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Climatic Change and National Security: Exploring the Conceptual and Empirical Connections in Nigeria

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ABSTRACT

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. Despite being the most profound of the environmental change problems confronting the world at large, with disproportionate impact on Asia and Africa, there is relatively little research that explores the ramifications of climate change for national security in Nigeria. This paper maps the possible connections between climate change and national security with particular reference to Nigeria. It further examines the key environmental trends that serve as 'stressors' for the transmission dynamics of security threats posed by climate change to the country. It concludes with a range of recommendations on how Nigeria could mitigate the security threats posed by climate change.

Key Words: Climate Change, National Security, Strategic Fragility, Stressors, Territorial Contiguity.

INTRODUCTION

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. Increasingly, there is emerging consensus among development practitioners, scientists, policy-makers, governments, and scholars that climate change is the biggest contemporary challenge facing humanity in the 21st century.

In terms of broad geographical regions, the Intergovernmental Panel on Climatic Change (IPCC) has found that Africa is already feeling the effect of climatic change and will experience more changes in the years ahead; yet, the continent has limited ability to adapt (IPCC, 2007). The cruelest irony of climate change is that the regions (in particular the poor and vulnerable groups living in these regions) that emit less of the greenhouse gases (GHG) – significantly responsible for climate change – suffer the worst impact of climate change. For example, in 2004 Africa, then with almost 920 million people, contributed 7.8% of GHG emissions, while the USA and Canada, with 326 million people, contributed 19.4% of emissions. Put differently, Africans contribute less than one ton of CO_2 per person per year, compared with the 19.9 tons CO_2 per person per year contributed by Americans and the 8.2 tons by Europeans (Cilliers, 2009). Yet Africa's people and natural ecosystem are among the most vulnerable to the effects of climate change. A study by the UK Department for International Development (DFID), which estimates the effect of climatic change on Africa by 2050, indicates that

Southern Africa and the Sahel, the Great Lakes region and the coastal zones of Eastern and Western Africa, will be chiefly at risk (DFID, 2006).

Although climate change is a global phenomenon, its threat and vulnerability differ not only from one continent to another, but also among sub-region, countries, and even communities. Despite its disproportionate impact on Africa, most extant studies on climate change and security have emerged essentially from developed countries. In this regard, exploring how climate change impacts on security in Nigeria is crucial, partly because of two reasons. First, Nigeria's population constitutes about 20% of the total population of sub-Saharan Africa. As such, the dynamics of its internal security and stability has regional and continental ramifications. Second, the country is characterized with such negative human development indices like, high poverty and unemployment rate, wide income and gender inequality, prevalence of diseases (HIV/AIDS and malaria), endemic corruption, and the existence of separatist and militant groups. This prevailing situation foregrounds much of the internal security complex and dynamics that climate change is set to trigger or exacerbate in Nigeria.

In light of this, this article explores the ramifications of climate change for national security in Nigeria with the following questions: Is there any linkage between climate change and national security; and if yes, how do we explain such linkage(s)? Are there identifiable environmental trends that act as 'stressors' or pathways via which climate change undermines national security in Nigeria? What measures could be adopted to mitigate or adapt to the challenges posed by climate change in Nigeria? The remainder of this article attempts to proffer answers to these questions.

CONCEPTUAL EXPLICATIONS

The concepts of climate change and national security are pivotal in this paper and therefore the way in which they are understood here needs to be clarified.

Climate change refers to any change in climate overtime, as a result of either or both natural variability and anthropogenic factors. Article 1 of the United Nations Framework Convention on Climate Change defines climate change as: 'a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods' (UNFCCC, 1992).

Climate change is caused by increasing concentrations of greenhouse gases (GHG) in the atmosphere. Greenhouse gases include any gas in the atmosphere that is capable, as a result of its particular molecular structure, of absorbing infrared radiation or heat. They are called greenhouse gases because they display effects similar to that in a 'greenhouse'. The glass in a 'greenhouse' allows the sunlight to pass through but trapping the heat formed and preventing it from escaping, thereby causing a rise in temperature.

