

Review

Climate change impact on female gender in Nigeria

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Climate change is the changes in the climate over time which includes regional or global temperature changes and the increased prevalence of extreme weather conditions. Climate change is one of the most critical challenges ever to face humanity. Climate change has been the monster tormenting the globe for over a decade now and has also become one of the most challenging issues in the developing country like Nigeria. Human activity is the main cause of the changes seen in climate and this is done through man's activities that cause emissions of greenhouse gases. The impact of climate change differs by region, age, social group, and sex. Disparities in the effect of climate change on women and men exist because of the social position of women in the family and the community and because climate change affects the factors most essential to women's means of subsistence (food, water and energy supply). This study is a descriptive research based on literature review and critical analysis of authors perspectives which describe the impact of climate change on one of the most vulnerable group (women). It analyses both their contributions to the climate change, vulnerability, their roles on adaptation, their contribution to risk reduction (mitigation) and the way forward.

Key words: Adaptation, climate change, mitigation, variability, vulnerability.

INTRODUCTION

The climate change is the monster tormenting the globe for over two or more decades now and it has been one of the most challenging issues in the developing countries like Nigeria. Climate change can be referred to a state of climate that can be identified by changes in the mean and /or variability of its properties and that persist for extended period, typically decades or longer. The change may be due to natural causes or as a result of human activities on the environment. It could also be explained as changes in the climate overtime, including regional or global temperature changes and the increased prevalence of extreme weather condition.

Some of the most striking impacts of climate change over Africa are expected to be increase in the frequency and severity of extreme events such as droughts, floods, and cyclones, and this have cause tremendous hardship socially and economically on the people of the continent.

There are four major causes of climate change namely; astronomical causes, volcanic eruptions, variations in solar output and changes in earth's environment as a

result of human activity. The intergovernmental panel on climate change (IPCC) says that human activity is the main cause of the changes seen in climate. This is done through man's activities that cause emissions of greenhouse gases which are mainly carbon dioxide, water vapour, methane and nitrous oxide. Studies of long-termed climate change have discovered a connection between the concentrations of carbon dioxide in the atmosphere and mean global temperature. These greenhouse gases are able to alter the energy balance of the earth by being able to absorb long wave radiation emitted from the earth's surface. The net results of this process and the re-emission of long wave back to the earth's surface increase the quantity of heat energy in the earth's climatic system. Human activities change the amount of greenhouse gases in the atmosphere in three important ways, namely; burning of fossil fuel, deforestation and the increase in the world population.

Africa's susceptibility is associated with the sensitivity and fragility of its natural environment, and its high dependence on environment-based livelihoods. An estimated 70% of Sub-Saharan Africa populations rely on subsistence rain-fed agriculture. Climate change is a threat to agricultural and non-agricultural socioeconomic

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but the agricultural production activities are generally more prone to climate change than other sectors.

The impact of climate change differs by region, age, social group, and sex. However women are more strongly affected by the effect of climate change (Lambrou and Prane, 2005).

Labour force data in most countries demonstrate women's predominance in subsistence agriculture and their roles in the production of economic crops, agriculture-linked market and retail trade, and nature tourism. Rural employment studies show that in most African countries, women are likely to be the main producers of food crops, such as maize, rice, cassava and other tubers, while men are engaged in commercial farming and produce cocoa, cotton and coffee for export (FAO 2010). However, in some cases (for example, Nigeria), male and female farmers jointly grow food and commercial crops. And sometimes Men may move into traditionally female activities if these activities have become more productive or profitable. Women are also involved in non-traditional agricultural exports in Kenya, South Africa, Uganda and Zimbabwe, and most of such production is female-dominated (FAO 2010). Their employment is more likely to be precarious; with short-term, seasonal and casual work predominating.

Women are particularly vulnerable to climate change because they are more prone to the adverse impacts from climate change. Their limited adaptive capacities arise from prevailing social inequalities and ascribed social and economic roles that manifest itself in differences in property rights, access to information, lack of employment and in equal access to resources.

