climate. There are some food items that are no longer available in large quantity. An example is guinea corn, (a smaller variety of maize) used in preparing Tuwo Dawa. Instead, Tuwo Masara, a product from the cheap, bigger variety and readily available maize is today consumed. The high price of the preferred guinea corn (Sorghum) has been attributed to climate change. Also, the amount of produce harvested each year has reduced. According to Alhaji Lawali Zaiyana, former Sokoto State's Commissioner of Environment, farmers in areas affected by climate change who would usually harvest between 200 and 300 bags of millet and guinea corn every year, harvest between 20 and 30 bags (Daily Champion, 2010).

Niger's agriculture focuses primarily on subsistence farming and livestock exports. Over 80% of the Nigerien population is dependent on the crops produced. Niger's agricultural sector is pivotal to the country's economy, amounting to roughly 28% of GDP. The agriculture sector faces numerous challenges and is highly volatile and susceptible to differing weather conditions. Much of the agricultural produce is dependent on a small quantity of rainfall in order to germinate and grow. However, rainfall in Niger is highly unreliable with average rates of rainfall decreasing by over 70% (as it did in 2009) or rainfall failing altogether (MDP, 2010)

Climate change causes higher temperatures and humidity, a boon to pests. Several reports such as Afrol News and Humanitarian International reported that late in the main 2004 rainy season, locusts invaded the agro-pastoral and pastoral zones of Niger, causing substantial but very localized, damage to grasslands and crops. Likewise, the effect of pests was not only experienced by the farmers but the pastoralists who experienced a great loss in fodder, many of whom had to liquidate their cattle. According to a joint mission by Permanent Interstate Committee for Drought Control in the Sahel (CILSS) and some other organisations in October 2004 a fodder deficit in these pastoral areas was 154% greater than the 2000 deficit, and at 4,642,000 tons, was the largest fodder deficit in Niger's history. Locusts caused one-third of this deficit, and two-thirds was caused by drought (Samba, 2010).

The proliferation of pests and crop diseases (again originating with climate change) can hinder storage when the need arises because of temperature increases. The pests, in turn, attack crops and animals. The current warming trend hinders livestock production and reproduction by reducing animal weight gain and dairy production. As well, livestock are usually subjected to long treks to find water and grass in the more southerly areas of the country during the dry seasons. Warming trends also affect the growth of grain crops such as maize, guinea corn, millet, and rice, and makes storage of root crops and vegetables difficult (Ikuomola, 2010).

Climate change also affects the prices of agricultural commodities. In the Kano market of Nigeria, the wholesale price of maize increased by 28.0 percent in the first half of the year due to reduced 2012 supplies. However, prices plummeted by 43.6 percent between June and October as increased supplies from 2013 harvests came on stream, before re-bounding in November, when they rose by 22.6 percent. Notably, despite a 30.9 percent period average decline in prices from January through to November, the prevailing 2013 prices were still above their 2012 levels (Chinganya, Strode, Crawford, Moratti & Schmieding, 2014).

Agricultural production and food security are particularly sensitive to climate variability. Climate change impacts are expected to further increase vulnerability. Climate change-induced yield declines will result in price increases for the most important agricultural crops — rice, wheat, maize and soybeans — with consequent higher feed and meat prices. The subsequent decline in calorie consumption is predicted to increase child malnutrition. Limited research, small holdings, poor infrastructure, susceptibility to drought and extreme weather events represent the principal causes of the threat of climate change to food security in Nigeria and Niger.

3.2 Climate Change and Health

Climate change affects the key determinants of human health – air, food and water. It also influences how frequently people are exposed to physical and biological risks, such as extreme weather and new diseases. Increase in temperature in the Sahel has direct impact on health such as increasing the occurrence of cerebro-spinal meningitis, and also increased incidences of heatstroke and heart and lung disorders. Scarcity of safe drinking water due to droughts is a major contributor to the spread of infectious and water-borne communicable diseases in Africa. Unsafe water and poor sanitation also

contribute to malnutrition, cholera and diarrheal diseases and increase in child mortality. Poor water and sanitation are linked to climate-induced droughts and floods, according to World Health Organization (WHO) and United Nations Children Emergency Fund (UNICEF), account for more than 20 percent of the burden of disease in Africa (Sewankambo, 2009). Diarrhea is the second leading cause of death for African children. The increased ultraviolet radiation exposure resulting from a depletion of stratospheric ozone may increase the risk of skin cancers and cataracts. It is also possible that increased exposure to ultraviolet radiation could elevate levels of Vitamin D, which had been associated with risk for colorectal cancer (Ministry of Health, 2012).