The gas responsible for the most warming is carbon dioxide, also called CO_2. Other important greenhouse gases include water vapor (H2Ov), chlorofluorocarbons, methane, nitrous oxide, ozone, and halocarbons, which is more commonly associated with the ozone layer and ultraviolet radiation released from landfills and agriculture, and the loss of plants that would otherwise store CO_2. The increasing concentration of chlorine and bromine atoms, which originates from man-

induced emissions of chlorofluorocarbons (used in air conditioners, refrigerators, aeroscis, foams, and sterilants) and haloes (used in fire extinguishing equipments), significantly contributes to global warming by exacerbating the thinning of the ozone layer meant to shield the planet from excessive heat.

The main GHG, carbon dioxide, is emitted when fossil fuels, like coal and oil, are burned. Since the industrial revolution, fossil fuel use has increased significantly. Due to these emissions, as well as changes in agriculture, land use, and socio-economic/industrial activities, atmospheric GHG concentrations have risen sharply. For instance, 'the concentration of CO_2 in the atmosphere has increased by around one-third, from 280 parts per million (ppm) in 1750 to 368 ppm in 2000' (van Aalst, 2006).

These GHG trap the heat in the atmosphere by preventing terrestrial radiation from escaping into space; thereby continuously warming the atmosphere. This gradual, but smoldering process, of warming the atmosphere is what is usually referred to as global warming. Hence, as more GHG are trapped in the atmosphere, it leads to the increasing warming of the globe, thereby resulting in different climate 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, an increased frequency and intensity of extreme weather events, and an extended range of tropical diseases (Melinda, 2005).

The issue of security is one of the basic pre-occupations of every individual, community, or state. In this wise, it is common, therefore, to see references being made to human security, community security, state security, societal security, national security, among others. In this context, the concerned is on *national security.* For long, the idea of national security has been defined from a state-centric, militaristic, and strategic perspective, especially during the Cold War era. In this wise, Lipman argues that a 'nation is secure to the extent that it is not in the danger of having to sacrifice core values, if it wishes to avoid war, and is able, if challenged, to maintain them by victory in such war' (Lipman, 1943). Thus, national security was couched in esoteric terms, and equated with the security of the state or the regime in power. Even though the state-centric and militaristic conceptualization of national security dominated much of security discourses and analysis in the Cold War era, the need for its redefinition has long been canvassed by scholars (Al-Mashat, 1985; Thomas, 1987).

With the end of the Cold War and the emergence of other non-conventional threats to security, such as diseases and natural disasters, the narrow interpretation of national security is gradually giving way to a more broad definition that is reflective of the multi-dimensional nature of security – economic, cultural, technological, epidemiological, political, environmental, and military variables. National security, as used in this paper, refers to the capacity of a state to promote the pursuit and realization of the fundamental needs and vital interests of its citizens and society, and to protect such from threats which may be economic, social, environmental, political, military, or epidemiological in nature (Onuoha, 2008a). National security is an ensemble of two key elements: human security and physical/state security. While the human security dimension focuses on improving the existential conditions of citizens of a state by preventing or mitigating threats to human safety and survival, the physical security dimension hinges on the protection of the territorial integrity of the state, including its vital national assets.

In this sense, national security is both *qualitative* and *dynamic*. In its qualitative sense, it encapsulates the unending drive of the state for improvement in the wellbeing of citizens as well as the protection of lives, property, and resources within its defined territorial boundary. It is dynamic in the sense that its broad contours oscillate with emergence of new threats or the transformation of old threats, which may come from within or outside the territorial borders of the state. In other words, as the political, economic, military, and social causes of threats change, so does the national security posture of a country change (Okodolor, 2004; Ezirim, 2008a). Given the qualitative and dynamic nature of national security, a country is secure to the extent that the political leadership is able to anticipate, recognize, and respond effectively to these multifarious threats, using the available national resources to ensure the safety of life and property of the citizens, and guarantee the integrity of its territorial boundaries as well as its strategic assets, both within and outside its territory.