Furthermore, changes in the climate usually have serious impact on sectors that are traditionally associated with Women, such as paddy cultivation, cotton and tea plantations, and fishing. This means increased hardship for women. For example, studies show that climate change has an adverse impact on fishing, as the sea level rises and saline water enters into freshwater systems, making fishing difficult. Also, in extreme events more women deaths are observed for women's inability to swim or run or lack of strength to withstand physically demanding situation such as storms', floods, typhoons etc. Nevertheless in scientific literature on climate change it had been suggested that women generally understand better the causes and local consequences of change in the condition of the climate and have the knowledge and skill for orienting the adaptation processes (Connor et al., 1998).

This study is a descriptive research based on the literature review and a critical analysis of authors which describes the impact of climate change on one of the most vulnerable group (women). It analyses both their contributions to the climate change, vulnerability, their roles on adaptation and their contribution to the risk reduction (mitigation) and the way forward.

CLIMATE CHANGE VARIABILITY IN NIGERIA

The UNFCCC refers climate change to a change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods. Recently the Intergovernmental Panel for Climate Change (IPCC) defines climate change as any change in climate over time, whether due to natural variability or as a result of human activity (Fourth Assessment Report – AR4, 2007).

Climate change's more alarming impact on Earth is the increase in world temperatures of around 0.7°C since the advent of the industrial era and fast rates of increase (Watkins, 2007). Even more shocking is the fact that in the course of the 21st Century, average global temperatures could increase by more than 5°C, albeit the threshold for dangerous climate change is an increase of only 2°C. This threshold broadly defines the point at which rapid reversals in human development and a drift towards irreversible ecological damage would become very difficult to avoid.

There is overwhelming scientific evidence linking the rise in temperature to increase in the concentration of greenhouse gases in the Earth's atmosphere, which has several impacts at different levels including increased frequency of droughts, floods and more intense storms, among others.

The continuous exposure of the environment to drought, intense storms, floods and environmental stress is holding back the efforts of the Africa people to build a better life. The likely direct impacts of climate change in Africa can be summarized as follows:

- i. By 2020, between 75 and 250 million of people are projected to be exposed to increased water stress;
- ii. By 2020, in some countries, yields from rain-fed agriculture could be reduced by up to 50%. Agricultural production, including access to food, in many African countries is projected to be severely compromised. This would further adversely affect food security and exacerbate malnutrition.
- iii. Towards the end of the 21st century, projected sea level rise will affect low-lying coastal areas with large populations. The cost of adaptation could amount to at least 5 to 10% of GDP.
- iv. By 2080, an increase of 5 to 8% of arid and semiarid land in Africa is projected under a range of climate scenario (IPCC's AR4, 2007).

The Nigerian population is about 140 million which is about 0.3% of the world's population and accounts for 0.1% of global emissions – an average of 0.1 tonnes of CO₂ per person that is below the emission levels of Sub-Saharan Africa of 1 ton of CO₂ per capita.

Despite its low contribution to climate change the country is already facing the effects of climate change/

variability especially those living in extreme poverty conditions in both rural and urban areas. For instance, in some parts of the northern Nigeria flood has swept all farm produce away and exposing a half of the population to hunger and poverty.

In Nigeria, the location and size of, and the characteristics of the relief give rise to various types of climates ranging from tropical rainforest along the coasts to Sahel climate in the northern parts of the country. The climate of the country strides from a fairly wet coastal area with annual rainfall greater than 3500mm to the Sahel region in the northwestern and northeastern parts with annual rainfall of less than 600mm (Adejuwon, 2004). The inter-annual variability of rainfall, particularly in the northern parts is large, often results in climate hazards, especially floods and droughts with their devastating effects on food production and associated calamities and human sufferings. More often than not, certain parts of Nigeria receive less than 75% of their annual rainfall and this is particularly worrisome in the north.

By virtue of Nigeria's location primarily within the lowland humid tropics, the country is generally characterized by a high temperature regime almost through the year. In the far south, mean maximum temperature is between 30°C and 32°C while in the north it is between 36°C and 38°C. However, the mean minimum temperature is between 20°C and 22°C in the south and under 13°C in the north which has a much higher annual range. The mean temperature for the country is between 27°C and 29°C.

