

## Climate Change Adaptation and Disaster Risk Management in Nigeria for Sustainable Development

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### Abstract

Hydro-meteorological hazards such as floods, droughts and tropical cyclones afflict many regions of the world. The impact of such hazard includes the destruction of natural habitat and resources, loss of lives and livelihood. These risks tend to increase the poverty in the world particularly the developing countries. Nigeria being located in a region very prone to natural disasters and due to poverty most average Nigerians do not have the resources to build strong and fortified houses or structures to with stand such disaster. Climate change threatens to heighten these impacts in many areas, both by changing the frequency or intensity of extreme events and also by bringing changes in mean conditions that may alter the underlying vulnerability of populations to hazards. In the next few decades these may result to an increase in the global burden of weather-related disasters. Such disaster events can threaten the sustainability of development processes and undermine progress toward poverty reduction in our continent particularly Nigeria. Disaster risk management requires a holistic action to reduce impacts of extreme events before, during and after they occur. These holistic actions include technical preventive measures and also the aspects of socio-economic development designed to reduce human vulnerability to hazards. Approaches toward the management of climate change impacts also have to consider the reduction of human vulnerability under changing levels of risk. This paper therefore attempts to scrutinize the challenge and opportunity that lies in building a bridge between current disaster risk management efforts aimed at reducing vulnerabilities to extreme events and efforts to promote climate change adaptation in our building design and construction. This would lead to better understanding the extent to which current disaster management practices reflect future adaptation needs and assess what changes may be required if such practices are to address future risks in Nigeria.

**Keywords:** Climate change, Disaster, Risk management, Sustainability and Poverty Reduction.

### Background to the Study

Climate change and its impact are one of the most important challenges for the future of mankind. It is a global phenomenon and its impacts will be felt locally in cities, towns and other human settlement in the rural areas. In era of rapid urbanization mainly in developing countries, cities are more at risk as climate change impacts which add to and reinforce existing environmental, economic and social problem of the environment (Doshu, 2008). The sustainability of economic growth, poverty reduction, the quality of life and political stability in Africa is seriously threatened by climate change. The intergovernmental panel on climate change (IPCC) presented a report on socio-economic activities of human to emission of greenhouse

gases (GHG) has a great influence on climate change (IPCC, 2007). On the other hand the Stern Review presented a comprehensive cost benefit analysis of concerted response to climate change. This review estimated that when nothing is done, climate change could cause an economic loss which is equivalent to a permanent 5% average per capital consumption. When environmental and social impacts are included to a wider range it could rise to as high as 20%. When effective measures are taken to reduce GHG emission of a least 1% global GDP it would mitigate future climate change and avert welfare losses (Review, 2006).

Although in Africa the total greenhouse gas emissions to atmosphere is so little compare to the western world, but still the African union in January 2007 session urges member state, region and economic communities (REC) in collaboration with private sector, civil society and development partners to integrate climate change considerations into development strategies and programmed at national and regional level. At the Gleneagle summit in July 2005, the head of state and government of G8 state called upon the world bank and Regional development bank prepare specific proposal to reduce the impact of the greenhouse gases emission in the atmosphere that affect the climate change since the developed countries are responsible for most of this greenhouse gases (Few,2006).

Since climate change has a great implication on food security and livelihood, there is need for climate change issues and awareness to be integrated to development process at all levels in our nation (climate change solution, 2007).

Adaptation can be defined as adjustments of a system to reduce vulnerability and increase the resilience of the system to change. In this case the system is climate.

It is also a response to climate change that seeks to reduce the vulnerability of biological system to climate change effects. Even if emissions are stabilized relatively soon, climate change and its effects will last many years and adaptation will be necessary. Climate change adaptation is anticipating or monitoring change and undertaking actions to address the consequences of that change (climate change adaptation definition) (IPCC, 2007).

#### Facing up to Climate Change Risk in Nigeria

Since mitigation is not the complete or total solution to climate change as a result of its multifaceted impact on development in Nigeria. The metrological and hydrological extremes of climate change impacts such as droughts, storms and flood which threatens lives, socio-economic assets and livelihoods. In Nigeria just like most African Countries, the nation depends on rain-fed agriculture in most times this affect the performance of development of economic through agriculture (Figure 1).