CLIMATE CHANGE AND NATIONAL SECURITY LINKAGES

The relationship between climate change and security has become a subject of growing public debate and academic inquiry, leading to the outpouring of scholarly literature (Garcia, 2008; Maybee, 2008; Kuwali, 2008; Podesta & Ogden, 2007; Barnett, 2003; Stripple, 2002). States, as well as international and regional organizations, are equally engaging with issues surrounding the relationship between climate change and security. On April 17, 2007, for instance, the United Nations Security Council held it's first-ever debate on the impact of climate change on peace and security (UN Department of Public Information, 2007). This demonstrates the recognition by the international community that climate change is a serious threat to national and international security.

Familiarity with extant literature suggests that one dominant way of interpreting the ramifications of climate change for national security is to view climate change basically as a *stressor* factor in the matrix of security challenges to a state. A recent report aptly interprets climate change as a "threat multiplier of instability" (Military Advisory Board, 2007). In this sense, climate change constitutes a threat to national security to the extent that it can exacerbate tenuous security situations or induce new shocks, which significantly alter social order in a society, constrict national revenue, and unsettles the political system. In this sense, 'the threat to national security is the combined assault on societies, economies, and governments by the different global climate change effects' (Maybee, 2008).

Climate change may not constitute an instantaneous and direct threat to a state. However, it introduces a whole new and more serious matrix or events that undermine human livelihood, safety, and survival. For example, long-simmering environmental trend, such as coastal flooding and erosion, could be taking place within a state without significantly posing a threat to the survival of individuals, groups, or communities within such a state. When these challenges remain insufficiently addressed, if not entirely ignored, they become serious security threats when climate change amplifies their impacts in terms of an increase in scale and extent of damage it generated. Thus, climate change constitutes a security issue to the extent that it poses existential threats to key empirical referents that embody the idea of national security – individuals and state. In other words, the effects of climate change have the potency of undermining the safety and survival of the designated referent objects, requiring the state to mobilize national resources or adopt measures to prevent, mitigate, or attenuate these existential threats.

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 challenges

posed by climate change inhere in the environmental trends that are occurring in such a state and their impacts are limited to the state. This arises principally due to low *adaptive capacity or institutional weaknesses* in a 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.

In terms of the external dimension, the threat may result from *territorial contiguity* (regional borders) or *strategic fragility* (global shocks). Whichever form the external dimension manifests, the irreducible minimum is that the sources of security threats posed by climate change emanated from environmental trends or shocks that are occurring outside the territorial borders of such a state but the impacts are unsettling for the state, or states afield. The case of climate change-induced drought can also be used to illustrate the argument on territorial contiguity. For instance, prolong 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.

