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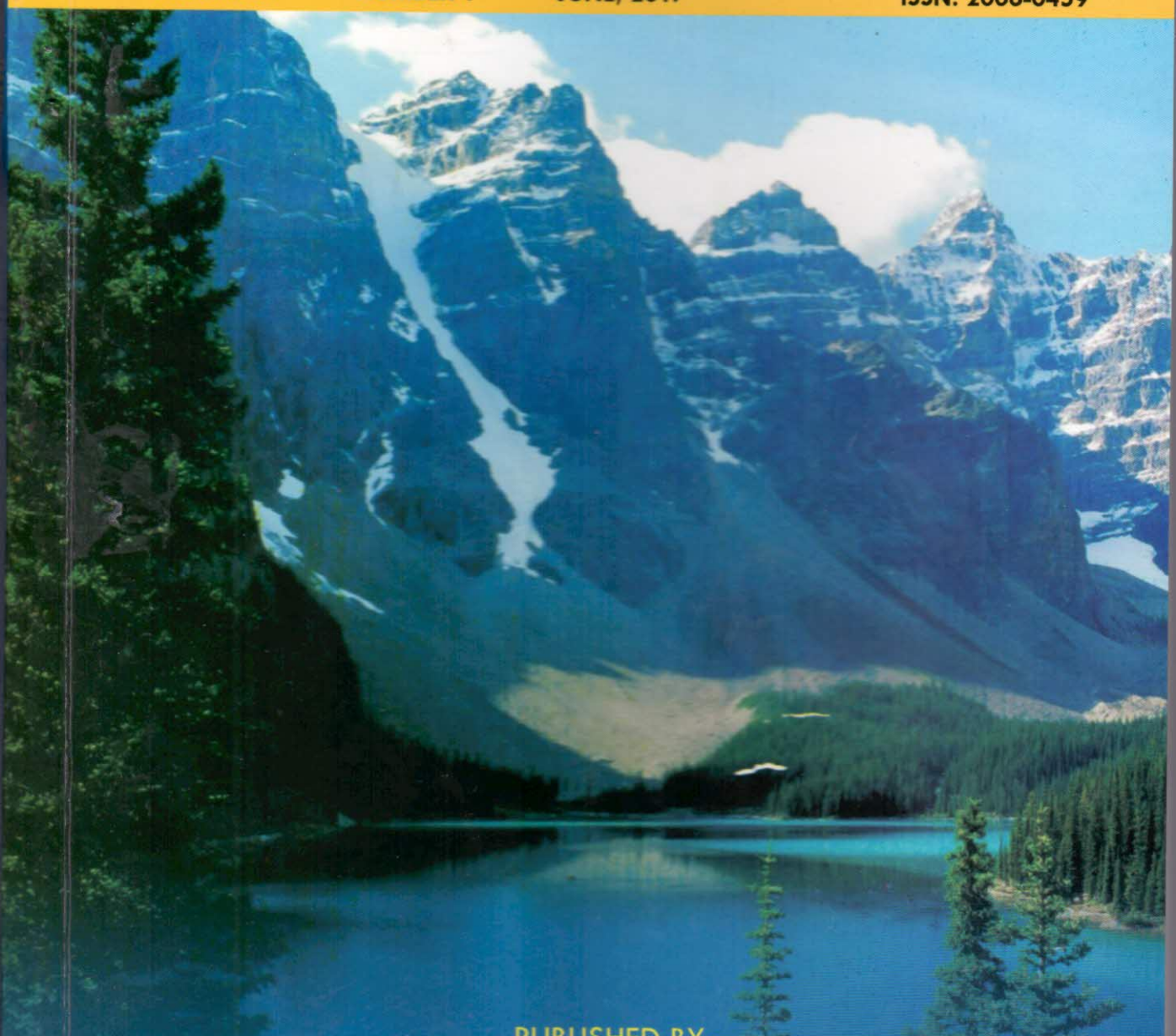

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Contents

Assessment of Public Perception of Climate Change Issues in Minna, Niger State, Nigeria

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Abstract

Climate change represents a significant environmental, social and economic threat and is now firmly recognized by the majority of the world's governments and scientists as an issue of extreme concern for the planet. The study examines the public perception of climate change on both local and global scales by residents of Minna, Niger State. Both Primary and secondary data were used for the analysis. The primary data for the study was collected by the administration of a structured questionnaire and conduction of group discussions while the secondary data was sourced from written materials on climate change. The results revealed that 85.6% of the public were aware of the change in climate using change rainfall and temperature pattern as indicators. The respondents noticed that there are changes in the amount of rainfall received and increase in average daily temperature while14.4% were completely unaware of climate change issues. The study thereby recommended among others that information and communication technology be used to sensitize people on the effects of changing climate.

