



Contents lists available at

Journal of Environmental Management and Safety

Journal homepage: www.cepajournal.com



Climate Change and Poverty: Assessing Impacts in Nigeria

***Vivan Ezra Lekwot¹ Ezemokwe Ifeanyi Uchenna² and Johnson Alfred¹**

¹*Department of Geography, University of Jos, Jos, Nigeria.*

²*Department of Environmental Management, Nnamdi Azikiwe University, Akwa, Nigeria.*

Corresponding author e-mail: ezravivan@yahoo.com, Tel: +2348032880342, +2348097601269

ARTICLE INFO

Article history

Received 28 June 2012

Received in revised form 23 July 2012

Accepted 3 September 2012

Available online 30 December, 2012

Keywords:

Poverty, Climate
change, Livelihood,
Nigeria, Impact

Abstract

It is an indisputable fact that the global climate is changing. These changes have been attributed to natural variability and human activity on the environment. Climate change poses serious challenges and takes centre stage in the global agenda as an issue calling for corporate strategies and appropriate measures by countries, communities, and individuals. The United Nations and other actors are responding to the challenge with the major focus on the development of strategies, and policy framework. These approaches are used to attain sustainable community-climate related livelihoods. It is on this basis, that this paper examines Climate Change and Poverty and its impact in Nigeria. It was revealed from the study that the means of livelihood is being affected by climate change. These impacts are as a result of devastating effects of flooding, drought, erosion, desertification, sea level rise, heat stress, pests and diseases, erratic rainfall patterns, etc which are all due to climate change. The paper further emphasized the need for climate policy in Nigeria, the establishment of Nigerian Climate Change Commission (NCCC), the development of a national framework for climate change adaptation, and the embracing of emerging technologies among others. It showcased the new role of agricultural extension in the face of climate risk management. These include awareness creation, mobilization, training, assistance, and dissemination of proven measures of mitigation/adaptation to climate change among vulnerable communities in Nigeria.

copyright@ 2012 cepa

INTRODUCTION

There is now an agreement that climate change exists in reality and that the change will continue to manifest itself and is therefore here to stay (IPCC, 2007). Climate change poses serious challenges for sustainable socio-economic development of countries and communities. It has taken centre stage in the global agenda as an international issue calling for corporate strategies and policies and appropriate measures by countries, communities and individuals. The United Nations, non-governmental organizations, and other actors have responded to the challenge. The major focus has been the development of global strategies, and policy framework to provide guidance on how to address climate change and related consequences. These approaches are meant to set standards for the development of relevant and context specific approaches by countries and other actors to attain sustainable community climate related livelihoods.

It is proper, therefore, for countries to marshal action and encourage dialogue towards mitigating the negative impacts and adopt positive measures of managing the effects of climate change at national level. Such measures should strengthen on-going governmental efforts to fight poverty and ensure that the improvement of community livelihoods is not a failure. The focus of this paper is to examine the impacts of climate on the livelihoods of Nigerians through assessing community preparedness for climate change and

formulating recommendations that are deemed necessary. The above is achieved through the following objectives, which is to examine:

- (i) the relationship between climate change and livelihoods in general
- (ii) the relationship between climate change and poverty
- (iii) the level of community preparedness in terms of climate change challenges;
- (iv) the way forward in creating sustainable community livelihoods.

THE RELATIONSHIP BETWEEN CLIMATE CHANGE AND LIVELIHOODS

Climate change continues to have a great effect on communal livelihoods globally, on the African continent and Nigeria in particular. According to the International Research Institute for Climate Change (IRI, 2007) the phenomenon refers to "longer term trends in average temperatures or rainfall or in variability itself and often to trends resulting wholly or in part from human activities, notably global warming due to burning of fossil fuels". These fossil fuels are said to have damaged the ozone layer which controls the sun's radiation and water evaporation. The International Federation of Red Cross and Red Crescent Societies attest that weather related disasters have increased from an annual average of 200 in the early 1990s to more than 350 since the year 2000 (IFRC, 2009). The increase in disasters relates to equally rising numbers of people affected worldwide. These

numbers have risen from an average of 190 million per year in the 1990s to 243 million in 2008. The IFRC (2009) further states that the high number of climate related disasters in 2008 (floods, storms, heatwaves, and droughts) accounted for 60 percent of grants allocated by its Disaster Relief Emergency Fund (DREF). IFRC (2009) posits that climate change affects the natural resources which are fundamental to the economic development of third world countries.