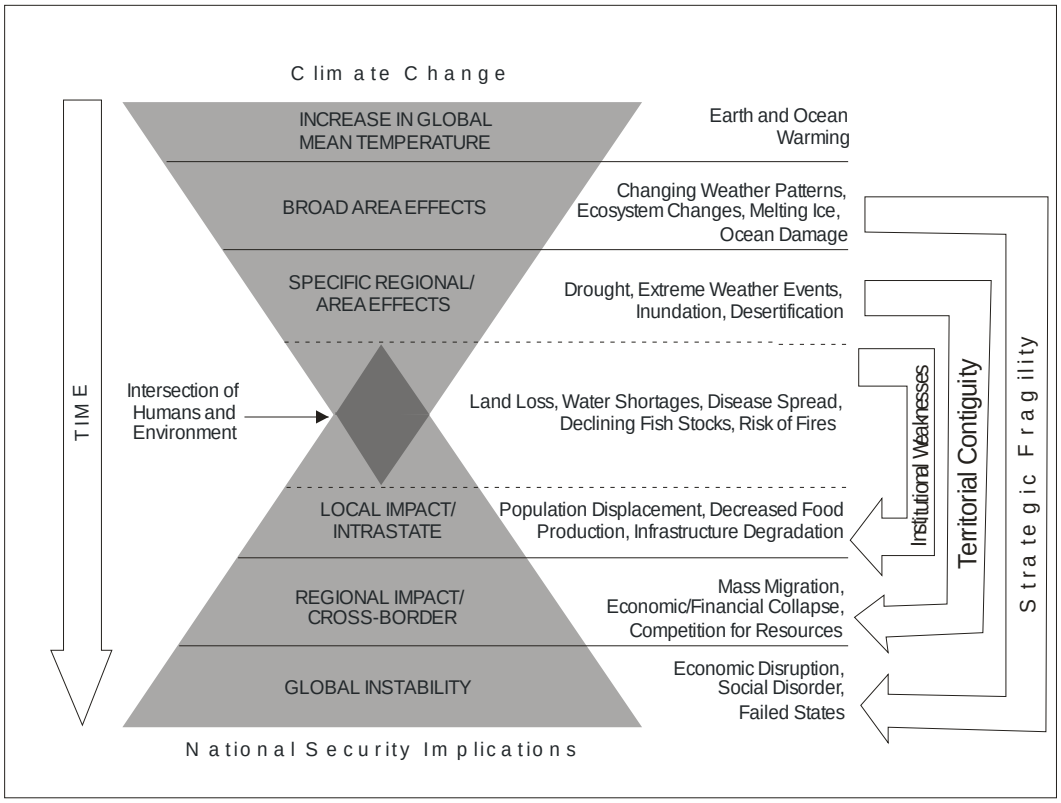
Understandably, when people no longer have access to basic necessities of life, such as water, food, shelter, or physical security critical for survival, they adapt by switching livelihood systems or migrating to greener pastures. In this context, the national security challenges emerge when the capacity of the receiving communities are stretched to a tipping point where interactions and relations become conflictual rather than cooperative. And 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, 2008). In this case, the impacts of climate change for national security in Nigeria is external and were made possible due to contiguous boundaries or territorial proximity.

Beyond threats to national security, posed by contiguous borders, the growing interdependency of the global economy and the ripple effects climate change generates can also undermine national security by exacerbating *strategic fragility*. Strategic fragility refers to the vulnerability of a state to threats or a shock resulting from the state's growing reliance on infrastructure, services, and goods that comes from outside its economy (Miller & Lachow, 2008). As an example, climate-induced floods in Asia can destroy food (e.g. rice) production, with security implications for other countries that significantly depend on imported food items. This would manifest in the form of rising food prices (food insecurity) with consequent increase in poverty, hunger, malnutrition, crime, and spiraling social instability. The food crises that hit 36 countries around the globe in mid-2008 have been attributed to high oil prices, market liberalization shocks, and climate change (World Bank, 2008; Saidi, 2008). The growing interdependence of the global economy suggests the intricate relationship that exists between climate change and security, irrespective of the region the climate shock originated.

This explanation holds for all measurable aspects of a state's vulnerability, which comes with dependence on foreign goods and/or services that are vulnerable to climate change. Climate change-induced shocks that significantly impact

Nigeria's oil infrastructure can unsettle America's security, particularly if it coincides with the period of economic downturn or a grave external security threat, like a terrorist attack. This is essentially because the US imports nearly 70% of its oil. In an era of dramatic climate change, it is predicted that the increased frequency of major storms will lead to more damage to off-shore oil rigs and coastal refineries, while oil tanker shipments will be delayed by weather events (Podesta & Ogden, 2007). By causing supply disruptions and contributing to instability in some oil producing regions, the resultant effect would be upward pressure on oil prices with consequences for states that depend on imported oil. The effect would cascade through the American society by constricting the viability of the national economy and generating unanticipated social problems. The result is that the declining economy will create conditions propitious to internal unrest, which is unhealthy for US national security. In this way, the threat to US national security derives partly from America's *strategic fragility*.

Figure 1: National Security Threats from Climate Change Continuum



Source: Authors' modification of Maybee (2008)

The above analysis demonstrates the climate change-national security nexus for a state and it is expressed figure 1 above. However, the connection between climate change and national security is complex, non-linear, and, at best, uncertain. Nevertheless, its implications for national security are more pronounced in states and regions of the world where environmental and natural resource challenges have added greatly to the matrix of political, socio-economic, religious, and cultural tensions threatening the survival of people and the stability or legitimacy of the state.