Keywords: assessment, climate change, global warming, greenhouse gas, perception

Introduction

Cities all over the world have witnessed significant change in climate due to global warming caused by greenhouse gas emission and other activities of man. The Intergovernmental Panel on Climate Change [IPCC](2007), forecasts a temperature rise of 2.5 to 10 degrees Fahrenheit over the next century. The effects of global climate change are very diverse. During the last century, the earth's average surface temperature rose by around 0.6°C and by the end of this century, the global average surface temperature is expected to rise by a further 1.1 to 6.4°C (IPCC, 2007). Climate change currently contributes to the global burden of disease and pre-mature deaths. Okali (2008) observed as quoted by Adeoti (2008) that human beings are directly exposed to climate change through changing weather patterns (temperature, precipitation, sea-level rise and more frequent extreme events) and indirectly through changes in ecosystems, agriculture, industry and settlements and the economy.

One of the causes of climate change is fossil fuel combustion. In Africa, only a few countries account for the bulk of the region's emission from fossil fuels. These are Nigeria, Egypt and Algeria which together account for 35.5% of total fossil fuel emission from the continent. In fact, Nigeria is the largest contributor of carbon dioxide and other greenhouse gases in the West African sub-region (World Bank Report, 1995). In Nigeria, only a relatively small

proportion of the natural gas produced is utilized and as much as 76 per cent of the gas is flared (World bank Report, 1995). Nigeria Natural gas comprises per cent methane1.5-2.0. Carbon dioxide 1.4-2.4, heavier hydrocarbons 3.9-5.3 per cent, and ethane, among other compounds (Jones *et al.*, 1998) thereby contributing substantially to greenhouse gases locally and invariably to the global climate.

Nigeria is among the nations of the world that have been at the forefront of the global efforts in addressing climate change and its effects even though the resources for understanding the magnitude and potential impacts on its economy is low. Despite this effort and knowledge of the fact that human activities majorly through deforestation and fossil fuel combustion, affect the environment and greatly contribute to global warming which in turn brings about climate change, the question is, how informed are the people whose activities contribute adversely to climate change and for whom efforts are being made by world leaders and scientists to discover mitigation and adaptation strategies to climate change?

One of the ways the impact of climate change can be addressed is to acknowledge the issue, discuss and share the knowledge. It is important to note that people's perception of and reaction to, vary between economic status and literacy level. In most developed countries, regular perception studies are conducted in form of opinion survey. Such surveys are necessary in order to create awareness about an issue but this is missing in developing countries where the majorities are dependent on economic activities that are sensitive to climate such as agriculture and forestry activities.

Leizerowitz (2004) observed that despite the scientific warnings of earlier decades, global warming did not become a public issue until 1988-the hottest year since the 19th century and thereafter, numerous public opinions have found that the Americans, Europeans and Japanese are increasingly aware of and concerned about global climate change and supportive of a wide range of mitigation and adaptation studies. The world poll partner (2010) discovered through the Pew Global Attitudes Survey conducted that majority of respondents from developed countries had heard of global warming, while awareness remained quite low in several developing countries in particular, large categories of respondents had never heard of global warming in Pakistan, Indonesia, Nigeria, and Egypt. This result suggests that many have not heard about global warming causing climate to change. There have been a lot of researches on climate and climate change and its threats to humanity and adaptation strategies by authors both within and outside Nigeria, however, only few studies exist on public perception of climate change.

In response to the report, similar studies were carried out in Lagos, Ibadan and Kaduna on climate change awareness in Nigeria with the result showing that climate change awareness increases with the level of urbanization and

education. The study conducted by Adelekan (2005) within Ibadan city revealed that a significant proportion of the public is aware of the dynamics of the local climate. In addition, 70% of the respondents have heard of global climate change but less than 25% know the causes. Ishaya (2008) examined the way indigenous people in Jema'a Local Government Area of Kaduna State perceived climate change and the author concluded that lack of awareness and knowledge of climate change scenarios are the hindering factors to the adoption of modern techniques of combating climate change in the area. The response by experienced farmers in Jema'a on the identified effects of climate changes in the area indicated observed increase in temperature and decrease in rainfall quantity. Gbadegesin and Ogundele (2008) revealed that Lagos level of awareness tally with the current perception of climate change in the USA. Most Lagos residents are aware of the climate change issues and concluded that awareness increases with level of urbanization, educational status and to some extent, gender and age.

