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Family Awareness of the Causes and Effects of Climate Change

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Abstract

The study investigated family awareness of causes and effects of climate change. Area of the study was Nsukka town in Enugu state of Nigeria. Population of the study included all 111, 026 families residing in Nsukka town. Purposive random sampling technique was used to select 278 (139 rich and 139 poor) adult family representatives, with means of livelihood. Descriptive survey design was employed. Questionnaire and structured interview schedule were used to collect data. Mean was used for data analysis. Findings reveal low awareness of the causes and effects of climate change among families (much lower among poorer families); climate change information is disseminated through various media, including television, radio programs/announcements, special columns on climate change in newspapers, social media, group forums and school subjects. Recommendations include that the strategies to be put in place to raise climate change awareness levels and measures for mitigating climate change influence be designed to reach both poor and rich families.

Keywords: Family, Awareness, Causes, Effects, Climate Change.

Introduction

The family is an intimate domestic group made up of people related to one another by bond of blood, sexual mating or legal ties. As a resilient social unit, families have survived and adapted through time. The family exists in the environment and whatever affects the environment affects the family. Climate change (CC) as an environmental issue impacts heavily on the environment, and by extension constitutes a threat/challenge to the existence and sustenance of families.

Climate change is described as a gradual change (increase or decrease) in the average temperature of the Earth's atmosphere and its oceans, believed to be permanently changing the Earth's climate (Livescience, 2016). It describes a change in composition of the atmosphere that is over natural variations, attributed directly or indirectly to human activities, which in addition to natural climate variability, is observed over comparable time periods (Obioha, 2009; Omotosho, 2007; United Nations Framework Convention on

Climate Change UNFCCC, 2007) and manifests in temperature increases, change in precipitation, sea level rise and the intensification of natural hazards such as storms, floods, droughts and landslides (Odjugo, 2010). The scientific consensus on climatic changes related to global warming is that the average temperature of the Earth has risen between 0.4 and 0.8°C over the past 100 years, and is predicted to increase between 1.4 and 5.8 °C by the year 2100 (Livescience, 2016).

Two main causes of CC include natural or bio-geographical processes and human or anthropogenic activities (Olaniyi, Funmilayo & Olutimehin, 2014; Olaniyi, Ojekunle & Amujo, 2013). Astronomical and extraterrestrial factors make up the natural process that cause CC. The astronomical factors include changes in the eccentricity of the earth's orbit, changes in the obliquity of the plane of ecliptic and changes in orbital procession while the extra-terrestrial factors are quantity (intensity) and quality of solar radiation, effect of impact craters, near earth objects, aerosols, and meteorites, among others. The anthropogenic factors implicated in CC revolve around human activities that either emit large amount of greenhouse gases (CO_2, CFCs, CH_4, N_2O, and H_2O_g) into the atmosphere that depletes the ozone layer or activities that reduce the amount of carbon absorbed from the atmosphere like deforestation (Ishaya & Abaje, 2008; Wallace & Hobbs, 2006). The human factors that emit large amounts of greenhouse gases include industrialization, burning of fossil fuel, gas flaring, urbanization and agriculture (Odjugo, 2010; Behnke & Macdermid,2004).

Available evidence shows that CC as a global phenomenon, is characterized by global effects, the most adverse of which will be felt mainly by poor people, developing countries (especially those in Africa) due to their low level of coping capabilities (Nwafor 2007; Jagtap 2007). Scotland and Northern Ireland Forum For Environmental Research, SNIFFER (2009) insists that the impact of CC is not evenly distributed. They opined that poorest countries and people will suffer earliest and the most because they are more exposed, more vulnerable to the impacts and finds it harder to recover when they occur. The 4th IPCC Assessment report confirmed that Africa, of which Nigeria is a part, will be worst hit by these effects of CC (IPCC, 2007). This is in conformity with SNIFFER- Project Search "UKCC 22" documentation that the people who are likely to be most vulnerable to the impacts of CC are those;

- Living in places at risk.
- People who are already deprived by their health, level of income, quality of their income and mobility, as well as capacity to adapt and who are less supported by family, friends and agencies.
- People who lack awareness of the risks of CC, the capacity to adapt and who are less well supported by family, friends and agencies.