CLIMATE CHANGE AND NATIONAL SECURITY: SOME ENVIRONMENTAL TRENDS IN NIGERIA

Nigeria is one of the African countries that are vulnerable to the adverse consequences of climatic change. It has been noted that Nigeria will suffer from climate-induced drought, desertification, and sea level rise as a result of climate change (Podesta & Ogden, 2007). It could be stated on the onset that climate change implicates national security in Nigeria by amplifying the intensity and impact of environmental trends on individuals, groups, or communities in the country. Trends that undermine the quality and resilience of the natural environment undermine a national security by expanding the margins of demands, insecurity, and instability that confront the state. This section highlights the key environmental trends that act as stressors for the Nigerian state.

The environment provides the natural support systems on which human beings and states depend for survival and economic mainstay. To this extent, the quality of the natural environment is critical for social harmony, economic viability, political stability, and, ultimately, for national and international security. However, there is often a delicate balance between human society and the natural environment, which is usually determined by the way and manner in which society exploits or manages the resources of the environment. In Nigeria, environmental hazards, such as increasing drought, soil erosion, coastal flooding, and heat wave in different parts of the country serve as the stressors on security in Nigeria.

Unfortunately, both systemic and spot surveys also indicate that only a very small fraction of Nigerians are aware of the seriousness of the environmental trends which are ravaging the country (Okpara, 1993). Only recently, President Yar'Adua revealed that Nigeria loses about $5.1 billion annually due to environmental degradation (*ThisDay*, 2008). Although the local people and communities have lived with these hazards for many years and have evolved ways of dealing with them, climate change is already exacerbating their impact with consequences for security and stability in Nigeria.

Desert Encroachment and Drought

Climate change is exacerbating drought and aridity in the sahelian zone with consequences for Nigeria. The northern part of the country, especially the northeast zone, has been the worst hit by these environmental trends (Onuoha, 2008b). Climate-related drought in the region is hastening desert encroachment, which is gulping most states in the north - Sokoto, Kebbi, Kano, Jigawa, Bauchi, Yobe, and Borno states. Further southwards, fast moving desert conditions have caught up with Adamawa, Gombe, Kwara, Kogi, Nasarawa, Niger, and Plateau states. This has significantly affected vegetation and pastures in the north. Consequently, desertification has virtually affected the entire savanna landscape of the country (*The Guardian*, 2008).

As cropland becomes unproductive and previous settlements become unlivable as a result of harsh environmental condition (drought, desert encroachment, and desertification), people will be forced to compete for available arable land or migrate to a new settlement. Against this backdrop, the rate of migration and cross-border movement in the northern region (with international borders with the Republics of Cameroon, Chad, and Niger) has intensified with serious implications for resources and identity conflicts in the region, and even beyond. Both the competition for scarce resources (arable/grazing land, fresh water, etc.) and *ecomigration* triggered or exacerbated by climate change-induced shrinkage of Lake Chad, underpin actual and potential conflicts in some parts of the northeast zone of Nigeria.

The incidence of drought in the north over the years, coupled with the shrinkage of Lake Chad partly due to climate change, has made the seasonal movement of the Hausa/Fulani cattle pastoralists to the southern part of Nigeria to become relatively more permanent. Before, these pastoralists migrate to the south during the dry season and move back to the north during the rainy season. However, because of the deteriorating environmental situation in the north, many of the pastoralists are now settling down in some areas of southern Nigeria, like Ilorin, Ogbomoso, Shaki, Ubakala, Uzo-Uwani, and Oyo. This has contributed to resource conflicts in these areas with the potency to spill over to ethnic clashes (Onuoha, 2010: 34).

Soil Erosion/Flooding

For many communities in Nigeria, especially the southeast zone (Abia, Anambra, Ebonyi, Enugu, and Imo States), erosion and the associated flooding constitute serious environmental hazards. Different types of erosions, such as sheet, rill, and gully, are pervasive in the zone. However, gully erosion constitutes the most significant threat to the survival of individuals and communities. In this area, both active and inactive gullied surface areas range from 0.7 km for Ohafia and 1.15 km for Abiriba in Abia State. The width of the gullies ranges between 2.4 km for Abiriba and 0.4 km for Ohafia. A minimum depth of 120 km gullied surface has been recorded at Abriba (Jimoh, 2006).

