SOCIO – ECONOMIC IMPLICATIONS OF CLIMATE CHANGE ON FOOD SECURITY AND LIVELIHOOD IN NIGERIA: A DESK REVIEW

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Abstract

The challenge of climate change is enormous in Nigeria due to widespread poverty, prevailing slash and burn agriculture, erosion and burning of firewood and farm residues which exerts multiple stresses on the biophysical as well as the social and institutional environments that underpin agricultural production. The threat of climate change in Nigeria is one that requires urgent attention by all stakeholders in a bid to stem down the adverse effects of changes in climate on all sectors of the economy most especially Agriculture being a key player of the economy that is subject to the vagaries of climate. Therefore, there is the need for well–coordinated measures of adapting to changes in climatic condition from the grass root to the national level and It is recommended that conscious policy measures hinged on climatic information dissemination should be put in place to enhance the adaptive capacity of agricultural systems and it should cut across local actions taken by the poor themselves in response to changing market or environmental conditions supported by well planned responses by government or other institutions that provide adaptation measures that are beyond the control or capabilities of local communities.

Keywords: Climate change, adaptation, agriculture, livelihood

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INTRODUCTION

Climate change is an observed change in climate which is attributed directly or indirectly to human activities that alter the composition of the global atmosphere and which are in addition to natural variability observed over comparable time periods (IPCC, 2007).Climate change through extreme temperature, frequent flooding and drought and increased salinity of water supply used for irrigation has become a recurrent subject of debate globally and Nigeria is one of the countries contributing to global warming. The vulnerability of Nigerian agricultural sector to climate change is of particular interest to policy makers because agriculture is a key sector in the economy accounting for between 60–70 % of the labour force and contributing between 30–40 % of the nation's GDP (Ajetomobi *et al*., 2010). Nigeria's climate is likely to see growing shifts in temperature, rainfall, storms, and sea levels throughout the twenty–first century. These climatic challenges, if unaddressed, could throw already stressed resources such as land and water into even shorter supply. Moreover, poor responses to resource shortages could have serious negative secondary effects, including more sickness and hunger, fewer jobs, and poor economic growth, which in turn could open the door to more violence. More heat plus less rain is already creating drought conditions in parts of northern Nigeria and in parts of southern Nigeria, flooding caused by sea level rise is also contaminating freshwater aquifers, rivers, and stock–watering points, leaving them with high salinity and more polluted with sediment and sewage. Climate change may also leave Nigeria increasingly short of at least two types of man–made resources. Sea level rise and severe weather could cause significant property loss. Statistics here are scarce, but between 1992 and 2007, wind and rainstorms alone damaged or destroyed at least $720 million in economically productive assets across twelve of Nigeria's thirty–six states (Odjugo, 2009). Poor people who depend on agriculture are the most vulnerable to climate change. Increasing crop failures and livestock deaths are already imposing high economic losses and undermining food security. More frequent droughts and increasing water scarcity may devastate large parts of the tropics and undermine irrigation and drinking water in entire communities of already poor and vulnerable people (World Bank, 2009). The increased frequency and extent of floods, droughts and land cutting has rendered the agriculture sector more vulnerable and reduced the productivity of land and of the potential for plant production. Climate change is no longer a problem to be faced in the future; it is a reality that is seriously affecting the Earth already, especially challenging agricultural productivity and food security in developed and developing economies of the world and thus requires urgent attention. The issue of climate change has become more threatening not only to the sustainable development of socio–economic and agricultural activities of any nation but to the totality of human

existence (Adejuwon, 2004).The subject matter of climate change in Nigeria has been receiving keen interest among researchers in recent times. A good number of studies have been carried out on climate change in Nigeria with respect to farmers perception of climate change, climate change adaptation and conflict, impacts of climate change and so on (Agbola & Ojeleye, 2007; Apata *et al*., 2009; Ajetomobi *et al*., 2010; Ayinde *et al.,* 2011; Obioha, 2009; Odjugo, 2010; Onyeneke & Madukwe, 2010; Ozor & Cynthia, 2009; Sofoluwe *et al.*, 2011; Umar & Ibrahim, 2011), the efforts of these researchers towards providing empirical information on climate change in Nigeria is indeed commendable but it is worth noting that an extensive review on the socioeconomic implications of climate change on food security and livelihood in Nigeria has not been carried out and this agrees with Enete & Amuta (2010) who opined that Much of climate change agricultural research has tended to concentrate on assessing the sensitivity of various attributes of crop systems (crop/livestock yields, pest, diseases, weeds), the biophysical aspects of food production with little or no regard to the socioeconomic aspects. Therefore, this paper has been specifically designed to contribute to knowledge bank on climate change by making a scholarly review of the socio–economic implications of climate change in Nigeria through a desk review of existing resources on climate change.