It is against this background that this research paper assessed the public level of knowledge on climate change issues within Minna metropolis, how they understood the environment and in addition to investigate their sources of information on the issue which could serve as a tool for decision making on ways to increase climate change awareness.

The Study Area

Minna is the capital of Niger state, Nigeria. Its conversion to a state capital gave rise to its population growth with the majority working with the government and the livelihood of the remaining population is dependent on agriculture, trading and transportation. The metropolis has a mean annual rainfall of 1334mm. The highest mean monthly rainfall is September with almost 300mm. The rainy season starts in April and lasts to October. The duration of rains is between 190-200 days. The mean monthly temperature is highest during the peak of the dry season usually between Februarys and March at 37.8^0C and lowest in August at 25.8^0C.The study covered two local government areas that make up Minna metropolis; which are Bosso and Chanchaga. Bosso is a Local Government area in Niger state with its headquarters in Maikunkele. It occupies an area of 1,592km2 and a population of 147,359 at the 2006 census. Chanchaga has its capital being Minna. It has an area of 72km^2 and a population of 201, 429 at the 2006 census. The whole study area has been further subdivided into six major districts namely: Bosso, Maikunkele, F-layout/GRA, Tunga, Chanchaga and the Central Business District comprising of Mobil area, Keterin-gwari, Kwangila, Yoruba road and Lagos street.

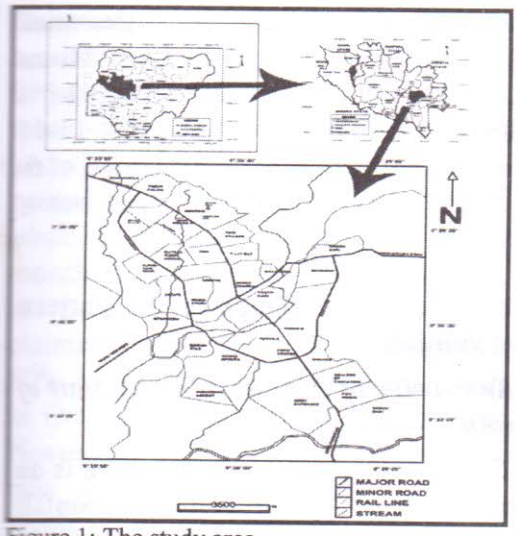

Figure 1: The study area
Source: Niger State Ministry of Lands and Housing, 2016

Methodology

Primary and Secondary data were employed. Primary data through structured questionnaire and oral interview were used to collect information on the socio and demographic characteristics of respondents, questions were structured to address the respondents' consciousness of prevailing climatic conditions, level of knowledge about climate change in particular on key climatic element of temperature and rainfall. Secondary data on temperature and rainfall were collected from the Nigerian Meteorological Agency (NIMET) in Minna (on climatic conditions of Minna metropolis showing the maximum and minimum temperatures) for the period of 20 years (1988-2008). A total of 208 responded, out of 240 questionnaires distributed. This number participated in the study across the different socio-economic strata of the study area which was sub-divided into six districts for the purpose of this study.

In order to have an unbiased sample; random sampling was used within the districts. Simple frequency analysis was used to compute the onset and cessation dates of rain and the trend of heat waves. Chi-Square analysis was used to measure the reliability and significance of data by comparing observed measurement with the expected.

Results and Discussion

Socio-Economic Characteristics of respondents

Age of Respondents

Out of the two hundred and eight respondents (208) respondents, 57.2% were males while 42.3% were female. Majority of the respondents (56.3) %, were between 20-40 years of age, 21.3%, falls below 20 years, 18.8% % were between 41-60 years while the elderly between the ages of 61-80 years were3.8%, implying that the respondents were vibrant.

Educational Level of Respondents

The study had respondents with post-secondary educational level taking 81.7%, those with secondary education were 13.0%; 2.4% had no formal education whereas those with only primary education were 4.3%. The educational statuses of the respondents were high due to amongst other factors, the establishment of Federal University of Technology, College of Education and a National Examination body. This portends that the respondents were enlightened.

Occupation of Respondents

The study revealed that 29.8% of the respondents were civil servants, 52.4% were students, those that were artisans are 10.1%, traders are 4.8% and farmers were 2.9%. It can be deduced that the respondents were actively engaged in one trade or the other and there are evidences that they are conversant with their locality and their immediate environment.