In Anambra State, for instance, about 61 active erosion sites had been documented in the 177 communities, which is estimated to gulp over N 17 billion (naira). One of such erosion sites in Umuchiana-Ekwulobia has submerged 75 buildings and displaced about 437 families (Collins, 2008; Ujumadu, 2008). In 2008, for instance, erosion washed off the rail line linking Aba and Port Harcourt, leading to a decline in economic activities in Aba, Abia State. Soil erosion has destroyed many communities and rendered about 200,000 homeless as internally displaced persons in Abia, Enugu, and Anambra states of southeastern Nigeria (*Vanguard*, 2008; APRM, 2008).

Pervasive erosion in the region is a product of both natural and anthropogenic factors. Human activities, such as bush burning, deforestation, improper farm practices, and, more importantly, construction activities (building of house, industries), that undermine natural landscape or drainage systems account for much of the erosion menace plaguing the region. However, given the unconsolidated underlying geologic formations in these areas, rainfall intensity and duration is the most important natural cause of soil erosion (Okpara, 1993).

Increase in the frequency of heavy rains and flooding had lead to widespread erosion and siltation with more dramatic impact on these areas. Its impacts include destruction of valuable property, loss of livelihood, loss of soil nutrients and biodiversity, productivity collapses, and loss of flora and fauna (e.g. fishes in rivers and streams) due to the transportation of sand deposits or pollutants to other natural ecosystems. Loss of productivity and valuable property undermine food security, personal security, and social order in a community with consequences for internal displacement.

Although climate change may not be the direct cause of soil erosion in most parts of the country, it is already amplifying its impact due to severe precipitation (AIT News Hour Report, 2008) . Consequently, unchecked or severe erosion has lead to increased demand by the local people on governments (federal, state, and local) and when poorly managed has precipitated conflicts. In March 2008, for instance, it took the combined efforts of men of the Anambra Police Command,

State Security Service, Nigeria Security, and Civil Defense Corp (NSCDC), and Federal Road Safety Corp (FRSC) to prevent a group of aggrieved local residents from staging a 3,000-man protest in Awka, Anambra State because of the Iyiagu erosion/flood disaster (Onuchukwu, 2008). Given the apparent weakness in the processes and institutions of governance in Nigeria, this kind of protest could turn violent in the future as climate change exacerbates the intensity and damage caused by erosion.

Coastal Erosion/Flooding

Coastal erosion and flooding is the most important environmental problem pervasive in the south-south zone of Nigeria – commonly referred to as the Niger Delta. Nigeria has a coastline of approximately 853 km, and the Niger Delta accounts for about 450 km of the coastal zone. Over 75% of the 30 million inhabitants of the Niger Delta region live along the coastal area and survive mainly on fishing and agriculture. The problem of coastal erosion/flooding due to sea-level rise and storm surges constitute a significant source of threat to life, property, livelihoods, and infrastructure in the Niger Delta region (Ezirim, 2008b). And this is made worse by the destruction of mangrove forests due to oil exploitation activities. Flooding is widespread in the Niger Delta because of low relief, the reduced hydraulic capacities of water channels, and high rainfall. In the mangrove swamp forest areas, diurnal tidal movements result in floods exacerbated by rising sea levels, coastal erosion, and land subsidence (UNEP, 2006).

Interestingly, it has been noted 'that severe flooding in the Niger Delta has become more frequent with floods wiping out crops and disrupting traditional farming practices' (Best & Lawson, 2008). Worst still, a UN report has estimated that about 30% of Africa's coastal infrastructure, including coastal settlements in the Gulf of Guinea, Senegal, the Gambia, and Egypt, could be inundated by 2085 due to climate change (UNEP, 2006). Although scientists generally dispute the warning that sea levels will rise by 2 meters by the year 2010, it is strongly estimated that a 0.2 meter rise in sea level would lead to displacement of about 200 villages in the Niger Delta region, a projected sea level rise of more than 1 meter could flood much of the Niger Delta and force up to 80 percent of the delta's population to higher ground, with a consequent property damage that the IPCC estimated at $9 billion (World Bank, 1996).