It further asserts that climate change and rapid development and/or economic meltdown in some countries combine to intensify disaster impacts (IFRC, 2009). The problem is not unique to African countries but is also experienced in the developed world. Australia is threatened by recurring severe drought and drying trends in major parts of the country, the likely increase in heat-waves, floods, and bush fires, and the impact of an increasingly acidic ocean and higher ocean temperatures on marine resources and iconic ecosystem (Steffen, 2009). UNDP (2008) asserts that Africa's variable climate contributes negatively to its development. It is affecting the key sectors of agriculture, water, energy, transport, and health that contribute significantly to a sustainable socio-economic-status of rural communities. African communities rely on animals for transport, draught power, as a source of income. Plants serve as sources of energy, food production, and herbs for treatment of various diseases. Subsistence agriculture has for years been the means of food availability and

accessibility for rural communities. It is dependent entirely on rain which provides water also for human and livestock consumption. These communities sell their assets to mediate food deficiencies during drought periods. This kind of practice was observed in northern Nigeria, where farmers, due to drought, sold their assets (livestock) and plunged into destitution (IFRC, 2007).

Northern Nigeria is prone to persistent droughts which the Government has combated for the past four decades. Recent studies reveals that, from 1981 to 1987 and 1991- 1992, the country experienced recurrent and severe droughts and flooding in different parts of the country. These trends severely affected communities dependent on subsistence agriculture, particularly that which is rainfed, and livestock. Floods, and bush fires are common experiences in Nigeria. In addition, water shortage in some Nigerian cities and surrounding villages has been a major drawback for the economic growth of the country. Without potable and industrial water, development of the people is socially and economically jeopardized. Osman-Elasha (2009) argues that currently 300 million Africans have no access to safe drinking water and 313 million others lack basic sanitation. These circumstances have led to various health, economic, and social problems in Africa. The lack of sufficient rain led to depletion of vegetation, soil erosion, land degradation, overharvesting of trees, and unwillingness to conserve natural resources. Yet excess rainfall equally destroys the environment, crops,

and houses and causes the development of gullies. A farmer in Ibadan, Nigeria, lamented the fact that the harvested maize was soaked by winter rains and that many economic trees were lost. The trees provide supplementary food for employees and their families. All these factors indicate the seriousness of threats posed by climate change to traditional agricultural or communal livelihoods in Nigeria (Daily Trust, 2009).

The relationship between climate change and livelihood will be better understood when discussed under the following sub headings:

Impacts on agricultural productivity and food security:

With increasing incidences of flooding, erosion, bush burning, pests and diseases, increased temperature, erratic rainfall, and drought, it is less difficult to believe that agricultural productivity under these circumstances will be very low. Consequently, the low yield will change the supply and demand pattern, and thus the commodity prices, the profitability of farming, and the affordability of food, food security, and human health. According to Pittock (2005), the impacts of climate change on food production, prices and food security depend on regional climate change, biological effects of increasing atmospheric carbon dioxide, changes in floods, droughts and other extreme events, existing agricultural systems, adaptive capacity, changes in population, economic growth and technological innovation.

Article 2 of the United Nations Framework Convention on Climate Change (UNFCCC) requires ‘ensuring that food production is not threatened’. In assessing the climate change impacts on food production, the adaptive capacity of agricultural systems has to be taken into consideration (WGBU, 2003). This capacity differs substantially between regions.

Unfortunately, the regions affected most are the ones with the least adaptive capacity – i.e. the developing countries (IPCC, 2001).

