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A Review On Sectoral Impact Of Climate Change In Nigeria

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ABSTRACT
In the modern context, the terms global warming and climate change are commonly used interchangeably, but climate change includes both global warming and its effects, such as changes to precipitation and impacts that differ by region. The changes trigger socio-economic and ecological disruptions globally. This paper aims to bring forth the difference between these two terms, identify the causes of climate change, and highlight the impact of climate change on various sectors in Nigeria. Understanding these may provide a useful starting point for those interested in developing more effective forms of Climate Change Communication to help bridge the gap between the scientific community and the public, with the hope of fostering effective mitigation and adaptation measures.
Keywords: climate change, global warming, ecological disruptions

INTRODUCTION
Climate change has been defined by Intergovernmental Panel on Climate Change, IPCC (2007) as a change in the state of the climate that can be identified statistically by changes in the meanand /or the variability of its properties and that persists for an extended period typically decadesor longer. In 1995, the second assessment of the Intergovernmental Panel on Climate Change (IPCC) confirmed that the balance of evidence suggests that there is a discernible human influence on the global climate. The report projected that the global mean surface temperature would increase by between 1 and 3.5 degrees Celsius by 2100, the fastest rate of change sincethe end of the last ice age, and that global mean sea levels would rise by between 15cm and 95cm by 2100 flooding many low-lying coastal areas. Changes in rainfall patters are also predicted, with increasing drought, floods or intense storms in many regions (Wendy 2006). Over the last century humans have significantly altered the chemistry of the air; the level ofcarbon dioxide has increased by 25%, nitrous oxide by 19% and the level of methane by 100% (IPCC, 2007). These anxieties necessitated series of international conferences that issued urgent calls for a global treaty to address the problem.
In Nigeria, It has been established that within the past 114 years (1901 to 2015), Rainfall amount dropped by 81 millimeter while temperature increase was statistically significant. Precisely, 1.2^{o}C evidently higher than the global mean temperature increase of 0.74 ^{O}C recorded since 1860 (Odjugo, 2007). This is a pointer that Nigeria is going to be hardly hit by global warming in the nearest future while the shifts in rainfall pattern are becoming worrisome. To reduce the risk of climate change to human life, property and the environment, both policy instruments and technology must be used in the context of sustainable development. These can only be done with sincerity and pragmatism.

The Concepts of Global Warming and Climate Change

Global warming is a long-term rise in the average temperature of the Earth's climate system, an aspect of climate change shown by temperature measurements and by multiple effects of the warming (Stocker et al, 2013). The term commonly refers to the observed and continuing increase in average air and ocean temperatures since 1900 caused mainly by emissions of greenhouse gasses in the modern industrial economy (Mach et al, 2014).

The terms *global warming* and *climate change* are commonly used interchangeably (Shaftel and holly, 2016), but climate change includes both global warming and its effects, such as changes to precipitation and impacts that differ by region (Mach et al, 2014). The term "climate change" is often used to refer specifically to anthropogenic climate change (also known as global warming). Anthropogenic climate change is caused by human activity, as opposed to changes in climate that may have resulted as part of Earth's natural processes (Shaftel and holly, 2016). In this sense, especially in the context of environmental policy, the term climate change has become synonymous with anthropogenic global warming. Within scientific journals, global warming refers to surface temperature increases while climate change includes global warming and everything else that increasing greenhouse gas levels affect.

Sectors and Climate Change in Nigeria

Climate change is already having significant impacts in Nigeria, and these impacts are expected to increase in the future. Recent estimates suggest that, in the absence of adaptation, climate change could result in a loss of between 2% and 11% of Nigeria's GDP by 2020, rising to between 6% and 30% by the year 2050. This loss is equivalent to between N15 trillion (US$100 billion) and N69 trillion (US$460 billion) Nebedum and Nnaemeka (2016). According to the same source, this large projected cost is the result of a wide range of climate change impacts affecting all sectors in Nigeria:

a) Agriculture (Crops and Livestock)

Changes in climate factors have significant consequences for the agricultural sector. The adverse impacts of climate change are expected to lead to production losses in the sector. The range of possible climate change hazards and relevant adaptation measures are diverse and must be considered in the context of the local agro-ecological, production and socio- cultural conditions present for any particular area of Nigeria.