Also, changes in temperature and humidity provide or extend a favorable habitat for insects, such as mosquitoes, tsetse fly, tick, and other pests in areas where they hitherto existed. There has been a reported increase in the prevalence or outbreak of diseases, such as malaria, cerebral-spinal meningitis, and heat strokes in Nigeria. For instance, the World Health Organization (WHO) reported there were about 17,500 cases of “serious” outbreaks of meningitis in the northern part of Nigeria in early 2009. No fewer than 960 people died of the disease, especially in Bauchi, Gombe, Taraba, Yobe, and Zamfara States (This Day, 2009).

In Kano, apart from destruction of seeds, the movement of cattle along rivers and streams exposes them to various diseases, such as blindness (Trachoma) and Guinea worm (*Dracunculus medinensis*). This corroborates Mansur, et al (2007) findings in a survey of 34 communities in Sokoto state, where it was found that 81% of households had refuse and animal dung littered within their compounds. Sixty percent of children had 'unclean faces' and over 85% of households had no access to water within their vicinity. Till date Trachoma and glaucoma in northern Nigeria are still of public health concern. Apart from animal dung around sources of water supply, the long dry season, dusty and hazy weather conditions are major contributory factors fostering various health problems and new variants of pest and insects affecting agriculture in Nigeria. Only recently Nigerian Television Authority (NTA) weather forecast reported that for the first time in the history of Nigeria Maiduguri, the capital city of Borno State had a temperature of 47°C, which was also linked to ailing health of the people and low crop yields (Ikuomola, 2010).

Many airborne diseases will thrive in those areas that become more arid due to drought and higher temperatures. Shortages of food or fresh drinking

water will also render human populations more susceptible to illness and less capable of rapid recovery. Predictions are that the loss of healthy life years due to global environmental change (including climate change) is 500 times greater in Africa than in Europe, and yet health is widely recognized globally as a fundamental human right (Sewankambo, 2009). The excessive heat, increasing water stress, air pollution and suppressed immune system occasioned by climate change will result in increasing incidence of excessive death due to heat exhaustion, famine, water related diseases (diarrhea, cholera and skin diseases), inflammatory and respiratory diseases (cough, and asthma), depression, skin cancer and cataract. These health conditions cause human suffering, which in turn affects the effectiveness and productivity of the labor force.

3.3 Socio-Economic Implications of Climate Change

On the social level, climate change has impacted positively on Western education. The current trend of agricultural produce had made a lot of families to advise their wards to take to Western education so as to be eligible for government jobs. Also, the changes in weather and climatic conditions have brought a lot of techniques such as irrigation practices and fertilizer application into agriculture. Such changes are needed in modern day rearing of animals and cultivation of crops. While it was relatively easy for wealthy farmers to adjust and cope with changes in climatic variations, it was not the case with the poor who constitute the majority of farmers in Nigeria. Poverty plays a major role in the poor yield of farms. More so governmental agencies do not supply fertilizers, insecticides and pesticides when due (Ikuomola, 2010).

According to a farmer in Kano, the dry season lasts between November and March, but lately it starts earlier around September and the effect is still being felt till April/May. There is no gainsaying, the inhabitants feel the brunt, as the rate of hunger and begging has been found soaring in the last decade. The Almagiri system where children are sent begging all in the name of acquiring Islamic knowledge is a common sight in the north. This set of children have also been found to be used in fomenting trouble in most of the ethno-religious crisis in Northern Nigeria (Fakoya, 2009).

The FAO (2005) survey of the 36 states in Nigeria shows that the fraction of Nigerians who had been unable to afford food ‘almost every month’ between January and December 2005 was on the increase. Part

of the problem noted is rising food prices. For example, millet prices rose from about 30 Naira per Kg in January 2008, to about 50 Naira per Kg in December 2008. Prices of other staple foods such as rice and maize also grew alarmingly. In the short term, as noted above, some families did sell or lease their farmlands for survival.

Emphatically in Borno, Sokoto and Zamfara, trans-border crime, movements of people and goods have been on the increase. These states share boundaries with Republic of Niger. Over the years the Nigerian police have been complaining of the in-migration of Negerians into the country through these borders; so also is the case by Nigerien Gerdames. Since agricultural activities are declining, many individuals especially among youths and middle-aged men in Borno, intensified their effort in cross-border trade, and involvement in smuggling activities. Such smuggled items range from sugar, canned beef, alcohol and spirit; vegetable oil, soaps, drugs, textile materials and small arms (Akoroda, 2009).