More than 850 million people worldwide are undernourished (German Advisory Council on Global Change WBGU, 2007). This situation is likely to worsen in future as a result of climate change, as food insecurity in many developing countries like Nigeria, will increase with a temperature rise of just 2°C (relative to the 1990 baseline). With global warming of 2-4°C, a drop in agricultural productivity is anticipated worldwide with more devastating effects in the tropics because crops are often close to their thermal optimum in the region (WBGU, 2003). This trend will be substantially reinforced by desertification, soil salinization or water scarcity. Already in many African countries, the areas suitable for agriculture are largely exploited. This may trigger regional food crises and further undermine the economic performance of weak and unstable states like Nigeria, thereby exacerbating destabilization, the collapse of social systems, and violent conflicts. The expected changes in crop development

and phonology can cause shortening or lengthening of crop cycles that could lead to decreases or increases in productivity. Structural changes, especially in carbohydrate status of plants can also occur. This may affect the nutritional value, taste and storage quality of some fruits and vegetables. Increases in CO₂ can also lower crop water requirements by reducing transpiration per unit leaf area.

Heavier than normal rainfall in the southern part of the country would lead to destruction of crops in the field, greater post-harvest losses, loss of arable land and increased growth of weeds. Significant reduction of rainfall in the Sudan-Sahel belt would make the region drier with consequent reduction in crop productivity. Decreased rainfall in the region would also reduce the primary productivity of the grassland areas in which livestock production is currently important. It would also have significant effects on the ecosystems; new ecoclimatic environment for livestock would emerge, possibly shifting towards the coast in many parts of the country.

The livestock production systems in Nigeria would be vulnerable to climate change in respect of anticipated decrease in rainfall in Sudan-Sahelian zone and consequent reduction in the available pastureland; declining availability of surface water resources for animals; possible increase in salinity at water resources for animals; possible increase in salinity at watering points due to increase in temperature and evaporation in the face of reduced rainfall. Climate change leads to decrease in livestock

production resulting in an impaired availability of animal protein including meat, egg, milk and animal products such as hides and skins. These have implications for food security.

Fishing, fish farming and fish processing and trading are important sources of revenue, and proteins in Africa, with estimated 10 million people depending on them in some way or the other (UNEP, 2007). Fishery resources are of particular importance in Nigeria as they provide a considerable amount of dietary protein in the country. Subtle changes in key environmental variables such as temperature, salinity, wind speed and direction, ocean currents, strength of upwelling due to climate change could sharply alter the abundance, distribution and availability of fish population in the country. Changes in ocean dynamics could lead to changes in migrating patterns of fish and possibly reduced fish landings especially in coastal fisheries (African Action, 2007).

Indirect effects of climate change on agriculture include effects on pests and diseases and the impacts of these on agricultural production. It is thought that various pests including the tobacco cut worm, rice sting bug, rice weevil and soybean pod borer would probably expand their distribution areas in the events of climate change. Also, an increase in the frequency of extreme events such as prolonged drought or intense flooding could create conditions that could be conducive to disease or pest outbreaks and severely disrupt the predator-prey relationships that normally restrict the proliferation of pests.

Warmer and more humid conditions could enhance the growth of bacteria and mould on many types of stored foods, and this would increase food spoilage and create some specific toxicological health hazards.

Sea levels around Africa are projected to rise by 15 – 95cm by the year 2000 (IPCC, 2001).

The rise in sea level in Atlantic Ocean may have catastrophic impacts on large coastal cities such as Banjul (Gambia), part of Lagos (Nigeria) and Alexandria (Egypt) (Nichols and Tol, 2006). Sea level rise would lead to submergence of the lowlands along the coast and much of the land currently used for agriculture would be lost leading to socio-economic and socio-cultural problems.

Resource conflicts:

Climate change is anticipated to increase conflicts as a result of struggles for resource use. The increasing supply and demand for resources such as food, water, oil, etc cannot be further assured with the inability of the climate to support its provision apart from other pressures coming from population growth. Evidences abound in Nigeria between the Fulani cattle rearers and the farming communities in Nigeria for struggle over graze land and water bodies especially. For example, the Mutumbiu and Mambila highlands in Taraba State, and the Fufure community in Adamawa State (Ozor, 2009). These crises have led to several deaths of farmers and pastoralists in the region. Also, the drying of streams and rivers in some communities due to climate change ultimately lead to their search for water

in neighbouring communities with its attendant man hour losses, propensity to trigger conflicts and hardships on the people. The situation could worsen for more millions of people as climate change alters the variability and quantity of available water. At the same time, the demand for water is increasing due to the country's growing population and its mounting aspirations. This situation triggers distributional conflicts and poses major challenges to water management systems in Nigeria. Nigeria will be hit in water stress because of our inadequate political and institutional framework necessary for the adaptation of water and crisis management systems.