As predicted, Nigeria is experiencing adverse climate conditions, with the

negative impacts manifesting on the welfare of millions of her populace, which is adversely affecting productivity in the country (Ziervogel, Bharwani & Downing, 2006). Nigeria, as a developing country, has witnessed persistent droughts, flooding, off-season rains and dry spells, all of which have immensely altered farming seasons in Eastern Nigeria, increased the prevalence of diseases (like malaria, diarrhea, Meningitis) and drought in the Northern part of the country, increased the incidences of flooding and erosion in the South (Odjugo, 2010). These variations in climate parameters as seen in the country affect different sectors of the economy such as agriculture, health, water resources, energy, and so on (Ministry of Environment of the Federal Republic of Nigeria, MoEFRN, 2010). All these have major implications for families. As critical as the effects of CC is on families, it remains unclear whether they are aware of what causes CC or its effects (Obioha, 2009).

Present strategies set by governments and agencies to address the challenges posed by CC recognize that there is no best solution. In this sense, CC provides new incentives for the need to plan ahead, to observe trends and anticipate extreme events (Zevenbergen, Veerbeek & VanHerk, 2008). There thus arises the urgent need to sensitize the general population regarding CC. To address all CC-related issues effectively and make for environmental sustainability and by extension family wellbeing, it is essential to assess awareness regarding CC among families. Lack of proper information, dissemination of information about climate change is in the view of Mbah and Ayegba (2013) one of the major problems militating against proper climate mitigation of and adaptation to climate change. Within the context of the above, all that is needed is anticipation and increased awareness of causes, effects, management strategies to meet the present needs and a path of adjustment for the future, in order to cushion families from severely suffering the impacts of CC, and consequently promote family wellbeing. It is on the backdrop of this that the present study was conducted.

Purpose of the Study

The general purpose of the study was to investigate family awareness of the causes and effects of CC. Specifically, the study:

1. determined the extent to which families are aware of the causes of CC.
2. determined the extent to which families are aware of the effects of CC.
3. identified media via which families get information about CC.

Research Questions

The following research questions guided the study:

1. To what extent are families aware of the causes of CC?
2. To what extent are families aware of the effects of CC?
3. What are the media via which families get information about CC?

Methodology

***Design of study*:** The study adopted descriptive survey design.

***Area of study*:** The study was conducted in Nsukka town, situated in Nsukka local government area of Enugu state, Nigeria. Families here include civil servants, traders and farmers, majorly dependent on rain-fed agriculture, which is seriously *implicated in CC.*

***Population for the study*:** The population of the study include all 111,026 family representatives in Nsukka town. The family representatives which made up the study population were adult members of families above the age of 21, that have a means of livelihood and/or a source of income.

***Sample for the study*:** According to Nwanna in Onuoha, Nnodu & Uwadiegwu (2014), should the population for a survey study be up to hundred thousand or more, a sample of 0.5% or 0.25% is appropriate for the study. Considering the population size, a sample of 278 family representatives (adult members of a family above 21 years and earning an income), representing 0.25% of the entire population was used for the study. This sample comprising 139 rich persons and 139 poor persons, based on their monthly income, were selected using the purposive random sampling technique. The World Bank poverty index which defined a poor person as an individual earning less than $ 1.90, approximately N 597.65 per day was used for the categorization (The World Bank, 2015). All family representatives within this income bracket were considered poor and those above it were taken to be rich.