MATERIALS AND METHODS

This paper is a review article which employed secondary data from existing literature on climate change to achieve the objective of assessing the socio–economic implications of climate change in Nigeria with particular emphasis on livelihood and food security. The secondary data employed in this paper were elicited from International Panel on Climate Change (IPCC) publications, Food and Agriculture Organization (FAO) publications, journals, textbooks and online resources.

CLIMATE CHANGE AND AGRICULTURE

The threat that climate changes pose to agricultural production does not only cover the area of crop husbandry but also includes livestock and in fact the total agricultural sector. The impacts of climate change on agriculture can be classified into biophysical and socioeconomic impact (Khanal, 2009). The biophysical impacts include; physiological effects on crop and livestock, change in land, soil and water resources, increased weed and pest challenges, shifts in spatial and temporal distribution of impacts, sea level rise and changes to ocean salinity and sea temperature rise causing fish to inhabit in different ranges. The socio–economic impacts result in decline in yield and production, reduced marginal GDP from agriculture, fluctuation in world market price, changes in geographical distribution of trade regime, increased number of people at risk of hunger and food insecurity, migration and civil unrest. Direct effects of climate variables such as air, temperature, humidity, wind speed and other climate factors influence crop performance such as yield and animal performance such as growth, milk production, wool production and reproduction. Climate can also affect the quantity and quality of feed stuffs such as pasture, forage, and grain and also the severity and distribution of livestock diseases and parasite (Niggol & Mendelsohn, 2008). According to FAO (2008), climate change variables influence biophysical factors such as plant and animal growth, water cycles, biodiversity and nutrient cycling, and the ways in which these are managed through agricultural practices and land use for food production. However, climate variables also have an impact on physical/human capital such as roads, storage and marketing infrastructure, houses, productive assets, electricity grids, and human health which indirectly changes the economic and socio–political factors that govern food access and utilization and can threaten the stability of food systems (Lal *et al*., 2010).

IMPLICATION OF CLIMATE CHANGE ON FOOD SECURITY

Climate change impacts the four key dimensions of food security, namely food availability, food stability, food accessibility, and food utilization. Availability of agricultural products is affected by climate change directly through its impacts on crop yields, crop pests and diseases, and soil fertility and water–holding properties. It is also affected by climate change indirectly through its impacts on economic growth, income distribution, and agricultural demand. In addition, stability of crop yields and food supplies is negatively affected by variable weather conditions. Physical, economic, and social access to food would is affected negatively by climate change as agricultural production declines, food prices rise, and purchasing power decreases. Last but not least, climate change poses threats to food utilization through effects on human health and the spread of diseases in geographical areas which were previously not affected. By 2080, agricultural output in developing countries may decline by 20 percent due to climate change, while output in industrial countries is expected to decrease by 6 percent. Also due to climate change, yields in developing countries could further decrease by 15 percent on average by 2080 (FAO, 2008). Climate change will also affect the ability of individuals to use food effectively by altering the conditions for food safety and changing the disease pressure from vector, water, and food–borne diseases (Schmidhuber & Tubiello, 2007).