In the event of this, the very constituency – the poor people and local communities of the Niger Delta – that contributed least to global emission will bear the greatest brunt of the climate shock. This would entail *double tragedy* for the region. First, they are affected directly by the process by which oil is extracted, and second, they are ultimately rendered vulnerable to a climate change-induced humanitarian catastrophe (Onuoha, 2008c).

Indeed, the oil industry in the Niger Delta is equally very vulnerable to climate change-induced extreme weather events, such as storm surges. Consequently, any serious climate-induced rise in the frequency of major storms will lead to more damage to off-shore rigs and coastal refineries, while oil tanker shipments will be delayed by weather events (Podesta and Ogden, 2007). For an industry that is strategic for Nigeria's corporate and fiscal survival, the impact of such climatic disruption of the oil industry in the Niger Delta will resonate beyond the geographical region and the energy sector in Nigeria.

The national security implications of the sudden disruption of the oil industry in the Niger Delta by climate variability will cascade disastrously through the Nigerian economy. It will deepen poverty; induce forced migration; disrupt socio-economic livelihoods; constrict national revenue; and consequently stretch the central government's capacity to provide

deliverables for the people. The recent of the US with Hurricane Katrina proves instructive in this regards. For instance, when Hurricane Katrina struck in 2005, it took 5 percent of US refining capacity temporarily off-line and incapacitating 8 percent of US oil production located in the Gulf of Mexico, which experts believe is at risk of extreme weather events (Council for Foreign Affairs, 2008).

The issue of coastal flooding is not limited to the South-South zone. The environmental problem also plagues other parts of the country, especially Lagos State and the adjoining state of Ogun. Although coastal flooding represents a threat to coastal communities worldwide, the threat is potentially acute for coastal cities, such as Lagos, which is already stressed to its limits by a population of 17 million. In the event of sudden rise of sea level of only 20 cm, it is estimated that over 740,000 people would be displaced in Nigeria. A rise of 1 m would lead to 3.7 million internally displaced persons (IDPs), and 2 m would render over 10 million homeless people in the country (Paehler, 2007). Flooding is a common environmental challenge in Lagos and its environs, and its impact would worsen in the years ahead as the sea-level rise interacts with other factors, like weak municipal waste disposal, poor drainage systems, demographic pressure, and collapse of social infrastructure.

Climate change-related flooding has already had immediate impacts on food production, livelihood assets, and human survival, in both rural and urban areas in Nigeria. Heavy rainfall and perennial flooding in some states, like Adamawa, Bauchi, Borno, Kebbi, Lagos, Nassarawa, Niger, Ogun, Plateau, Sokoto, and Yobe, in 2007 affected about 50,000 peopl, and killed about 63 persons (UNOCHA, 2007; *The Guardian*, 2007). In Bauchi State, no fewer than 24 persons were reported dead, while 5,787 farmlands and 13,609 houses, worth over ₦ 717.3 million (naira), were destroyed by the flood. In Gombe state, similar floods induced about a 50 percent hike in prices of grains. Consequently, 100 kg bags of maize, beans, millet, and sorghum increased to ₦ 3,400, ₦ 6,000, ₦ 4,000, and ₦ 3,000 respectively, as against ₦ 1,700, ₦ 3,000, ₦ 2,000, and ₦ 1,500 three weeks before the flood disasters. Dr Tunde Arosanyim, chairman of the All Farmers Association of Nigeria (AFAN), attributed the flood to global warming, describing it “as the worst in 20 years” (*The Guardian*, 2007).

Depletion of Biodiversity

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

Regrettably, Nigeria is experiencing progressive decline of its biodiversity. Natural water bodies, like streams, lakes, and springs, are drying up due to climate-induced changes, like drought, in the Northern parts of the country and the worsening incidence of erosion in the southern parts, which is transporting pollutants to these water bodies. The intrusion of saline water as a result of erosion into streams, lakes, and rivers has lead to the reduction in freshwater supplies and fish fauna. Nigerian forests are equally affected by climate change, manifest in the decreasing forest density, poor tree

growth and development, increased incidence of pests and diseases that attack and decimate forest plants and trees, and disruption and reduction of the fruiting intensity of some trees. Thus, many species of plants and animals in the country are becoming extinct (ICEED, 2007). The impact of biodiversity depletion has been worse on the local people, who depend on it for their livelihood, especially for nutritional and medicinal purposes.