Residency Period

To establish the level of awareness of the respondents as regards changes experienced both in temperature and rainfall, the year of residency of the respondents became essential. Respondents who had lived in Minna for over 20 years were 15.9%, 41.3% had been living in Minna for 11-15 years, 17.3% had residency period of 6-10 years and 15.9% had lived below 5years.

Knowledge of change in the pattern of rainfall

Knowledge of Past and Present start of rain

The respondents opined that there is an observable change in pattern of rainfall from their experiences in the past and present years..

Table1: Educational Level of Respondents

Education	Frequency	Percentage
Post-Secondary	169	81.7
Secondary	27	13.0
Primary	8	4.3
Non formal	4	2.4
Total	**208**	**100.0**

Table 2: Respondents Residency Period

Residency Period	Frequency	Percentage
0-5 years	33	15.9
6-10 years	36	17.3
11-15 years	86	41.3
16-20 years	20	9.6
Above 20 years	33	15.9
Total	**208**	**100.0**

51.4% said in the past 20 years that rain used to start around April, 17.3% claimed the month of May as the beginning of rainy season and another 17.3% claimed that start of rain was in March. Presently, 44.7% of the respondents' still observed the start of rain to be in the month of April, 35.6% submitted the month of May while 7.7% believed commencement of rain as March. It could be deduced that the data for month of April was reduced while the month of May was increased implying that the start of rain has changed from the month of April to May in Minna as presented figure 2a.

Knowledge of Past and Present cessation of rain

It was observed that 43.8% of the respondents observed that the past cessation of rain was November, 37.5% opined it was in the month of October while13.5% claimed that it was in the month of September. While considering the present cessation of rain, 13.5 % claimed it was the month of September, 50% of the respondents claimed it was in October while only 11.1% observed November as the present cessation of rain and 25.4% were not sure. The result gives a sharp shift from 43.8% that claimed November to 11.1% while the month of October receive the biggest nod as the present cessation of rain (see figure 2b). This implies that the people are observant and invariably aware of the changing climate.

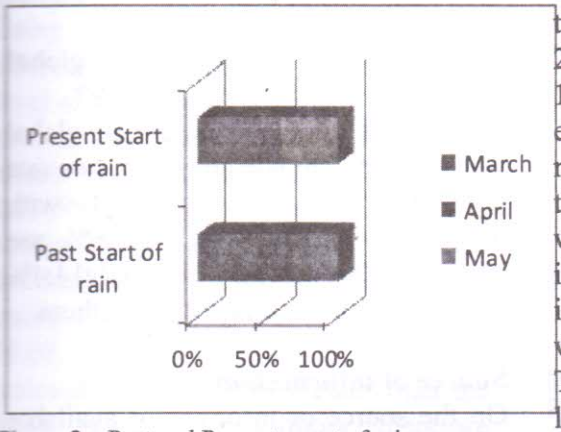

Figure 2a: Past and Present onset of rain

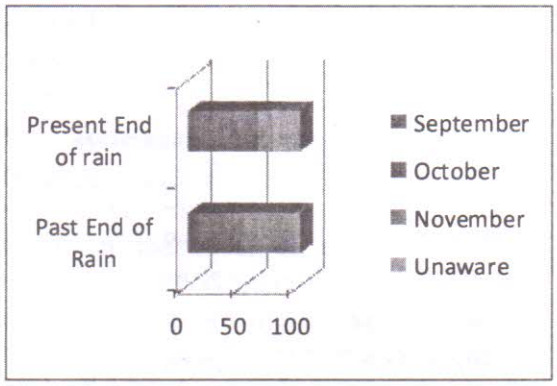

Figure 2b: Past and Present end of rain

Knowledge of temperature

Temperature values were also used as indicator to examine the public knowledge of changes in climate. 54.3% was of the opinion that the temperature used to be hot, 32.2% said the temperature used to be very hot while only 6.2% opined it used to be extremely hot. Presently, 37.0% were of the opinion that the temperature is hot, 28.4% believed it to be very hot while 13.5% thought the temperature is extremely hot. The percentages of those respondents who observed that the temperature used to be hot decreased while extremely hot respondents' increased which buttressed the internationally acclaimed fact that the world temperature is indeed changing. This implies that the consciousness and level of awareness of the people is high.