***Instrument for data collection*:** The instruments for data collection were questionnaire and structured interview schedule. The questionnaire tagged Questionnaire on Family Awareness of the Causes and Effects of CC (QFACECC), was developed in line with reviewed literature and the purpose of the study, so as to elicit data with which the research questions were answered. The questionnaire had two sections, the first requesting respondents' biodata and the second made up of three clusters with 10 items each on causes, effects and media. Altogether a total of 30 items with a 4-point Likert type response scale of strongly agree, agree, disagree and strongly disagree was used. The interview schedule included follow-up questions from the questionnaire items and served the purpose of eliciting more information about the responses given by the interviewed respondents on their awareness of the causes and effects of CC. They were both face validated, trial-tested, and the former had a reliability index of 0.92.

***Data collection techniques*:** Two hundred and seventy-eight copies of the questionnaire were administered to respondents by hand. The entire 278 copies were returned. This gave 100 percent return. Twenty respondents (ten poor, ten rich) were interviewed using the interview schedule. Qualitative data was also collected through the interviews. Respondents were interviewed briefly upon return of

their questionnaire to ascertain the extent to which they are aware of the causes and effects of CC. The interview was such that the respondents provided more insight into the responses they had given in the questionnaire.

***Method of data analysis*:** Collected data was analyzed using mean. Criterion mean of 2.50 was adopted as decision rule, thus mean responses < 2.50 were tagged "disagree," indicating that the respondents disagreed with the item for which the mean score was calculated. However, mean scores ≥ 2.50 were tagged "agree," indicating that the respondents agreed to the item which had such mean score.

Findings of the Study

The following findings were made:

Extent of Families' Awareness of Causes of CC

Table I: Mean scores of respondents on extent to which families are aware of the causes of CC.

S/N	Indicators of Awareness of Causes of CC	Status	
		$\bar{X}_p$	$\bar{X}_r$
1.	Solar radiation	2.76**	3.50***
2.	Aerosols	1.38*	2.31*
3.	Volcanic eruptions	1.09*	1.57*
4.	Impact craters/meteorites	1.04*	1.94*
5.	Sun spots and solar wind	1.14*	1.22*
6.	Deforestation	2.15**	3.02***
7.	Emitted Greenhouse Gases	1.32*	3.17***
8.	Burning of fossil fuel	1.91*	2.90**
9.	Increased use of chemical fertilizers	1.13*	1.56*
10.	Increased emission of fossil Carbon (IV) oxide	1.47*	2.07**
	Grand Mean	**1.54***	**2.42****

$\bar{X}_p$ = Mean Responses for Poor Families $\bar{X}_r$ = Mean Responses for Rich Families *** Very Highly Aware ** Highly Aware * Least Aware

Table I shows the extent to which families are aware of the causes of CC. Results show that families are aware of the causes of CC to varied extents, with grand mean scores 1.54 and 2.42 indicating that poor families are least aware of these causes while rich families are highly aware.

Findings from the interview shows:

- Very low level of awareness to the causes of CC.- some insisted that the only thing responsible for CC is the increased intensity of the sun
- Respondents do not know what aerosols and meteorites are, or how they contribute to CC.
- Respondents do not know and expressed shock at the fact that fertilizers used on the soil can cause CC. One quipped "How can fertilizer used on land affect climate"
- Sunspots and solar wind are concepts alien to the respondents. They asked " is solar wind different from the normal wind on earth?". Does the sun

have its own wind? How does the wind of the sun affect the Earth climate

Extent of Families' Awareness of Effects of CC

Table 2: Mean scores of respondents on extent to which families are aware of effects of CC.

S/N	Indicators of Awareness of Effects of CC	Status $\overline{X}_p$	$\overline{X}_r$
1.	Hotter dry seasons (increase in average temperature)	2.59**	2.77**
2.	Wetter rainy season (increase in average rainfall)	2.83**	2.96**
3.	Changes in agricultural timetables	2.77**	2.21**
4.	Appearance of new diseases	2.54**	1.99*
5.	Fluctuations of weather patterns and seasons	2.00*	2.43**
6.	Drought	2.13**	2.80**
7.	Floods	2.77**	2.96**
8.	Water shortages	2.78**	2.51**
9.	Extreme weather	2.80**	2.82**
10.	Colder harmattan	2.39**	2.72**
	Grand Mean	**2.26****	**2.52****

$\mathbf{X_p}$ = Mean Responses for Poor Families $\mathbf{X_r}$ = Mean Responses for Rich Families *** Very Highly Aware ** Highly Aware * Least Aware

Table 2 shows the extent to which families are aware of the effects of CC. Results show that families are aware of the effects of CC to varied extents, with grand mean scores of 2.26 and 2.52 indicating that poor and rich families are highly aware of the effects of CC, even though rich families seem to be more aware.