Figure 3 Report of displaced families of 2012 flood in Nigeria

The economic and financial rates of return are been compromise due to climate variability and extreme event which also reduce the economic and social infrastructures, affect sustainability and performance. Climate change uncertainty and unpredictability can be a powerful deterrent to investment which may result to permanent reduction of economic growth of the nation (Figure 4).



Figure 4 poorly constructed buildings affected by 2012 flood in Nigeria.  
[Http://www.vanguardngr.com/2012/10/victims-count-losses-as-flood-ravages-gombe/](http://www.vanguardngr.com/2012/10/victims-count-losses-as-flood-ravages-gombe/)





Figure 5 Report of 2012 flood victims in Nigeria.

[Http://www.sustainabilitysc.org/magazine/top-10-countries-most-affected-by-climate-change/](http://www.sustainabilitysc.org/magazine/top-10-countries-most-affected-by-climate-change/)

According to the IPCC, Africa is the most vulnerable continent and the situation to climate change and climate variability; and the situation are aggravated by the interaction of multiple stresses occurring at variable levels, compounded by low adaptive capacity (IPCC, 2007). Climate change expects projects that all sub-regions of the continent will experience a temperature rise higher than the global mean annual warming (Figure 6). Most part of the continent is expected to experience reduced average rainfall and increase aridity and droughts. When there is reduction in rainfall and higher temperature it is expected that there will be increased aridity and a net drying for a greater proportion of the continent (IPCC, 2007).



Figure 6 Effect of high temperature & reduction in rainfall on the land.

[Http://www.sustainabilitysc.org/magazine/top-10-countries-most-affected-by-climate-change/](http://www.sustainabilitysc.org/magazine/top-10-countries-most-affected-by-climate-change/)

There is a continuous need to address mitigation through the promotion of low carbon technology and infrastructure option which will clearly address climate risk mitigation even as the G20 are taking more proactive role in promoting clean energy and green house transmission. (verbrugen, 2007)

The movement of people from the rural setting to urban centers as a result of loss of livelihood which is cause by drought can cause an additional burden of widespread of disease. The movement of people increases urbanization and the socio-economic condition which is already exacerbated by high level of city population growth is also another stressed (Figure 7).



Figure 7 Report of drought on the movement of people from rural setting to urban centers.  
[http://www.huffingtonpost.co.uk/maria-caspani/male-child-nigerian-women\\_b\\_4180740.html](http://www.huffingtonpost.co.uk/maria-caspani/male-child-nigerian-women_b_4180740.html)

Most dwelling places in Nigeria have poor drainage facilities which make dwelling places prone to flood and ill health (Figure 8, Figure 9). Less than one million people were affected by 2013 flood, few people lost their lives (Osayande, 2014). There was a decrease in the number of people affected by the impact of climate change in 2013 due to the initiatives by the Nigerian metrological Agency 'ability to early rain prediction, workshops, meeting with stake holders. Vulnerable communities and safe ground in all vulnerable communities were identified and temporary shelters were provided (Osayande, 2014).



Figure 8 Report of 2012 flood in Nigeria as a result of poor drainage facilities  
<http://www.voanews.com/content/aid-agencies-say-west-african-governments-should-better-prepare-for-disaster-131913668/146690.html>



Figure 9 Report of flood in Nigeria 2012  
[http://ec.europa.eu/echo/news/2013/20130813\\_en.htm](http://ec.europa.eu/echo/news/2013/20130813_en.htm)

As result of highly variable rainfall pattern caused by climate change, women are increasingly hit by this due to the fact that most states in our nation or society looks primarily to these women to feed their families. Women find it hard to manage current climate risk and adapt their livelihood to long term climate change in Nigeria because of gender inequalities in rights over land resources, access to technology and information (Figure 10). Although the present administration in the country is trying very hard on this aspect but still more need to be done

with regards to this. In new areas or locality with poor drainage facilities in the nation a lot of expectant women, infants and children with no previous immunity are at greater risk to the spread of malaria and other infectious diseases. The present administration is increasingly paying attention to mitigating the effect of climate change on gender equality though it focus on gender main streaming and women's economic empowerment in programs like Sure P, You win Agricultural grand and loan program for women in Nigeria.



