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AWARENESS OF CLIMATE CHANGE IMPACTS AND ADAPTATION IN ADAMAWA STATE, NIGERIA

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ABSTRACT

The aim of this paper is to examine the general level of awareness of climate change impacts and adaptations in Adamawa state, Nigeria. Primary data utilized in the study include the socio-economic characteristics of respondents namely gender, age, educational qualification, occupation and data on awareness, impacts and adaptation to climate change. A multistage sampling technique was employed in the selection of the 367 respondents. The data were subjected to descriptive and chi square analyses. The results showed that there is a high level of awareness of climate change among the citizens of the state. Majority of the respondents (90%) indicated that they are aware of climate change but only 70% indicated that they know the causes of climate change. Chi square test of association revealed that age, occupation, and education influence people's level of awareness and knowledge of the causes of climate change but gender does not affect these. Respondents' assessment of climatic element in the last 20 -30 years agreed with the experts reports. That is, temperature is increasing while rainfall is decreasing and frequency and length of dry spells are also on the increase. Sourcing water and fuel wood are the major domestic activities mostly affected by climate change.

KEY WORDS: Climate Change, Awareness, Knowledge, Adaptation, Adamawa State, Nigeria

INTRODUCTION

Without gainsaying, climate change is a serious challenge facing the entire world today. Its impact is felt in all facets of life. Climate change poses a serious threat to poverty eradication and sustainable development, particularly in developing countries, including Nigeria, thereby making the attainment of the Millennium Development Goals (MDGs) difficult. Without addressing climate change, achieving the eight MDGs will be a mirage. The reason is that MDG No. 1 (reducing poverty and hunger) which is pivotal to all the remaining seven is seriously being affected by climate change (Adebayo, 2010).

In Adamawa state of Nigeria, evidence of climate change includes delayed onset date of rains, increase in number of dry days during the raining season, decrease in annual rainfall and increase in maximum temperature (Adebayo, 2010; 2011). Many social, biological and geophysical systems are at risk from climate change. The major challenge facing the state is how to mitigate and adapt to climate change. It therefore becomes imperative to develop action plans that will assist people to cope with different scenarios of climate change that are prevalent in the state.

However, developing such action plans will require information from the people since the ability to adapt and cope with climate change depends on several factors such as technology, education, access to resources, management capabilities etc. In addition, the level of awareness of the people is also crucial in formulating such action plans. Against this background, the objective of this paper is to examine the general level of awareness and impacts of climate change and the adaptation strategies being adopted in the state. The survey focused mainly on respondents whose primary occupations

are not farming since another study has been targeted on farmers and the vulnerability of the agricultural sector to climate change in the state.

Adamawa State is located at the North Eastern part of Nigeria. It lies between latitude 7 and 11^0 N and between Longitude 11 and 14^0 E. It shares boundary with Taraba State in the south and west, Gombe State in its North-west and Borno state to the North. The State has an international boundary with the Cameroon Republic along its eastern side (Fig. 1). It has a land area of about 38,741 km^2 (Adebayo, 1999). The state is divided into 21 local government areas.

Adamawa State has a tropical wet and dry climate. Dry season lasts for a minimum of five months (November-March) while the wet season spans April to October. Mean annual rainfall in the state ranges from 700mm in the North-west, to 1600mm in the extreme southern part of the state (Adebayo, 1999). The state is naturally divided into two ecological zones; the guinea and Sudan savannah zones. In general, the distribution of vegetation reflects the combined control of rainfall, topography and to a lesser extent, that of soils.

METHODOLOGY

A multistage sampling technique was employed in the selection of the respondents. The first stage involved the selection of senatorial districts/ zones. Adamawa State has been divided into three senatorial districts namely Northern, Central and Southern Districts. The second stage is the selection of two local government areas in each senatorial District as follows:Northern District: Maiha and Madagali; Central District: Song and Fufore; Southern District: Jada and Lamurde. From each LGA two rural settlements were selected. From each settlement 15 respondents were randomly selected. The last stage involved the selection of one major urban centre in each zone namely Mubi, Yola and Numan from northern, central and southern district respectively (Table 1).