Important to state also is the fact that most textile industries which also contributed a lot to employment opportunities in the past have packed up. Water shortage was pinpointed as the cause, which over the years has become a problem, not only for water-based industries but also for inhabitants. Water is a major resource needed in textile industries. The Nigerian Tribune noted that the only few surviving ones depend on generators and plants, with a snowballing effect on the cost of production and eventual closure and relocation of industries (Babagana, 2007). The collapse coupled with poor government policies on importation and high prices of locally produced goods have turned Nigeria into a dumping ground for all kinds of textile and fairly used clothes, boosted by activities of smugglers and trans-border crime (Afolayan, 2000).

The weather condition and its consequences were observed to have strained the relationship between Negerians and Nigerians on long time agricultural relations. Most Negerians come to Nigeria as laborers and farmers because desertification has had a long time effect on them as far back as the 1980s. Regarding the skills of hired farm laborers from neighboring countries it was observed that most Northerners prefer the labor of the Negerian because they are more knowledgeable in desert and dry season farming. However, farming is reducing; less of their labor is needed. This does not augur well with them too. Many of these Negerians are becoming aggressive and militant in nature because of the low patronage of their skills. Security report

has also shown that most of the crisis occurring in the north have traces of Negerian Muslims (mostly youths) hired to fight against the Christians and non-Muslim population. The Boko Haram killings brought out these facts in Maiduguri and Jos crisis (The Guardian, 2010).

3.4 Climate Change, Violent Conflict and Armed Banditry

It is clear that many of the renewable resources which sustain life in Sub-Saharan Africa will come under increasing threat as a direct consequence of climate change. As temperatures increase and rainfall decreases, the availability of cropland, forests and water supplies will decline. As local demand for these resources outstrips the available supply, scarcities will ensue which could lead to social breakdown and violence. Resource scarcities can lead to violence because they create cleavages between groups competing over access to, or control over, the scarce resource. If this competition yields an inequitable distribution of resources, aggrieved parties may turn to violence. This notion as championed by Homer-Dixon and his associates has its root in the neo-Malthusian theory. According to Dixon and his associates, the decreasing availability of physical, environmental and land resources such as clean water, good agricultural land for arable and animal husbandry could create a condition of "simple scarcity", "group identity" and "deprivation" in the area, that may provoke violent conflicts of high magnitude due to population movements and scramble for the available resources (Obioha, 2008).

Another scenario which could lead to violent conflict as a result of resource scarcities revolves around the issue of migration. When facing scarcities in their homelands, populations may seek new opportunities by migrating to a different region or country. This could increase the risk of violent conflict in the receiving region as they would experience increased competition between natives and migrants over resources. The arrival of environmental migrants can burden the economic and resource base of the receiving area, promoting native-migrant contest over resources. Pressures are expected to rise with the number of migrants and residents, particularly when resources are scarce in the receiving area and property rights are underdeveloped. Moreover, when environmental migrants and residents belong to different ethnic groups, the migration may promote tension (Rueveny, 2007).

Climate change may exacerbate another underlying cause of violent conflict when viewed in the context

of poverty. As discussed, a large proportion of the population in Sub-Saharan Africa are employed within the agricultural sector of the economy. With rising temperatures and reductions in rainfall, growing seasons and crop yields will likely diminish thereby reducing employment prospects in the sector. Coupled with food shortages and lack of water, it is likely that the rates of poverty will increase. The role that poverty plays in violent conflict can largely be seen as a motivating factor at the individual level. Studies have shown that as people face the risk of poverty or a lack of economic opportunities, the likelihood of them joining an armed struggle increases. The decision to do so can ultimately be viewed as rational given that an armed group may provide them with some level of social status or personal enrichment. As such, they can be preferable alternative to impoverishment (Clendinning, 2012).