IMPLICATION OF CLIMATE CHANGE ON LIVELIHOOD

Agriculture provides the means of livelihoods to a larger proportion of Nigerians either directly or indirectly and therefore, the need to combat climate change for the purpose of sustaining livelihoods in Nigeria cannot be overemphasized. Climate change worsens the living conditions for many who are already vulnerable, particularly in developing countries like Nigeria because of the lack of assets and adequate insurance coverage. Agriculture–based livelihood systems such as small–scale rainfed farming, pastoralism, inland and coastal fishing/aquaculture communities, and forest–based systems that are already vulnerable to climate change face immediate risk of increased crop failure, loss of livestock and fish stocks, increasing water scarcities and destruction of productive assets (FAO, 2008). These unfavourable conditions are likely to have an adverse effect on the income, standard of living and health status of agrarian households. The livelihood status of agricultural as well as agro–allied firms will also change if centres of agricultural production shift or methods of production become less labour–intensive in response to climate change. All wage earners face new health risks that could cause declines in their productivity and earning power. Changing climate conditions and rising sea levels are also likely to make many places uninhabitable unless concerted and effective adaptation measures are taken, which could displace many vulnerable people with devastating consequences for their livelihoods and social relations. It is worth noting that climate change will affect livelihood of people differently depending on such factors as landownership, asset holdings, marketable skills, gender, age and health status (FAO, 2008).

ADAPTATION MECHANISM TO CLIMATE CHANGE

It has been established that climate change could result in adverse agricultural as well as environmental effects leading to food insecurity, poor livelihood, widespread poverty, high disease incidence, unemployment and poor economic growth which calls for well thought–out measures of adapting to climate change as a means of mitigating the adverse effects of climate change (FAO, 2008). IPCC (2001) defined adaptation to climate change specifically as adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities. Various types of adaptation can be distinguished, including anticipatory and reactive adaptation, private and public adaptation, and autonomous and planned adaptation. Climate change adaptation aims to mitigate and develop appropriate coping measures to address the negative impacts of climate change on agriculture. Adapting to climate change involves managing risk by improving the quality of information and its use, providing insurance against climate change risk, adopting known good practices to strengthen the resilience of vulnerable livelihood systems, and finding new institutional and technological solutions (FAO, 2008). Most agricultural systems have a measure of in–built adaptation capacity known as autonomous adaptation but the current rapid rate of climate change will impose new and potentially overwhelming pressures on existing adaptation capacity. This is particularly true given that the secondary changes induced by climate change are expected to undermine the ability of people and ecosystems to cope with, and recover from, extreme climate events and other natural hazards. It is for this reason that the IPCC encourages planned adaptation; that is deliberate steps aimed at creating the capacity to cope with climate change impacts (IPCC, 2007). A key component of climate adaptation involves building resilience, where resilience is the capacity of a system to tolerate disturbance without collapsing into a qualitatively different state that is controlled by a different set of processes. According to FAO (2008), Additional action areas that can strengthen resilience of agriculture–based livelihood systems include: research and dissemination of crop varieties and breeds adapted to changing climatic conditions, promotion of agroforestry, integrated farming systems and adapted forest management practices and improved soil management practices. At the grass root level, some of the adaptive measures taken by small scale farmers in the face of changing climate include alteration of planting dates, mixed cropping, tree planting, prompt weeding, changes in harvesting dates, mulching, irrigation, minimum tillage, culling of infected animals and decrease in stocking rate of animals. From the foregoing, it can be inferred that measures of effective climate change adaptation at the grass root or national level has the potential to mitigate the adverse effects of climate change thereby ensuring environmentally friendly atmosphere in Nigeria for better livelihood, reduction in poverty and hunger and economic growth.

CONCLUSION

The threat of climate change in Nigeria is particularly in the areas of agriculture, land use, energy consumption, biodiversity, health and water resources. Poor people who depend on agriculture as a means of livelihood are the most vulnerable to the challenges stemming from climate change. Agriculture is not only affected by climate change, but also contributes to it through emitting greenhouse gases. Therefore, climate change mitigation can be partly achieved through the reduction of greenhouse emissions from agriculture by encouraging environmental friendly agricultural practises. The need for effective adaptive measures to changes in climatic condition in Nigeria cannot be overemphasized as the challenges posed by vagaries of climate has an adverse effect on food security, livelihood, labour productivity, poverty and the economy in general. It is recommended that policy measures on climate change adaptation in Nigeria should be very supportive of climatic information dissemination as successful adaptation to climate change depends on reaching the most vulnerable, who may not have easy access to and appropriate understanding of existing climate information. This implies that vulnerable groups such as farmers should have regular information on current issues of climate change adaptation which can be achieved through the strengthening of the nation's extension services in disseminating farm– level adaptation measures and other relevant climate information to farmers.

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