Apart from the above-mentioned environmental trends, climate change affects security in Nigeria by exacerbating the effects of other security stressors, like poverty and disease. For instance, agriculture is the main source of food, industrial raw materials, and employment (about 70%) in Nigeria. However, agricultural productivity in Nigeria is highly vulnerable to climate change because it depends heavily on rainfall. Hence, the shifts in rainfall patterns in various parts of the country, due to climate change, have lead to crop and livestock failures, leading to food insecurity and worsening poverty.

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 (*ThisDay*, 2009). Obviously, in an environment of worsening poverty and falling health standards, citizen's expectation from the government increases. Consequently, unfulfilled promises and expectations could interact with other security and governance deficits to precipitate social disorders and violent conflicts.

The implication of the foregoing is that more demands would be made by the citizens on the government to assist in preventing or mitigating the impact of climate shocks on the people. If a government is perceived to be incapable of addressing these climate-exacerbated stressors, it can produce heightened senses of marginalization and deprivation amongst the affected population and a stronger sense of resentment towards the government. It can equally fracture the fabrics of harmonious co-existence among hitherto peaceful groups that are divided along different cultural, ethnic, religious, and political linings. The net effect could prove very unsettling for the stability and security of a state.

PREVENTIVE AND REMEDIAL MEASURES

The foregoing analysis highlights some of the current environmental trends that offer the transmission dynamics of the security threats posed by climate change to Nigeria. Climate change is exacerbating these environmental trends and this could make existing situations of inequality, instability, and conflict in the country more severe in the years ahead. Given that climate change is affecting people and communities in the country in various direct and indirect ways, the Nigerian government should begin to consider how best to prepare for the economic disruption, social disorder, and threats to peace and security that the climate change may trigger, sustain, or exacerbate in the country. In this wise, the following recommendations are presented:

- The Nigerian 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 to provide for proactive measures for responding to climate shocks that may come from within or outside Nigeria's territorial borders.

- Governments, at all levels (federal, state, and local), 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 Nigerian schools.
- 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 fora 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 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 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 our environment.
- The federal government should strive to institutionalize good governance in the country through the strengthening of institutions, such as the Independent Corrupt Practices and other Related Offences Commission (ICPC) and the Economic and Financial Crimes Commission (EFCC), which promote transparency and accountability in the management of public resources. This would require greater collaboration with civil society organizations to further promote sustainable fiscal policy management across the federation by assisting both in public awareness programs and in holding people in authority accountable for their actions. In this way, public resources, such as the Ecological Fund, would be properly monitored to ensure that the states and local governments judiciously utilize the fund to tackle emerging environmental challenges.
- In addition to supporting and implementing international conventions and protocols (such as the Montreal and Kyoto 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. Also, mangroves act as a sturdy, natural barrier against negative environmental shocks, like storms, flooding, sea surges, and tsunamis, which are becoming more frequent and devastating worldwide due to climate change.

CONCLUSION

Climate change is no respecter of persons, states, regions, or continents. The security implications of climate change are as pervasive as they are unique in different parts of the globe. This paper has explored the possible connections between climate change and national security. The analysis focused on Nigeria to unravel the key environmental trends that serve as the stressors for the transmission of the negative impacts of climate change for the country. The conclusion, derivable from this exposé, is that the security impact of these environmental problems are expected to increase as a result of climate change, especially if the Nigerian government fails to put in place measures that could help individuals and communities to adapt, resist, or cope with the challenges in the years and decades ahead. Given the uniqueness of the various parts of Nigeria, the security threat, posed by climate change, is contingent on a number of local political, socio-economic, cultural, and demographic variables that may interact with the prevalent environmental stressor in the area.

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