Like the broader West African Sahel, Northern Nigeria and Niger have suffered environmental degradation caused by successive years of poor rainfall and recurrent droughts, exacerbated by the combined effects of natural population growth and in-migration. With the growing population, more land is being cultivated and less is available for pasture and traditional land use systems that rely on mobility. As average rainfall decreases, pastoralists have migrated south into land occupied by sedentary farmers. While both pastoralists and sedentary farmers believe that water is a gift from God, the farmers believe that since they paid for the construction of the wells to serve domestic and irrigation needs, the pastoralists should not use the wells to water their cattle. The sedentary farmers also believe that the pastoralists deliberately bring cows to feed on their crops instead of grass. However, the pastoralists accuse the farmers of deliberately cultivating crops on the cattle paths in order to seek compensation from the pastoralists and increase their income, particularly during droughts. The perceptual difference of both groups appears to amplify the conflict situation (Nyong, 2007).

Climate-induced drought does not pose its greatest challenge on the desert edge, where few people live and there is little productive activity. Rather, attention is needed in higher rainfall zones where dense human and livestock populations put considerable pressure on the available resources. Displaced from their traditional habitat by the erosion of their resource base, the pastoralists from Niger increasingly push into Northern Nigeria. They enter the region as temporary refugees; some eventually settle and enter into competition with the host population, and many others simply to take to armed banditry and other crimes (Mamman & Peters, 2011).

According to the Police, there are three categories of armed bandits which include the local ones known as Kwanta Kwanta, the Udawa made up of foreign herdsmen who cross the border into Nigeria and the Tubawas who consist of Negerien and Chadian rebels that sneak into Nigeria through the porous borders in Yobe, Borno and Adamawa states. The threat posed by these migrants manifest itself in many incidences of armed banditry attacks in the North East zone of the country (Birai, 2011). The murder of over forty farmers in Taraba and Adamawa states in January 1998 marked the beginning of criminal activities against host communities. The death toll has reached over 1000 since then. Cross-border raids for cattle and for other property are launched regularly from time to time within the zone. It was reported that about 1,230 livestock including 916 cattle, 264 sheep, 45 goats, six donkeys and three camels were recovered from fleeing Udawa cattle rearers in Gombe state (Mamman & Peters, 2011).

A review of some recorded incidents of armed banditry in the North East zone is necessary to highlight the gravity of the problem. Between December 1998 and early June 1999, over 100 persons were killed while huge amounts of money, livestock and other valuables were lost to the bandits. There were violent clashes in mid-December 1998 between Udawa herdsmen and farmers at Mai-Kawo, Dabba Dasa and Bane Dela/Tsando communities in Gombe state during which nine people lost their lives (Mohammed, 2011).

On January 1999, armed bandits suspected to be nationals of Niger and Chad Republics attacked some villages in Shangom Local Government Area (LGA), killing three persons and carting away large number of cattle. A few days later on 24th January, a group of fifty armed bandits from Chad and Niger attacked a village in Billiri LGA of Gombe state killing four persons and torching several houses.

Again, in February 1999 a group of foreign bandits raided Ladu Dumba, a market in Abadam LGA, Borno, deflated the tyres of vehicles in the market and robbed their victims of considerable amounts of money and other valuables. During this incident, one person died while two others sustained injuries. Then on 23rd February, well-armed bandits, suspected to be nationals of Niger Republic of Tubawa and Dabawa origin, attacked indigenes of Zumiguin Yusufari Local Government, Yobe State killing two soldiers attached to the state anti-crime outfit. Later, on 9th April, about forty Tubawa armed bandits from Niger Republic and Chad that had earlier terrorized Plateau and Bauchi states descended on Gana and Zayi

villages in Fika LGA, Yobe state. On 3rd May, about 200 armed Fulani cattle rearers attacked Any LGA in Jigawa state and set several houses ablaze. During this attack three persons were killed while nine elders were wounded. The next day 14th June, about 500 cattle rearers armed with dangerous weapons raided some villages in Karim-Lamido LGA, Taraba state, killing one person and wounding the village head of Rafin Toba (Mohammed, 2011).

Climate change is no respecter of persons, states, regions or continents. Given the uniqueness of northern Nigeria and Niger, the security threat posed by climate change is dependent on a number of variables that may interact with the prevalent environmental stressor in the area. Climate change has and is still affecting farms and people in northern Nigeria and Niger economically, socially and otherwise. Incessant agitation for scarce fertile lands for farming between farmers and pastoralists in the two countries and the corollary effect on the number of displaced persons call for urgent attention.