Impacts on livelihoods:

Peoples' means of sustenance will be threatened with the increasing effects of climate change. With low yields in crops and animals, farmers' income will diminish and their ability to meet household needs (food, feed, fibre, fun, income, etc) will be difficult. The oceanic acidification and increase in surface water temperature, especially around the coast, will affect fish stocks and as a result, threaten the livelihood of small-scale fishing communities in the area. Reports of the IPCC (2007) show that climate change will pose great threats to communities that depend on fishing for their survival. The loss of lives, livelihoods, assets, infrastructure, etc from climate extreme events will further deepen the vulnerability of the poor.

Models indicate that for a 1oC warming a significant number of developing countries appear likely to experience net

losses (WBGU, 2003). The projected distribution of economic impacts is such that it would increase the socio-economic disparity between developing countries and developed countries, with disparity growing in step with warming, as impacts will fall disproportionately upon developing countries and the poor persons within them.

Impacts on employment:

There is no doubt that jobs will be lost as a result of the looming danger of climate change. This will further over-stretch the unemployment rate in Nigeria.

Firstly, industries that depend on agricultural products, fisheries and livestock for their raw material supply will receive the initial blow. They will be forced to cut down their employees in the short run in order to accommodate the reduction in scale of operation. At the long run, such industries might fold up if nothing is done to reverse the situation. Again, closing down industries that contribute to global warming will make more people to be unemployed.

Furthermore, climate change will lead to reduction in stream flows which will cause reduction in hydropower production, leading to negative effects on industrial productivity and costly relocation of some industrial plants. This will have effects on employment and income.

Environmentally-induced migration:

The effects of climate change are certain to displace some categories of people. The number of environmental migrants will substantially increase in future due to the impacts of climate change (WBGU, 2007). In developing countries

like Nigeria, the increase in drought, soil degradation and growing water scarcity in combination with high population growth, unstable institutions, poverty or a high level of dependency on agriculture means that there is a particularly significant risk of environmental migration occurring and increasing in scale (WBGU, 2007). For instance, people living in low lying islands and Deltas face the threat of being submerged by water, hence the only coping strategy will be to move out of the risk sites to more habitable areas (Ozor, 2009). This movement will greatly affect such people in many ways such as loss of their livelihoods, loss of social systems and values, loss of property and age-long acquired wealth, injuries and sometimes death. At the transit and destination points, it might generate conflicts of different dimensions, hunger and starvation, and health problems, including epidemic. This situation is worsened where there are no effective and efficient emergency management services to take care of the displaced people. In Nigeria, officials of such agencies have been accused of even diverting the goods and services meant for the people in trouble to other sources for their personal gains.

Impacts on health:

According to WBGU (2003), health is important in climate change debate for three reasons: a) health is recognized by all cultures, religions, states and social groups worldwide as an asset worthy of protection; b) health is affected by all drivers of global environmental change; and c) a population's state of health can

be used as an indicator to measure the impacts of climate change (Krafft et al., 2002), in a manner comparable to the key role of health within the Human Development Index (HDI). There is no doubt therefore that climate change will induce health problems as a result of such factors like hunger and starvation, water stress, pests and diseases, resource conflicts, injuries and stress from extreme weather events. Besides, health has a direct implication on agricultural productivity. According to Pittock (2005), climate change will increase threats to human health thereby affecting their productivity. Already, a study by the World health Organization shows that climate change is the cause of 150,000 deaths every year (WBGU, 2003). Campbell-Lendrum et al. (2003) have estimated the health impacts of climate change to include malaria, malnutrition, diarrhea, and flood related accidents. They estimated an annual health impact of 5.5 million DALYs (Disability-Adjusted Life Years). This represents the loss of healthy or productive life years (WHO, 2002). This cumulative measure has been developed as an indicator of a population's total disease burden (premature mortality, disease and disability). Results showed that the greatest health burden arising in the regions where vulnerability and population growth are greatest were in sub Saharan Africa and south Asia (WBGU, 2003).