Table 2: Maximum and Minimum Temperature for Minna (1988-2007)

Year	Max. Temperature C	Min. Temperature C
1988	38.52	26.52
1989	32.49	20.49
1990	39.01	27.01
1991	41.34	29.38
1992	35.06	23.06
1993	34.82	22.81
1994	41.13	29.13
1995	34.45	22.45
1996	39.23	27.23
1997	36.30	24.30
1998	38.80	26.80
1999	39.62	27.62
2000	37.10	25.10
2001	39.27	27.27
2002	35.16	23.16
2003	32.25	20.25
2004	34.63	22.63
2005	42.86	30.86
2006	31.67	19.67
2007	42.67	30.67

Source: Nigerian Meteorological Agency, Minna, 2010

Cause of Changes in rainfall and temperature pattern

The result of the public perception on changing pattern of rainfall and temperature indicate that 48.5% identified climate change and global warming as a cause. 13.0 relate it to human activities, 25.5% opined that the change results from position of the globe while 13.0 had no idea and 0.55 attached change to an act of God(received when asked about reasons behind the change in rainfall and temperature pattern were categorized and presented: 48.5% were quick to mention climate change and global warming,13. 0% said human activities, 25.5% opined that the change resulted from position of the globe, while 13.0% had no idea, only 0.5% of the respondent attached change to act of God.

Table 3: Causes of Change in Rainfall and Temperature

Cause of Change	Frequency	Percentage
Climate Change/Global Warming	97	46.6
Human Activities	30	14.4
Position of the globe	53	25.5
No idea	27	13.0
Spiritual(Act of God)	1	0.5
Total	208	100.0

Source: Authors Field Survey (2011)

Knowledge of the term "global warming" and "climate change"

The results on the concepts of global warming and climate change shows that the majority are conversant with happenings around them. 85.6% are aware of the terms while only14.4% claimed not to have heard about them.

Source of information

On the source of information available to people on their awareness of global climate issues, 26.6% said through television programmes, 22.8% of respondents claimed that their occupation contributed to their knowledge of climate change and 13.5% who mostly student, gathered the information from the internet/classroom, from the newspaper carried 6.2% and 4.8% acknowledge

they heard from family and friends while 4.8% got their information on the radio. This invariably implied that television remains an important source of information with dual advantages of seeing and hearing at the same time.

Table 4: Source of Information

Source of Information	Frequency	Percentage
Television	49	26.6
Occupation	42	22.8
Internet/ Classroom	34	18.4
Newspaper	13	7.0
Family & Friends	10	5.4
Radio	10	5.4
Total	158	85.6

Source; Authors Field Survey, 2011

Test of relationship between Occupation and Perception of climate change

Using Chi-Square to determine the effect of occupation on the perception level of the people on climate change, it shows that there was a significant effect. The test was carried out under 0.05(5%) level of significance. Chi square value was14.581 and degree of freedom (df) 5. While checking df under 0.05, the result was equal to 11.07. This shows that the Chi-square (calculated) value was greater than the table value. The authors therefore accepted the hypothesis and deduced the there was a significant relationship between types of occupation and knowledge of climate change.

Test of relationship between Education and Perception of climate change

The test was conducted using the given chi-square value of 11,052 degree of freedom (df) 4 of respondents who had knowledge of climate change and checking df under 0.05= 9.49. Chi-square (calculated) value was greater than the table value; the authors therefore accepted the hypothesis and implied that education has a significant effect on the level of awareness of respondents on climate change. These results confirms to the earlier findings of the similar studies carried out on the level of education and climate change awareness in cities such as Lagos and Ibadan.

Conclusion

It has been established that climate change will have a strong impact on Nigeria and West Africa in general, particularly in the areas of agriculture, land use, energy and water sources. Making perception study a regular exercise, as in this case, environmental perception which is the means by which we seek to understand environmental phenomena in order to arrive at a better use of environmental resources and a more effective response to environmental hazards will help policy makers to formulate better policies that could meet the local needs of the people. It is important for Urban Planners to use the available resources one of such is the outcome of the perception studies generated to improve the understanding of people on impacts of climate change and its related causes in order to enhance security and safety of lives and livelihoods in our small, medium-sized, large cities.

Recommendations

It is expedient to state the following recommendations which includes:

i. The recommends that more indices about climate change awareness and its causes and impacts should be designed.
ii. In addition, television and other outlets of information dissemination should be explored to target population.
iii. Finally, climate change education should be incorporated into school curriculum to enhance better understanding of climate change issues.

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