4. Concerted Efforts at Mitigating Climate Change and its Effect in Nigeria and Niger

A project titled “Integrated Ecosystem Management of Trans-boundary Areas between Nigeria and Niger” was initiated by Nigeria and Niger, following the concern raised by both governments over persistent land degradation. Both countries noted that the trend had increased the vulnerability of the local communities to environmental change and were determined to reverse the trend through the project. The project is a Global Environmental Facility-funded project aimed at creating conditions for sustainable integrated ecosystem management and thereby improving livelihoods in areas covered by the Maiduguri Agreement between the two countries. The areas are the Komadugu-Yobe, Tagwai-El Fadama, Gada-Gulbin, Maradi, and Maggia-Lamido catchments (Agence de Presse Africaine, 2013)

The project is in harmony with the development priority thrusts of the two countries, particularly as it relates to their national efforts to reduce poverty and sustain the environment. The total value of the project was put at 29 million dollars. Global Environmental Facility (GEF), the main financier, approved the eight-year project in August 2005, while implementation started in April 2006. The first phase of the project that commenced in 2006 ended in June 2010 while NNJC was still negotiating with the principal donor GEF on the second phase. According to the Secretary General of the

Commission Kabiru Garba, The Nigeria/Niger Joint Commission for Cooperation (NNJCC) launched the project with a sum of US\$28 million. Garba indicated desertification, hunger and rural poverty as some of the problems affecting the ecosystem, and these were of great concern to the Commission (The Nation Archives, 2013). Also, Prof. Emmanuel Oladipo, Regional Coordinator, Nigeria-Niger Joint Commission for Cooperation (NNJC), said The Commission has so far spent five million dollars (about N585 million) on the Integrated Ecosystem Management in the trans-boundary areas (Agence de Presse Africaine, 2013).

Aid as an instrument of foreign policy became prominent in Nigeria’s African diplomacy as from the early 1970s. In spite of the strongly humanitarian dimension of Nigeria’s aid to Niger, there is no doubt that these were equally intended to promote harmony within the diverse security issues existent between them. Nigeria’s aid has sought mainly to guarantee food security to this drought-stricken country. Apart from bringing immediate relief to the Nigeriens, the drought aid has always been intended to help Niger rehabilitate both its livestock and agriculture whose products find a ready market in Nigeria. In 1974, the Federal Military Government made a donation of various relief materials to the tune of 250,000 to the Republic of Niger (The Sunday Observer, 1974). Also, in 2000, the Federal Ministry of Health donated 50,000 doses of Cerebro Spinal Meningitis (CSM) vaccines to the Republic of Niger (The Guardian, 2000). In 2005, Nigeria delivered more relief materials to Niger. Niger Famine Relief Committee headed by the Speaker of the House of Representatives, Alhaji Bello Masari, delivered 30 trucks of assorted relief materials to the famine-stricken people of Niger Republic (This Day, 2005). Nigeria also in 2006, donated 1,000 pieces of Personal Protective Equipment (PPE) 20 knapsack sprinklers and 1,000 disposal bags to the Republic of Niger (The Guardian, 2006).

Most significant though is the industrial cooperation between Nigeria and Niger. In January 1972 Nigeria agreed to supply about 30,000 kilowatts of electric power to Niger from its Kainji dam. The construction of the grid through the 600 kilometres separating Kainji from Niamey and the greater part that runs through Nigerian territory has facilitated Nigeria’s electrification program (West Africa, 1972). The success of this scheme no doubt influenced the two states to reach agreement in 1988 to construct a 132 Kilovolt-power extension project from Katina to Maradi in Niger (The Guardian, 1988). As part of the industrial cooperation, Nigeria has invested directly

in Niger's mining sector. Nigeria's participation in Niger's iron ore, phosphate and uranium mining is well within its overall objective of solidifying intra-ECOWAS links. At the same time Nigeria needs Niger's iron ore and phosphate for its Ajaokuta Steel Complex and fertilizer plant at Kaduna respectively (Nwokedi, 1992).

Desert encroachment on farmlands has forced a lot of youths and unemployed adults to migrate and seek non-agricultural employment in urban centers and neighboring countries as well as deviant survival strategies such as crime and prostitutions. Prior to the creation of the National Boundary Commission in 1987, Nigeria had entered into various trans-border cooperation agreements with the aim of curbing the menace of trans-border crime. One of such arrangements was the International Joint Patrol (IJPTL) Accord signed in Abuja in 1984. With the creation of the National Boundary Commission, Nigeria was able to introduce a well-articulated policy on boundary management. The Commission that serves as an advisory agency for government, assumed the coordination of the activities of government bodies, whose functions were relevant to boundary matters. There were various trans-border agreements between Nigeria and Niger that are under the purview of the Commission (Bobbo, 2011).