Detailed analysis of the health damage triggered by climate change permits a distinction between direct and indirect impacts (IPCC, 2001). Direct impacts

include, for instance, the effects of extreme weather events (e.g. cardiovascular disease, asthma) or weather-related disasters (e.g. coastal or inland flooding and landslides). However, the greatest health damage arises through indirect effects, as in the case of vector-borne infectious diseases (e.g. infections caused by mosquitoes, ticks or flies). The IPCC predicts that by 2080, about 260- 320 million more people will be exposed to malaria worldwide (IPCC, 2001). Dengue fever or tick-transmitted meningitis are also vector-borne infectious diseases that can be influenced by climate change

RELATIONSHIP BETWEEN THE CLIMATE CHANGE AND POVERTY

Climate change will hasten the demise of poor and vulnerable communities in Nigeria. Abdalla (2010) postulates that climate change escalated desertification and environmental disasters in the Sahara Desert such that farmers and herders struggle to survive. It has eroded their ability to make a living. Currently poverty is a major challenge in Nigeria. Therefore, climate change may expose vulnerable communities to extreme poverty. Climate change is not a disaster but a natural hazard with the potentials capable of affecting many people negatively. UNDP (2008) defines natural hazards as a "natural processes or phenomena occurring in the biosphere that may constitute a damaging event and that in turn may be modified by human activities, such as environmental degradation and urbanization".

The International Research Institute (2007) confirms that climate-related disasters, such as catastrophic floods or prolonged drought, have enormous social and economic impacts that can negate many years of development. The prolonged dry periods characterized by damaged vegetation and loose soils, low or no crop production, loss of livestock, and heat-waves followed by heavy rains causing floods, gullies, and landslides, all contribute to the destruction of the environment (UN, 1996). In the Sahara Desert, vulnerability was worsened by the absence of clear environmental and development policies, combined with population growth, land degradation, and erratic rainfall (Abdalla, 2010). Recently torrential rains in some parts of Plateau State caused floods which killed at least thirty people, left dozens missing, 5090 people homeless, and washed away 2000 herds of cattle (This Day; August 8, 2012). The loss reduced the resilience of, and increased vulnerability to, poverty in the affected communities. Similar flooding has been experienced in Ibadan, Oyo State, in July, 2011 floods destroyed many lives and swept away many properties attributable to climate change. In response, the Nigerian Government action was limited to provision of immediate needs rather than long term strategies and this led to an increase of poverty (IFRC, 2007). As such, those who were poor before the disaster suffered increased economic and social hardships thereafter. They remained without habitable shelter, nutritious food, potable water, income, livestock, and

economic support to reconstruct their lives. In Nigeria, heavy down pours destroyed maize, millet, and sorghum in many farms in the area (Daily Trust, April 13, 2010). Climate change complicates the achievement of the MDGs by 2015 because of increased suffering and potentials for armed conflict within and between countries.

In addition to climate change, negative human attitudes and practices, especially discrimination and corruption, contribute to their vulnerability (IFRC, 2007). The World Disaster Report (2007:11) states that "disasters do not discriminate but affect minorities and majorities, the able and disable persons, young and old, men and women. But discrimination can multiply the effects of crisis on vulnerable people." As such, due to gender discrimination, disasters affect women and children more than men and female headed more than male headed households.

Gender mainstreaming in poverty reduction is critical as poverty impacts differently on women and men, in particular when coupled with crises and HIV/AIDS.