b) Freshwater Resources, Coastal Water Resources and Fisheries

Climate change will affect the nature and characteristics of the freshwater resources on which Nigerians depend. The impacts will vary between eco-zones, exacerbating existing problems of too much water (floods), too little water (droughts) and reduced water quality (e.g. salt water intrusion). Climate change impacts, including sea level rise and extreme weather, will also affect Nigeria's coastal and marine areas, home to 25% of the country's population and to Nigeria's economically important petroleum industry. These impacts on water resources will also affect fisheries, a main source of livelihoods and protein for riverside and coastal rural communities.

c) Forests

Nigerian forests are already under great pressures arising from increasing populations and growing economic wealth leading to greater demand for forest resources. Climate change is expected to add to these pressures, through direct impacts of the changing climate on forest growth and development and through greater demands on forests by populations adjusting to climate change.

d) Biodiversity

Increased aridity, increased intensity and variability of rainfall, and sea level rise all have impact on organisms, species, and habitats. Climate change can also lead to loss of livelihoods (for instance loss of agricultural productivity), leading to increased dependence on biodiversity for income. These climate change-related factors will exacerbate the impacts of existing human pressure on biodiversity. This will further diminish the ability of these natural heritage resources to continue to provide ecosystem services on which human development and survival depend. Climate change may also lead to the displacement of valuable ecosystems by invading species that are favoured by the new climate regime.

e) Health and Sanitation

A large part of Nigeria's economy is dependent on natural resources that are vulnerable to climate change impacts. When these resources are affected, the health of Nigerians can also be affected. Direct health impacts of climate change stem from extreme events such as heat waves, floods, droughts, windstorms, and wildfires. Indirect effects of climate change on health may arise from malnutrition due to reduced food production, from spread of infectious disease and food- and water-borne illness, and from increased air pollution. The impact of climate change on water resources, including reduced water availability in some areas and flooding causing contamination of water in other areas, will have a negative impact on the already poor sanitation situation in Nigeria.

f) Human Settlements and Housing

Nigeria has experienced rapid urbanization with nearly 50% of the population now livingin urban areas. Generally the condition of housing and provision of essential infrastructure are poor in both urban and rural areas, and Nigeria has an estimated shortage of 16 million housing units. Climate change will have an economic impact on housing throughout the country due to the wide range and distribution of hazards including sea level rise, increased frequency and severity of storm surges, increased flooding associated with high rainfall events, and high winds. Moreover, if climate change impacts decrease the national GDP as projected, this will in turn result in decreased available funding for the construction and renovation of housing.

g) Energy

The economic value of oil and gas investment in Nigeria's coastal and offshore areas is in the trillions of US dollars. This investment is at risk from the negative impacts of climate change, including rising sea levels, heavy storms, floods, high winds and shoreline erosion. Climate change is also expected to negatively impact the already limited electrical power supply through impacts on hydroelectric and thermal generation. Service interruption is also expected to result from damage to transmission lines and substation equipment impacted by sea level rise, flash floods, and other extreme weather events. Climate change impacts resulting in increased fuel-wood scarcity will increase pressure on the remaining forest resources, resulting in further degradation of the environment and negative impacts on rural livelihoods.

h) Transportation and Communications

Nigeria's transportation infrastructure includes road and highway networks, railways, canals and navigable waterways, seaports, airports, associated facilities, and vehicle fleets. Much of this infrastructure is inadequate for current needs, and vulnerable to the impactsof climate change. Under maintained road networks, for instance, will be further degradedby extreme weather, and airport operations will be disrupted by heavy rainfall events, violent thunder storms, severe winds and harmattan dust storms. Negative impacts on the transportation system can be expected to have negative impacts on the overall Nigerian economy.

i) Industry and Commerce

Many industries in Nigeria are vulnerable to a myriad of climate change-induced problems. Construction, transportation operations, road infrastructure, energy production and transmission, off-shore oil and gas operations, thermal power generation, as well as tourism and recreation, are some of the industrial sectors that are exposed to the vagariesof changing climate conditions. Industries dependent on climate-sensitive resources will suffer the most, as they derive their raw materials from sectors most affected by climate change, such as agriculture. Negative impacts on industry and commerce will lead to greater poverty among people who depend on the affected industries for their livelihoods.