Under the auspices of the Nigeria-Niger Joint Commission for Cooperation (NNJC), the Committee of Experts alternates its yearly meeting in Nigeria and Niger. Some of the items that featured prominently on the Committee's agenda during the meeting held in Argungun, Kebbi State, in 1998 included: incessant raids by armed bandits on Nigerian villages along the border, and incursions of Niger security agents into the Nigerian territory along the border. The meeting among other things resolved to intensify cooperation between the two countries in the areas of exchange of information on security matters and to harmonise their regulations on car-theft and illegal receipt of vehicles. The Judicial Convention that would provide the legal framework for the regulation of these activities was signed by both countries in 1990 but was yet to be ratified by Nigeria (Bobbo, 2011).

5. Recommendations

The Nigerian and Nigerien political leadership should securitize the issue of environmental degradation in the country by paying increased legislative, policy, and fiscal attention on preserving the integrity of the environment. In addition, the security consequences of climate change should be fully integrated in the

national security and national defense strategies in Nigeria and Niger to provide for proactive measures for responding to climate shocks that may come from the territorial borders.

Governments, at all levels (federal, state, and local) in both countries, must intensify action on promoting environmental education and monitoring as key interventions strategies for mitigating and managing climate change-related disasters. Environmental education involves a conscious effort aimed at imparting individuals with knowledge, skills, values, and awareness of the changes in the environment. Hence, environmental education, with specific attention on climate change, must be integrated in academic curricula of schools in both countries.

There is the need for the emergence of a community of climate actors, cutting across philanthropic individuals, civil society groups, faith-based organizations, academic institutions, community-based organizations, government agencies, and international organizations to lead the challenge of creating the necessary environmental awareness among the citizens. Avenues, such as schools, churches, village assembly, the mass media, the internet, and other for a of interaction and communication could be used to share information, ideas, and lessons that would help both the urban and rural dwellers, as well as literate and illiterate citizens, to better understand the changes in their environment and how to adapt indigenous knowledge and resources to withstand, cope, and recover from environmental hazards.

The federal government in both countries should move quickly to strengthen all environmental regulatory institutions and agencies in the country through enhanced capacity building, greater funding, and inter-agency collaboration to improve their effectiveness in preserving and monitoring environmental trends throughout the country. This would enable these agencies to offer professional advice to governments, organizations, communities, groups, or individuals regarding climate change-related developments in the country. The Nigerian and Nigerien government should increase funding of research, seminars, and conferences in the area of climate change to generate ideas, best practices, and technologies that could help protect and preserve the environment.

In addition to supporting and implementing international conventions and protocols (such as the Montreal, Kyoto and Paris Protocols) aimed at combating climate change, the Nigerian government

must begin to enforce stringent legislation for promoting environmental best practices in natural resource exploitation, such as ending gas flaring that contributes significantly to carbon emission. This should be complemented with greater investment on the development of other potential sources of clean energy, like wind power and solar energy. This will reduce the country's reliance on hydrocarbon fuels, such as petroleum products, coal, and fuel woods, which contribute significantly to carbon emissions. The creation of alternative means of generating energy will equally help to prevent wanton cutting of fuel wood as a source of energy by local inhabitants; an action that has greatly contributed to the increasing desertification in northern part of the country.

Nigerian government, in partnership with environmental groups and local communities, should undertake a national greening program to help protect and preserve the environment. The program should emphasize aggressive tree planting in the country, as well as the combating of bush burning and deforestation. Tree planting is one of the sustainable ways of controlling climate change because the growing of trees halts erosion and degradation, protects water resource, and reduces carbon emission.

Above all, the drought and flood do not respect national boundaries; therefore, stronger bilateral efforts by Nigeria and Niger should be encouraged in order to deal with the menace of climate change.

6. Conclusion

Climate change has been shown to be a reality particularly in the Sahelian states of Northern Nigeria and that it has security implications for the country in its relation with the Republic of Niger, its neighbor to the North. We have seen how these two countries are tackling the challenges posed by climate change individually and cooperatively. More so, climate change is not restricted to the field of science and only an interdisciplinary approach linking studies of environmental, political and socio-economic spheres can help one understand the full dimensions of this phenomenon. Added to this is that climate change is not a problem one country can solve on its own as floods and droughts know no national boundaries. Therefore, multilateral cooperation is necessary to combat climate change and its overall effect on livelihood in the Sahel region of Nigeria and Niger Republic.

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