Findings from the interview reveal among other things that:

4. Respondents have witnessed increasing temperatures, floods, shortage of water, drying up of water bodies, extreme weather (colder and hotter temperatures), dry seasons being hotter than normal, among other effects of CC listed in the questionnaire.
5. Very few of the respondents seem to know that these phenomena outlined above are all due to CC.

The following comments from some of the interviewees serve to buttress these points:

6. A respondent said "for some time now whenever you plant cocoyam it rots in the soil and doesn't grow. It made cocoyam very scarce in Nsukka. We use to think it's because the ground was too hot. Was it CC causing it?"
7. Another respondent highlighted the lack of starch in *garri* made from Nsukka cassava and the once popular *ose Nsukka* (Nsukka pepper) known for being very hot and having a distinct flavour losing all its distinguishing attributes. She said: "in recent time, the yellow *Ose Nsukka* is no longer peppery and rots faster than normal once plucked. Cassava from Nsukka land doesn't ferment when soaked in water and if

used to produce Nsukka garri, the garri doesn't have starch. Is it CC that has been causing all these?"

8. Another interviewee noted that there was a particular lake around her home when she was in primary school but it has dried up. In her words, "back in primary school there was this lake in our neighborhood. I recall we kids going to swim there but growing up now the lake have dried up; it is no longer there. Is this due to the changing climate too?".
9. Other interviewees observed that Nsukka weather has been getting hotter too, and the ice pellets which used to fall with rain during rainy seasons in Nsukka have all disappeared.

Media via Which Families Get Information About CC

Table 3: Mean scores of respondents on media via which families get information about CC.

S/N	Indicators of media via which families get information about CC	Status $\bar{X}_p$	$\bar{X}_r$
1.	The use of television via TV programs.	3.13**	3.33**
2.	Radio programs/announcements.	3.16**	3.29**
3.	Special columns on CC in newspapers.	2.55**	2.59**
4.	CC sensitization campaigns/programme.	2.74**	2.81**
5.	Social media platforms on the internet.	2.51**	3.17**
6.	Bulk SMS	1.32*	2.11*
7.	Group forums (meetings)	2.61**	3.77**
8.	School subjects	3.35**	3.04**
9.	Symposia	1.35*	2.47*
10.	Workshops/Conferences	1.10*	3.12**
	Grand Mean	**2.54****	**2.85****

$\mathbf{X_p}$ = Mean Responses for Poor Families $\mathbf{X_r}$ = Mean Responses for Rich Families ** Agreed * Disagreed

Table 3 shows the view of respondents on the media via which families get information about CC. Data on the table indicates that the respondents agreed to items 1-5 , 7 and 8 as being the media via which families get information about CC. Respondents however disagreed to items 6 (bulk SMS), 9 (symposia), and even 10 workshops and conferences indicating that they do not represent media through which families get information on CC.

Results from the interview indicate the following:

8. Climate change information gets to families through radio, television, sensitization campaigns, social media platforms and the internet, newspapers, school subjects, among others.
9. Respondents do not believe it is possible for bulk SMS to be used to disseminate information on climate change.

10. Some of the respondents do not know what symposium is and those who do, believe that symposia, conferences and workshops are restricted to academicians/people in universities and as such the common man has nothing to do with them.