Figure 10 Report of women increasingly hit by variable rainfall pattern in Nigeria 2012

#### The Option in Africa for Climate Change Risk Management and Adaptation

The negative impacts of climate change in our nation far outweigh the few benefits that it brings to some areas. Nigeria needs prudent responses simultaneously of implementation. There is the need to develop adequate capacities to manage present climate change, the policies should be directed to specific programs and projects which include strategies and measures to manage risk arising from climate change variability and change e.g. to possible adaptation to climate change.

Most of us that are into farming in Nigeria can testify that the effort of the government in improves seedlings and livestock that are better suited for the changed growing condition in the nation such as higher temperature, shorter rainfall pattern and more unpredictable rainfall patterns.

#### Society Adaptation to Climate Change

In the aspect of construction of individual dwelling, new technical and social standard for sitting and construction of dwelling that could maintain ambient temperature, humidity with minimum energy consumption per capital should be put in place. For example, there is need for most of our houses to use low energy bulb, use of local building material that are weather friendly and the structure to be well landscaped.



A change in behavior of greater energy efficiency, water conservation and greater social valuation of natural ecosystems such as forests all could constitute expression of adaptation to the realities of climate change (Klein, 2007).

The society need to use the above policies or methods to adapt themselves to changing climate and the changed climate conditions. Through this adaptation, individual, local communities and the entire nation aim to preserve themselves and maintain their welfare in the face of long term climate change and its impact on the environment. Adaptation is inherently local, the direct impact of climate change are felt locally therefore the response measure need to be addressed to local circumstances. The national policies and strategies need to guide and support this effort to be robust.

The Kyoto protocol needs to renew their commitment to reduce the emission of GHG by the international community toward the mitigation of climate change and its impact in the long term. Since Africa only produces less than 5% of global GHG emission it has contributed less to past emission.

#### The Challenges and Opportunities that Lies in Climate Change Risk Management and Adaptation in Nigeria

Nigeria is faced with a number of challenges in mainstreaming climate change management and adaptation into development planning, policy, public and private investments. These challenges include; Nigeria is lacking the capacity and resources to track metrological patterns, forecast impacts and access risk. This is due to limited availability of reliable and useful climate information. Thus, cannot provide the nation with good quality information, also less able to target the public investments and develop policies that can reduce vulnerability.

#### Climate Change Adaptation

Climate change adaptation is especially important in developing countries, since these countries are predicted to bear the brunt of the effects of climate change. Adaptation to global warming is a response to climate change that seeks to reduce the vulnerability of biological system to climate change effects (adaptation to global warming). Even if emissions are stabilized relatively soon, climate change and its effects will last for many years in our continent and adaptation will be necessary. Adaptive capacity is closely linked to social and economic development (IPCC, 2007) the economic cost of climate change adaptation is yet unknown, it may likely cost billion Dollars annually for the next few decades.

Another policy to climate change known as climate change mitigation (Verbruggen, 2007) is to reduce the greenhouse gas emission (GHG) or enhance the renewal of these gases from the atmosphere through (carbon sink). The need for adaptation is unavoidable due to the fact that the most effective emissions would not prevent further climate change impact. In the absence of mitigation effort, the effect of climate change would reach such a magnitude as to make adaptive impossible for some natural ecosystem (Klein et al, 2007).

### Mitigation / Adaptation

1. Reduction in the amount of carbon dioxide released into the atmosphere can only be done when we stop or reduce the cutting and burning of our forest. The burning and cutting of forest has released vast amount of CO<sub>2</sub> into the atmosphere, which in turn resulted to poor agriculture which in turn resulted to CO<sub>2</sub> being released from the soil.
2. The use of renewable energy which include energy from the solar, wind, wave and bio-fuel. The fossil fuel directly substitute for renewable energy and help in eliminating CO<sub>2</sub> emission entirely.

### Conclusion

1. Since climate change adaptation is all about anticipating or monitoring change and undertaking actions to address the consequences of that change, Nigeria need to evaluate the 2013 adaptation or risk control option used. (Effectiveness, cost implication, residual risk and stakeholder's acceptance).
2. Nigeria also needs to develop a risk communication plan related to residual risk and also update risk information library.
3. There is need for Nigeria to develop implementation plan for anticipatory adaptation or risk control measure.

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