Therefore, it is equally important to track how gender discrimination widens when poverty deepens due to climate change (UNDP, 2003). This makes the poor female headed households and women more vulnerable to disasters or even poorer than they were before the disasters (IFRC, 2009). Human vulnerability refers to a condition or process resulting from physical, social, economic, and environmental factors

which determine the likelihood and scale of damage from the impact of a given hazard (UNDP, 2008). The Nigerian MDG Report (2004) shows that poor households are made vulnerable to hunger by inflation which erodes real incomes of farmers to subsist during unfavourable seasons. Nigeria estimates that 37 percent of the population lives below the poverty datum line. The greater proportion is female-headed households which live on less than a dollar a day. These households are over represented amongst those vulnerable to disasters and trapped in poverty. Although all human beings are vulnerable to climate change and related hazards, the poor are the most vulnerable. The Nigerian MDG Report (2004) asserts that economic modernization has eroded the traditional support mechanisms and has become a source of vulnerability for households.

In northern Nigeria where poor families used to get a small number of livestock, usually cattle, from those with more resources for purposes of milking, draught power, and possibly seed stock, has all but disappeared. The situation suggests that the United Nation's goal of halving poverty and hunger by 2015 may become a mere dream for African countries, Nigeria in particular, when family support systems collapse. Extreme poverty may characterize the period up to 2016 and this may be exacerbated by land degradation, less or heavy rain, crop failure, economic meltdown, and other climate change related factors (Ezemokwe, 1998; Abdalla, 2010).

LEVEL OF COMMUNITY PREPAREDNESS TO ADDRESS CLIMATE CHANGE

Community knowledge on climate change and how to prepare against its negative effects is inadequate in Nigeria. A sustainable strategy is not only a necessity but a requirement for communities to adopt techniques, lifestyles, and behaviour that is climate intelligent. The changes are not only pertinent to communities but also local institutions, households, and governments. There is need for good governance to resolve corruption issues regarding land allocation, resource and water management, and discrimination at all levels. Ezemokwe (1998) argues that, although a greater percentage of the surface area in Nigeria has the potential for agriculture, it is affected by rainfall variability combined with high evapo-transpiration rates which leads to crop failure. This condition affects the food security of the country especially at the household levels where people cannot afford to buy imported food (Ezemokwe, 1998). Though that is the case, no strategy has been developed to educate communities on these realities and assist them to devise new forms of sustainable livelihood which are environmentally friendly. The Nigerian government Poverty Reduction Strategy focuses on small scale agriculture development, expanding rural employment opportunities through rain fed crop production, increasing small stock production, strengthening community based natural resource management programmes, refocusing

social safety nets, creating employment opportunity in the tourism industry, and balancing capacity for small and medium citizen business. All these need to be linked with climate change policies and programmes. Sitton (2000) states that the Israeli Government's major transition from traditional to modern agriculture was based, from the beginning, on changing attitudes with regard to the supply of water to arid regions, combined with sustainable adaptation and implementation of advanced agricultural methods based on research and development. The country is arid with serious problems of water shortage because of stronger solar radiation and higher levels of water evaporation from the ground surface. Similar decisive action by the Government to provide water in the arid area and ensure that agricultural activities continue despite weather conditions should be taken in Nigeria.

Nigeria should revisit its framework on sustainable use of environmental resources which focuses on: (a) land degradation and the related issues of desertification, soil erosion and biodiversity loss; (b) conflicting land uses; (c) climate change; (d) access to water for household, livestock, arable and industrial use; (e) water scarcities; (f) fuel wood depletion and lack of alternative forms of energy; and (g) the protection/ of cultural and natural heritages (UNDP, 2003-2007). The following critical issues must be addressed with involvement of communities for climate change preparedness:

a) Water is a scarce resource in Nigeria, but the country is on course to ensure universal access to safe drinking water. The proportion of the population with sustainable access to safe drinking water has increased from 77% in 1996 to 97.7% in 2000 (UNDP, 2003-2007). The major problem is that water coverage does not include a provision for irrigation but only for domestic and industrial purposes.

b) It is assumed that environmental concerns, public education, and awareness activities are undertaken by environmental organizations within and outside government and that there has been an increase in public participation in management and use of natural resources. This is motivated by government's decision to devolve natural resources management and user rights to local communities. Public education in terms of the policy is lacking because not all communities are aware and utilize it (UNDP, 2003-2007). The policy has to incorporate climate change and be intensively disseminated to the wider community.