In the absence of altitudinal modifications, the diverse nature of the country's climate consequently gives rise to a high degree of biological diversity resulting mainly in six vegetation zones: the mangrove swamps, the saltwater and freshwater swamps, Tropical Lowland Rainforests, Guinea Savanna, Sudan Savanna, and Sahel Savanna. Salt and Fresh water swamps are along the coast of Nigeria. The salt-water swamps stretch inland for 1-2 km in the Lagos area to over 30 km in the Sapele area. Further inland, beyond the reach of tidal waters, mangroves give way to freshwater plants, the most important of which is the raffia palm. From a water balance perspective, the country experiences large variation in evaporation and evapo-transpiration. Consequently, rainfall is by far the most important element of climate in Nigeria and thereby spatial and temporal variations in rainfall, and less becomes a critical index for assessing agricultural and water resources potential in the country.

Based on the Intergovernmental Panel on Climate Change (IPCC) projection, the humid tropical zone of southern Nigeria, which is already too hot and too wet is expected to be characterized by increase in both precipitation (especially at the peak of the rainy season) and temperature. Already, temperature increases of about 0.2°C and 0.3°C per decade have been observed in the various ecological zones of the country, while drought persistence has characterized the Sudan-Sahel

regions, particularly since the late 1960s. For the tropic humid zones of Nigeria, precipitation increases of about 2-3% for each degree of global warming may be expected. Thus, it is reasonable to expect that the precipitation would probably increase by approximately 5-20% in the very humid areas of the forest regions and southern savanna areas. The increase in temperature in these areas would also possibly increase evaporation, reducing the effectiveness of the increase in precipitation. According to IPCC projections, rainfall in the very humid regions of southern Nigeria is expected to increase. This may be accompanied by increase in cloudiness and rainfall intensity, particularly during severe storms. It could also result in shifts in geographical patterns of precipitation and changes in the sustainability of the environment and management of resources. However, since the increase in temperature could increase evaporation and potential evapo-transpiration, there would be tendency towards "droughts" in parts of these humid areas of the country. In fact, recent studies have shown that precipitation decrease in the humid regions of West Africa, including southern Nigeria, since the beginning of the century is about 10-25% or about 2-5% per decade. If this trend persists, rainfall in the humid regions of southern Nigeria may be about 50% to 80% of the 1900 values by 2100. With increase in ocean temperatures, however, there could be increase in the frequency of storms in the coastal zone of the country. In contrast to the humid areas of southern Nigeria, the savanna areas of northern Nigeria would probably have less rainfall, which, coupled with the temperature increases, would reduce soil moisture availability. Recent studies have indicated that the Sudan-Sahel zone of Nigeria has suffered a decrease in rainfall in the range of about 30-40% or about 3%-4% per decade since the beginning of the nineteenth century. Already, these savanna and semi-arid areas suffer from seasonal and inter annual climatic variabilities, and there have been droughts and effective desertification processes, particularly, since the 1960s. This situation may be worsened by the expected decrease in rainfall with greater drought probabilities and more rainfall variabilities and unreliabilities. Part of the conclusions of IPCC's third assessment report is that during the 21st Century, some extreme climatic events will increase in frequency and/or severity due to changes in the mean and/or variability of climate. Some of these events will have negative impacts on agricultural production.

IMPACTS OF CLIMATE CHANGE ON AGRICULTURAL PRODUCTS

Agriculture is an important sector of the Nigeria economy. In addition to providing the country with much of our food, the crops, livestock, and seafood that are grown, still provide a large percentage of the GDP and employment in Nigeria and Africa as a whole.