On bulk SMS being used to disseminate information on CC, one of the interviewees expressed shock at the possibility, making such comments as "is bulk SMS no longer used for sending wedding invitation? How can it be used to give CC information?" Another respondent with a curious expression on her face queried "who will send the messages on CC? who will it be sent to? How will the sender get people's phone numbers?" Regarding symposia, most of the interviewed respondents expressed almost zero knowledge of what symposia are, talk more of it being a media through which CC information is spread. One of the interviewees actually asked " what is symposia? How is it done?"

Discussion

It is evident from table 1, that poor and rich families are generally aware of the following causes of CC: solar radiation and deforestation. The former representing a natural cause and the later a human cause. This is in line with the submission of Olaniyi, Funmilayo & Olutimelim (2014) who classified these causes of CC into two basic factors: natural or bio-geographical processes and human or anthropogenic causes. The natural causes of CC include among others solar radiation, aerosols, volcanic eruption, impact craters, changes in solar climate and solar flares. The anthropogenic causes of CC on the other hand include emission of GHGs, burning of fossil fuel, increased use of chemical fertilizers, among others. The results further show that rich families are more aware of all the causes of CC than poor families. The rich families are more aware of such causes of CC as solar radiation, emitted GHGs, deforestation, burning of fossil fuel, aerosols, increased emission of CO_2, impact craters/metorites, volcanic eruptions, increased use of fertilizers, sunspot and solar wind (in descending order). Poor families are however aware of such causes as solar radiation and deforestation only. This finding is corroborated by Harvey (2015), who posits that urban populations (who are mostly rich) are more aware about CC causes than people residing in rural areas (who are mostly poor). This could be attributed to among other things the enhanced economic status in the urban areas, as well as increased access to information and education.

Data presented on Table 2, shows clearly that families are aware of the effects of CC outlined in the instrument. The respondents from the interview explained that they have noticed these effects but did not know they were caused by CC. These effects include weather fluctuations, increase in average temperature, prolonged rainy seasons, changes in agricultural time tables, appearance of new diseases, drought, flood, water shortages longer season and colder harmattan. The table further shows that the effects of CC is as high among the poor as it is among the

rich. For this reason, the effects of climate change are described as global by Udenyi (2010). In Sub-Saharan African countries like Nigeria, CC constitutes a threat to agricultural systems and food security (Okoli & Amaechi,2014),health and healthcare systems(Nichols, Maynard, Goodman & Richardson,2009;Hosking, Jones, Percival, Turner & Ameratunga,2010).finance and economic growth, sustainable growth and development, melting of the polar ice caps, as well as an increase in occurrence and severity of storms and other severe weather events adversely affecting movement, shelter and even education (Ogbo & Onyedinma, 2012; Olaniyi, 2013; Okoli & Amaechi, 2014; Alexander & Dim, 2016; Livescience, 2016).

The media through which families get information about climate change include TV programs, radio programs, CC columns in newspapers, sensitization campaigns, social media platforms on the internet, group forums and school subjects. Ameller, Cervone, Kafatos & Jones (2008) posit that the various forms of media have been and is currently being used as a tool for dissemination of information regarding environmental issues, one of which is climate change. Respondents interviewed indicated that other media via which families get information about CC in villages include village town hall meetings, announcements on possible changes in climate in churches among others. The interviewees however opined that because workshops, conferences and symposia are mostly paid for and open to experts in the field for whom it is conducted, only people who attend such gatherings partake in whatever is discussed there. As such, the rural poor people who do not have access to workshops, conferences and symposia cannot receive information on CC when they are disseminated there. They also add that around Nsukka metropolis, bulk SMS is used mostly to disseminate information about gatherings such as meetings, weddings and the likes. They expressed shock at the question of bulk SMS being used to inform people about CC and that if it is being used anywhere in Nigeria, they are yet to receive any. However, it is possible for bulk SMS messages on CC to be designed and disseminated to people, thus making it a novel avenue via which information on CC can be disseminated. As Kirui, Oseni and Omedo (2012) pointed out, access to climate information and support services is necessary for coping, adaptation and mitigation strategies necessary in the face of changing climate, it is therefore necessary for CC information dissemination techniques to be broadened and made more flexible and accessible to people.