Among some of the strategies to arrest the decline of wildlife populations was the devolution of use and management of wildlife to local communities. However, the management capacity of many rural communities is low and the provision of necessary technical support is a mammoth task. Participation by the private sector in environmental management has been limited (UNDP, 2003-2007). Based on a global understanding of climate change, it is not only necessary to capacitate

communities but it should be a mandatory process.

CONCLUSION AND THE WAY FORWARD

The paper described what climate change is all about. It portrays climate change as 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). Such changes were attributed to the emission of gases known as greenhouse gases mainly; CO₂, CO, CH₄, N₂O, HFCs, PFCs, and SF₆ into the atmosphere. These gases trap the terrestrial radiations from the earth and re-radiate the heat back to earth, thereby leading to a general increase in temperature known as global warming.

The paper further described the effects of climate change to include flooding, drought, erosion, desertification, sea level rise, heat stress, pests and diseases, erratic rainfall pattern among others. These effects will undoubtedly impact on national development in the following ways; low agricultural productivity, food insecurity, resource conflicts, poverty, unemployment, environmentally-induced migration, health issues and livelihood problems.

The paper then suggests appropriate climate policy at national and local levels as the first step towards dealing with climate change problems. Similarly, the paper underpinned the new role of agricultural extension in the transfer of

improved knowledge and practices aimed at climate risk management.

RECOMMENDATIONS

The paper recommends the following measures to enhance better understanding and capability in dealing with climate change issues in Nigeria.

- The focus of government policies in Nigeria is on economic empowerment and, to a lesser extent, the use of natural resources without incorporating climate change strategies. Emphasis on economic poverty without taking into account other factors that may adversely affect the sustainability of such programmes is proving to be problematic
- There should also be widespread Climate Change Community Education and intensified advocacy at all levels of government in Nigeria. Communities should lead the process of making adjustments in their lifestyles and caring for their environment.
- A bill for the establishment of National Climate Change Commission (NCCC) in Nigeria with the mandate to deal with all climate change issues.
- Commission a National Benchmark Survey (NBS) to identify the remote and immediate causes of climate change, its effects, local knowledge and practices across our six geopolitical zones.
- Develop a National Adaptation Framework for all the geopolitical zones in Nigeria. This will include

plans for resettlement of victims of environmentally induced migration, resource conflicts, and crime and violence associated with climate risks.

- Partnerships between governments and other stakeholders including NGOs, CBOs, farmers, private sectors, and local communities to ensure a win-win situation against climate risks.
- *Going green*. This implies the use of environmentally-friendly equipment, machines, infrastructure, and technology that produce less of the GHGs. For example, improvement in rail transport, use of bio-fuels, and energy saving devices among others.

REFERENCES

- Abdalla, M Africa Oldest Victims of Climate Change in the African. (2009/2010). Org: views and analyses from the African Continent, Institute of Security Studies, Pretoria, Issue 4, December
- Acquah, B. K (2000). Farming Systems Approach to Technology Development and Transfer: An Overview. A paper presented at a Conference on Development Strategies for Farming systems, 25-27 July, 2000, Department of Agriculture, Gaboron
- Adejuwon, J.O. (2006). *Food security, climate variability and climate change in sub-Saharan West Africa*. Assessments of Impacts and Adaptations to Climate Change (AIACC), Project No. AF 23 A Final Report, AIACC Project Office, Washington, D.C.
- Africa Action (2007). Africa Policy e-Journal. Available at <http://www.africaaction.org> (12/11/07).
- Campbell-Lendrum, D. H, Pruss-Ustun, A. and Corvalan, C. (2003). How much disease could climate change cause? In: A. J. McMichael, D. H. Campbell-Lendrum, C. Corvalan, K. Ebi, A Githeko, J. Scheraga and A. Woodward (eds) *Climate Change and Health: Risks and Responses*. WHO, Geneva.
- Ezemokwe, I. (1998). Food Policy: Managing Drought and the Environment in Nigeria. *Africa Development*. xxiii (2): 62-83.
- FAO (2007). Adaptation to climate change in Agriculture, forestry and fisheries: Perspective, Framework and priorities. Rome. Available at: www.fao.org/icatalog/inter.e.htm (13/11/07).
- Federal Ministry of Environment (FME) of the Federal Republic of Nigeria, (2003). Nigeria's First National Communication under the United Nations Framework Convention on Climate Change.
- German Advisory Council on Global Change (WBGU) (2003). *Climate Protection Strategies for the 21st Century: Kyoto and beyond*. Special Report. Berlin, Germany, WBGU: 1.
- German Advisory Council on Global Change (WBGU) (2007). *World in Transition: Climate Change as a*