Agriculture and fisheries are highly dependent on specific climate conditions. In order to understand the overall effect of climate change on our food supply can be difficult. Increases in temperature and carbon dioxide (CO₂) can be beneficial for some crops in some places. But to realize these benefits, nutrient levels, soil moisture, water availability, and other conditions must also be met. Changes in the frequency and severity of droughts and floods could pose challenges for farmers and ranchers. Meanwhile, warmer water temperatures are likely to cause the habitat ranges of many fish and shellfish species to shift, which could disrupt ecosystems. Overall, climate change could make it more difficult to grow crops, raise animals, and catch fish in the same ways and same places as we have done in the past. The effects of climate change also need to be considered along with other evolving factors that affect agricultural production, such as changes in farming practices and technology. The climate change effect is mostly felt by the agricultural sector in Nigeria since the farmer in this country still practice the conventional ways of farming. It threatens agricultural production through higher and more variable temperatures, and increase in floods, droughts or rainfall (<http://www.ifpri.cgiar> 2012). Agriculture was also reported to be sensitive to climate change and weather extremes such as flood, drought, severe storms etc. while food productivity may benefit from a warmer climate, increase or decrease in rainfall, droughts, flood etc. may pose challenges to food production, hence to the farmers. Also climate change, water supply and climate moisture may also affect food production. (<http://www.epa.gov/climate/effect/agriculture> 2012). It is a known fact that wealth of every nation is dependent on its fertile farmland; climate change therefore has impact on the quality of soil, and on the production of food supply (<http://www.epa.gov/climate/effect/agriculture> 2011). Agriculture in Nigeria is strongly dependent on climate conditions and water resources; hence, agricultural produce is sensitive to climate change (<http://www.agric.gov.ab.ca/department/deptdocs.nsf/all/ci>, 2012.). It is generally accepted that, developed countries are less vulnerable to climate change than the developing countries like Nigeria. This is because African geography makes it particularly vulnerable to climate change, as 70% of the population of the developing countries relies on rain activities to earn their living coupled with absence of sophisticated technological equipments needed for the control of climate change (<http://www.en.wikipedia.org/wiki/climate>, 2012).

IMPACT OF CLIMATE CHANGE ON NIGERIAN WOMEN

Most authors agree that the negative effects of climate change are likely to hit the poorest people in the poorest countries hardest. It is generally accepted that women constitute the majority of the world's poor since they are often more dependent upon natural resources. Climate

change has different impacts on men and women and in many occasions, the adverse effects of climate change disproportionately affect women. For example, with increasing drought it is women who have to walk longer distances to collect water (LEG, 2002).

The major reason that the impact of climate change on women is likely to be more severe is because it will increase the females burden of meeting their household responsibilities, forcing them to spend more time and energy to meet their obligations (Kurst and Kurst, 2001). This position was further explained by the view that Climate change is exacerbating the problems and inequities that women already face. Women are generally bound by the cultural norms that may prevent them from being educated, owning land or presenting solutions to the village leaders. The impact on women following climate disasters is disproportionate no matter where the geographical location. Also Women's livelihoods are more dependent upon natural resources which are threatened by climate change. When weather patterns are erratic, women spend more time on each of these tasks, which then means less time spent on education, family and health. Girls are often taken out of school either to help with the additional burden the climate crisis has placed on the mother, especially fetching fuel wood and water (Chairperson, Friends of the Environment – FOTE).

It is no doubt that climate change affects both men and women in Nigeria; however the researchers believe that the impact is more felt by women than their male counterpart. This is because, in Nigeria, women constitute the larger percentage of farmers with little or no modern skill of agricultural equipments (Osita, 1984). It may also be interesting to note that women work more than men in the field of agriculture but they are poorly paid. This case is not only peculiar to Nigeria but globally. Women cultivate, plough, and harvest more than half of all the food in the world. For instance, in sub-Sahara Africa and the Caribbean, they produce up to 80% of basic food stuffs, in Asia, they account for around 50% of food production, in Latin America, they are mainly engaged in subsistence farming, horticulture, poultry and raising small live stock, (Ezeilo, 2001). Of all these, many women often get little or no recognition for the job done. And many women are even unpaid for the services rendered. The US statistics once found out that of 1.3 billion people living in poverty around the world 70% are women. Also women do about 60% the work in return for less than 5% its income in least developed countries. Women work two-third of the world working hours, they produce half of the world food but they owns less than 1% of the world properties (Opaluwa, 2007)

VULNERABILITY, ADAPTATION, AND MITIGATION OF WOMEN TO CLIMATE CHANGE

Vulnerability is defined as the extent to which climate

change may damage or harm a system; it depends not only on a system's sensitivity but also on its ability to adapt to new climatic conditions (The IPCC's 2nd Assessment Report (1996)). Kelly and Adger (2007) also define vulnerability in terms of the ability of individuals and social groupings to respond to, in the sense of cope with, recover from and adapt to, any external stress placed on their livelihoods and well-being. The aforementioned definitions complement each other in the sense that the first focuses on the biophysical dimensions while the latter puts emphasis on socio-economic and institutional factors, which are two key aspects in understanding and confronting climate change issues. Considering the purposes of this paper both definitions are adopted in this research.