Conclusion

CC is a social as well as an environmental issue, posing great threat to family wellbeing. The findings of this study have unraveled poor and rich families awareness of causes, effects and available media for information on CC. The direct and indirect impacts of CC on family wellbeing in areas of finance, health, food, shelter, education and

even movement is becoming increasingly obvious. These highlight the need for concerted efforts to minimize these impacts and ensure the wellbeing and sustainability of families. Following the findings of the study, it could be concluded that creating awareness to the causes and effects of CC and increasing, improving on and diversifying media for information on CC could go a long way to promote family wellbeing.

Recommendations

Based on the findings of the study, the following recommendations are made:

1. Strategies for creating awareness of CC issues should be modified and re-designed to meet the CC awareness needs of both poor and rich families.
2. Families should be open to CC information and follow recommendations given in-order to reduce their contribution to CC and promote overall family wellbeing both in the short and long run.
3. Adaptation measures must consider differential social impacts to help build the capacity of vulnerable groups to adapt better to CC.
4. CC adaptation programs should involve collaboration with the poor people who are most vulnerable to CC (by involving, engaging, empowering & ultimately building their adaptive capacities).
5. Government should as a matter of urgency recognize the need to set mitigating strategies to cushion the impact of CC on families as soon as they occur.

References

Alexander, R. & Dim, C. (2016). Climate change impacts in Sub-Saharan Africa: from physical changes to their social repercussions. Retrieved from https://www.researchgate.net/publication/290194107

Ameller, R., Cervone, G., Kafatos M. & Jones, D. (2008). The role of media in the dissemination of environmental and natural disaster information to the public. Presented at the 37th COSPAR Scientific Assembly held 13 – 20 July, 2008 in Montreal, Canada. Retrieved from http://adsabs.havard.edu/abs/2008cosp...37...81A

Behnke, A. & Macdermid, S. (2004). Family Wellbeing. Retrieved September 20, 2016, from http://workfamily.sasa.upenn.edu/glossary/f/family-well-being-definitions.html.

Harvey, F. (2015). From Science to Economics, Why 2015 is Different for Climate Action. Retrieved September 20, 2016, from http://www.greenbiz.com/article/science-economics-why-2015-different-climate-action.html.

Hosking, J., Jones, R., Percival, T., Turner, N., & Ameratunga, S. (2010). Climate change: The implications for child health in *Australian Journal of Pediatrics and Child Health*. Available online at doi:10.1111/j.1440-1754.2010.01699.x

Intergovernmental Panel on Climate Change (2007) Fourth Assessment Report: Impacts, Adaption 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.

Ishaya, S. I., & Abaje, I. B. (2008). Indigenous people's perception on

climate change and adaptation strategies in Jema'a local government area of Kaduna State, Nigeria. *Journal of Geography and Regional Planning* 1(8), 138-143, Available online at http://www.academicjournals.org/JGRP ISSN 2070-1845

Jagtap, S. (2007). Managing vulnerability to extreme weather and climate events: Implications for agriculture and food security in Africa. Proceedings of the International Conference on Climate Change and Economic Sustainability held at Nnamdi Azikiwe University, Awka, Nigeria. 12-14 June 2007.

Kirui, V. C., Oseni, S & Omedo B. B. (2012). Access to climate change information and support services by the vulnerable groups in semi-arid Kenya for adaptive capacity development. *African Crop Science Journal* Vol. 20, Issue Supplement s2, pp. 169 - 180

Livescience (2016). Global Warming: News, Facts, Causes and Effects. Retrieved from http://www.livescience.com/topics/global-warming

Mbah, E. E. and Ayegba, M. (2013). Proper dissemination of information on climate change: a comparative study of the roles of official and indigenous language in Nigeria. *International Journal of Physical and Human Geography* 1(2) 21 – 30.