j) Disaster, Migration and Security

Nigeria is prone to a wide variety of climate-induced hazards and disasters. Floods, storms, ocean surges, droughts, wildfires, pest plagues, and air and water pollution cause extensive losses to livelihoods and property, compromise development progress, and claim many lives. Climate change will increase the frequency and intensity of extreme climatic hazards; introduce hazards to areas previously free from their impacts; and increase vulnerability when climate-induced hazards exacerbate underlying risk conditions. Moreover, climate change will lead to migration of people from affected areas and to a new class of environmental refugees.

Climate Mitigation and Adaptation

The terms "adaptation" and "mitigation" are two important terms that are fundamental in the climate change debate. The IPCC defined adaptation as adjustment in natural or human systemsin response to actual or expected climatic stimuli or their effects, which moderate harm or exploits beneficial opportunities. Similarly, Mitchell and Tanner (2006) defined adaptation as an understanding of how individuals, groups and natural systems can prepare for and respond to changes in climate or their environment. According to them, it is crucial to reducing vulnerability to climate change. While mitigation tackles the causes of climate change, adaptation tackles the effects of the phenomenon. The potential to adjust in order to minimize negative impact and maximize any benefits from changes in climate is known as adaptive capacity. A successful adaptation can reduce vulnerability by building on and strengthening existing coping strategies. Examples of mitigation include phasing out fossil fuels by switching to low-carbon energy sources, such as renewable and nuclear energy, and expanding forests and other "sinks" to remove greater amounts of carbon dioxide from the atmosphere (Solomon et al 2007). Energy efficiency may also play a role; for example, through improving the insulation of buildings. Another approach to climate change mitigation is climate engineering (Metzs et al, 2001). Approaches to adaptation include; Short-term adaptation: It is essential to initiate and encourage urgent response measures to prevent or mitigate short-term impacts that are already occurringand likely to arise from climate change. And Medium- and long-term adaptation: Response measures are necessary to enhance adaptive capacity to prevent and mitigate possible impacts, by assessing the risks of impacts that may occur in the medium and long term, and by controllingthe impacts, reducing vulnerability, and strengthening resilience.

Barriers to Implementation

Implementation puts into effect climate change mitigation strategies and targets. These can be targets set by international bodies or voluntary action by individuals or institutions. This is the most important, expensive and least appealing aspect of environmental governance (Biesbroek et al, 2007).There are numerous issues which result in a current perceived lack of implementation.It has been suggested that the main barriers to implementation are, Uncertainty, Fragmentation, Institutional void, Short time horizon of policies and politicians and Missing motives and willingness to start adapting. The relationships between many climatic processes can cause large levels of uncertainty as they are not fully understood and can be a barrier to implementation.

When information on climate change is held between the large numbers of actors involved, it can be highly dispersed, context specific or difficult to access causing fragmentation to be a barrier. Institutional void is the lack of commonly accepted rules and norms for policy processes to take place, calling into question the legitimacy and efficacy of policy processes. The Short time horizon of policies and politicians often means that climate change policies are not implemented in favor of socially favored societal issues. Statements are often posed to keep the illusion of political action to prevent or postpone decisions being made. Missing motives and willingness to start adapting is a large barrier as it prevents any implementation (Biesbroek et al, 2007).

CONCLUSION

The reality of climate change in conclusion, is that the countries which historically have not produced significant greenhouse gas emissions such as small island states of the pacific andmany African Countries are the most vulnerable to its impacts. In its effort, Nigeria's Nationally Determined Contribution (NDC) shows its global commitment towards embracing sustainable development measures that limit the rate of global warming and negative impacts of climate change. It shows the country's climate targets and measures to be adopted in actualizing them. Present and future activities need to be planned and executed in space such that the future is not jeopardized. Adapting to climate Change is therefore imperative. This overview, in addition tothe ways climate change may impacts various socio-economic and ecological spheres of Nigeria points to the direction of environmental governance in the country. It provides information that may facilitate in bridging the gap between the scientific community and the public, with the hope of fostering effective mitigation and adaptation measures.

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