In the context of the aforementioned definitions, Nigeria is considered vulnerable to climate change due to its geographical location (biophysical vulnerability) and the frail socio-economic context (socio-economic vulnerability). In Nigeria the high level of climate risk to a number of factors include its densely populated low-lying coastline, which is also home to a high concentration of industry and infrastructures. The north of the country forms the part of the Sahel region is at risk of further drought and desertification (Adejumobi *et al.*, 2009). In recent time the analysis carried out by the Nigeria Meteorological Agency (NIMET) points the late onset of rainy season. Climate projection indicate that mean annual rainfall will lower in the north of the country and it will be higher than normal in the coastal belt, with lower dry season. Sea level rise leading to submergence of lowland along the coast would result in much of the land currently used for agriculture being lost this can result to devastating socio-economic and socio-cultural lost.

Adaptation

Adaptation refers to adjustments in practices, processes or structures in response to projected or actual changes in climate (IPCC, 2009), with the goal of maintaining the capacity to deal with current and future changes. Adaptation to climate change also refers to activities that reduce the negative impacts of climate change and/or takes advantage of new opportunities that may be presented. It includes activities that are taken before impacts are observed (anticipatory) and after impacts have been felt (reactive). Eboh (2009) stated that even if efforts to reduce greenhouse gas (GHG) emissions are successful, it is no longer possible to avoid some degree of global warming and climate change.

The fundamental goal of adaptation strategies is the reduction of the vulnerabilities to climate induced change in order to protect and enhance the livelihoods of poor people. Experience shows that vulnerability is differentiated by gender. Adaptation to climate change or indeed climate variability is dependent on issues such as

wealth, technological power, access to information, all of which are major problem areas for women. However, women can be key agents of adaptation and mitigation to climate change. Their responsibilities in households, communities and as stewards of natural resources position them well to develop strategies for adapting to changing environmental realities (WEDO, 2007).

Generally, women seek solution to the drinking, access to good health and education, reducing factors of vulnerability of their community in the face of hydro meteorological event associated with Climate change and other potential hazards. In their professional development or their domestic activities, women are often in a better position to note certain environmental hazards. They are aware of the pattern of sicknesses in the children in the neighbourhood, and they can quickly detect changes in the water when they wash clothes or strange smells in the ground where their children play.

Mitigation

Women also have a role deriving from their own strength. Women are engaged in a number of activities such as brick-making, charcoal-making waste management and agro-processing where energy efficiency can lead to CO₂ mitigation and their role in mitigation in these areas can be vital. The development of Clean Development Mechanisms (CDM), through carbon sequestration from afforestation and reforestation can also be done by poor rural women (Jyoti Parikh 2003). Women in urban areas can implement energy efficiency programmes at the household level - lighting, the use of appliances etc, while women in rural areas may be encouraged to use biomass and biogas (for fuel generation), and switch to solar energy. Poor women, without access to modern energy fuels are faced with problems relating to indoor air pollution and bear huge health burdens as a result- there is a high incidence of bronchitis, asthma and other health problems. While women should not be denied the use of fossil fuels like LPG or Kerosene, yet at the same time appropriate technologies that take into account the specific socio-economic realities of different rural areas, reduce women's workload, free-up time and enable them to pursue income generating or other activities need to be developed.

Adaptation and mitigation strategies

- i. Promoting women's equal access to land ownership and other resources needed for effective socio-economic participation, such as capital, technical assistance, technology, tools, equipment, markets and time.
- ii. Recognizing the importance of domestic work and the knowledge it brings to matters concerning climate change, and to promote men's participation in this

sphere.

iii. Training women how to reduce and prevent fires. Preventing forest fires and controlling agricultural burning is the most effective prevention measure in managing protected areas and wooded zones.

CONCLUSION

This work examined the impacts of climate change on female gender in Nigerian. It also examined various factors affecting women adaptability to climate change in Nigeria. Although climate change affects both men and women alike, the effect is intensified in the case of women. This is because of women reliance on subsistence farming activities. This change affects soil conditions and therefore has adverse impact on food production. It was further discovered that when climate condition affect the livelihood of women alot have to be done to combat the effect of climate change and they are therefore urged to be more sensitive and alive to their roles, while government on its part is urged to gear its activities towards adapting to the impacts and mitigating the effect of climate change on women.

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