Ministry of Environment of the Federal Republic of Nigeria, MoEFRN (2010). Climate Change. Retrieved September 20, 2016 from http://environment.gov.ng/issues/climate-change

Nichols, A., Maynard, V., Goodman, B. and Richardson, J. (2009). Health, climate change and sustainability: A systematic review and thematic analysis of the literature. *Environmental Health Insight Journal* 9(3) 63-88

Nwafor J. C. (2007) Global climate change: The driver of multiple causes of flood intensity in Sub-Saharan Africa. Paper presented at the International Conference on Climate Change and Economic Sustainability held at Nnamdi Azikiwe University, Awka, Nigeria, 12-14 June 2007.

Obioha, E. E. (2009). Climate Chamge, Population Drift and Violent Conflict over Land Resources in Northeastern Nigeria. *Journal of Human Ecology*, 23(4), 311-324

Odjugo, P. A. O. (2010). General overview of climate change impacts in Nigeria. *Journal Human Ecology*, 29(1), 47-55.

Ogbo, A. I. & Onyedinma, A.C. (2012). Climate Change Adaptation in Nigeria: Problems and Prospects. *Sacha Journal of Environmental Studies* 2 (1), p. 130 – 145

Okoli, N. J and Amaechi, I. C. (2014). An Overview of Climate Change and Food Security: Adaptation. *Journal of Education and Practice* 5 (32), 13 – 19

Olaniyi O.A., Fumilayo O.A. & Olutimehin I.O. (2014). Review Of Climate Change And Its Effect On Nigeria Ecosystem. *International Journal of Environmental and Pollution Research* (IJEPR).vol.2, issue3, December 2014

Olaniyi, O. A., Ojekunle Z.O. and Amujo B.T. (2013). Review of Climate Change and Its Effect on Nigeria Ecosystem. *International Journal of African and Asian Studies* (1) 57-65.

Omotosho, J. B. (2007). Pre-rainy season moisture build-up and storm precipitation delivery in the West Africa Sahel. *International Journal of Climatology* (28) 937-946. doi:10.1002/joc.1548

Onuoha, D. C., Nnodu, V. C. & Uwadiegwu, B. O. (2014). Determination of the Significance Level of Environmental and Economic Effects of the Road Failure of Onitsha-Enugu

Scotland and Northern Ireland Forum for Environment Research, SNIFFER (2009). Differential Social Impacts of Climate

Change in the United Kingdom. Retrieved October 05, 2016. www.sniffer.org.uk.files.ukcc22

Scotland and Northern Ireland Forum for Environment Research, SNIFFER(2009). Differential Social Impacts of Climate in the United Kingdom. Retrieved October 05,2016. www.sniffer.org.uk.files.ukcc22

The World Bank (2015). Let's talk development. An article retrieved from http://blogs.worldbank.org/developmenttalk/international-poverty-line-has-just-been-raised-190-day-global-poverty-basically-unchaged-how-even

Udenyi, O. G. (2010). Impacts of Climate Change. Nigeria Social Network.

United Nations Foundation (2013). The millennium development goals. Retrieved September 220, 2016. www.unfoundations.org/what-we-do/issues/mdgs.html

United Nations Framework Convention on Climate Change, UNFCCC (2007). Climatic Change Impact, Vulnerabilities and Adaptation in Developing Countries UNFCCC Secretariat, Martin-Luther-King-Straat 8 53175 Bonn, Germany. http;//www.unfccc.int

Wallace, J. M. & Hobbs, P. V. (2006). *Atmospheric science: An introductory survey* (2nd edition). International Geophysics Series 92, Academic press.

Zevenbergen, C.W., Veerbeek, B.G. & Van Herk,S.(2008). Climate Change uncertainty: building flexibility into water and flood risk infrastructure. *Journal of Flood Risk Management 1(2)*

Ziervogel, G., Bharwani, S. & Downing, T. E. (2006) Adapting to climate variability: Pumpkins, people and policy. Retrieved September 20, 2016, http://onlinelibrary.wiley.com/doi/10.1111/j.1477-8947.2006.00121.x/abstract.