- Security Risk*. Berlin, Germany, WBGU: p13.
- International Federation of Red Cross and Red Crescent Societies (IFRC, 2007). *World Disaster Report: Focus on Discrimination*. Switzerland: ATAR Press. Geneva,
- International Federation of Red Cross and Red Crescent Societies (IFRC, 2009). Climate Change Conference, "Background document on Red Cross Red Crescent and Climate Change", COP 15 Copenhagen 7- 18 December 2009.
- International Labour Organization (2007). Decent Work and Poverty Reduction Strategies, Geneva, Switzerland Online at http://www.ilo.org/..ed_emp/documents/publication (accessed on 30/3/10).
- Intergovernmental Panel on Climate Change (IPCC) (2007). Impact, Adaptation and Vulnerability. Contribution of Working Group I of the Intergovernmental Panel on Climate Change to the Third Assessment Report of IPCC. London: Cambridge University Press.
- Intergovernmental Panel on Climate Change (IPCC) (2001). Impact, Adaptation and Vulnerability. Contribution of Working Group II of the Intergovernmental Panel on Climate Change to the Third Assessment Report of IPCC. London: Cambridge University Press.
- Krafft, T., Bissel, R. and Rosenberg, M. (2002). *Health and the Environment. A Cross Cutting Issues in Global Change Research*. German National Committee for Global Change Research (NKGCF), Munich.
- Leeuwis, Cees (2006). Communication for Rural Innovation: Rethinking Agricultural Extension, 3rd ed. The Netherlands: Blackwell Publishing p.27.
- Osman-Elasha, B. (2009). Managing Africa's Water in a Changing Climate. *Jotoafrika: Adapting to Climate Change in Africa Issue 2*, 1-10
- Ozor, N. (2009). "Understanding Climate Change: Implications for Nigerian Agriculture, Policy and Extension". Paper presented at the National Conference on "Climate Change and the Nigerian Environment", organized by the Department of Geography, University of Nigeria, Nsukka, 29 June – 2 July.
- Ozor, N. and Fodeke, V. (2009). "The Role of the Designated National Authority (DNA) Capacity Building". Paper presented at the 2009 Africa Energy Week titled "Energy, Economy, and Environment" which held in Cape Town, South Africa from 6-10 July.
- Ozor, N. and Umehai, M.C. (2009). "Effects of Climate Change on the Livelihoods of Wetland Inhabitants in Nigeria – A Review". Paper presented at the National Conference on "Climate Change and the Nigerian Environment", organized by the Department of

- Geography, University of Nigeria, Nsukka, 29 June – 2 July.
- Pittock, A.B. (2005). *Climate Change: Turning up the Heat*. London: Earthscan: pp.1-23.
- Spore, (2008). Climate Change. A Bi-monthly Magazine of the Technical Centre for Agricultural and Rural Cooperation (CTA). Wageningen.
- Sitton, D (2000). Advanced Agriculture as a Tool Against Desertification, Applied Research Institutes, Ben-Gurion University of the Negev, Israel.
- United Nations, Economic and Social Commission for Asia and the Pacific (1996). Rural Poverty Alleviation and Sustainable Development in Asia and the Pacific, New York.
- UNDP (2008). Natural Disaster as a Cause and Product of Failed Development in Reducing Disaster Risk: A Challenge for Development. <http://www.hdr.undp.org/hd/default.cfm> accessed online on 30/3/10
- United Nations Environmental programme UNEP (2007). “Global Environmental Outlook”. *Environment for Development* Kenya, p 540.
- World Health Organization (WHO) (2002). World Health Report 2002: Reducing Risks, Promoting Healthy Life. WHO, Geneva.