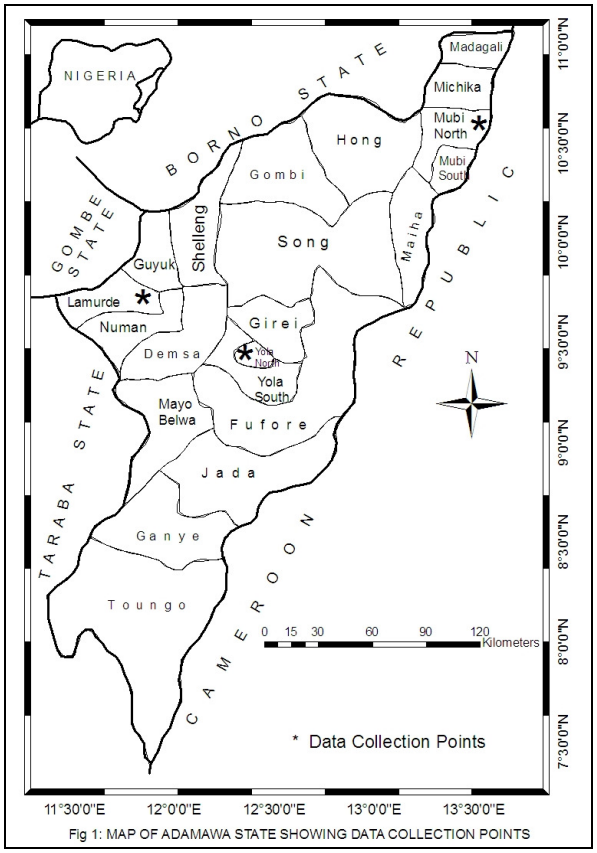

Fig 1: MAP OF ADAMAWA STATE SHOWING DATA COLLECTION POINTS

Table 1: Sampling Frame for the Survey

Senatorial District	LGA	Rural Settlements	Urban Settlement
Northern District	Maiha Madagali	Maiha & Pakka Gulak & Madagali	Mubi
Central District	Song Fufore	Song & Dumne Fufore &Gurin	Yola
Southern District	Jada Lamurde	Jada & Kojoli Lafia & Lamurde	Numan
Number of Questionnaires	**Rural = 186**	**Urban = 181**	**Total = 367**

Both descriptive and inferential statistics were used in analyzing the data collected. The descriptive statistics involves the use of means, standard deviation coefficient of variation and percentages while the inferential statistic entails the use of chi square analysis. Chi square test was used to examine the association between socio economic variables and awareness and knowledge of the causes of climate change.

RESULTS AND DISCUSSIONS

Socio Economic Characteristics of the Respondents

This section examines some of the socio-economic features of the respondents. As shown in Table 2, majority of the respondents (38.42%) fall between the age brackets 31-40 while those above 40 years constitute over 28%. This indicates that over 66% of the respondents are old enough to assess environmental changes in the last 20 years. On gender distribution, over 32% of the respondents are female while the rest (67.8%) are male (Table 2). The same table indicates that only 9.8% of the respondents have no formal education while the rest have one form of education or the other with the majority having tertiary education. According to the table most of the respondents (36.5%) are civil servants, followed by business 16% and artisans (10.9%). Others include unemployed (9.2%) housewife (6.8%), farmers (6.3%) and students (4.9%).

Table 2: Socio Economic Characteristics of the Respondents from the State

Age Group	Number	Percentage
≤ 25	33	8.99
26-30	89	24.25
31-40	141	38.42
41-50	75	20.44
51-60	24	6.54
>60	5	1.36
Total	367	100.00
Gender	**Number**	**Percentage**
Male	249	67.80
Female	118	32.20
Total	367	100.00
Education	**Number**	**Percentage**
No formal	36	9.80
Primary	22	5.90
Secondary	108	29.40
Tertiary	201	54.80
Total	367	100.00

Table 2 – Contd.,

Age Group	Number	Percentage
Occupation	**Number**	**Percentage**
Civil servants	134	36.50
Private sector	33	8.90
Business	60	16.40
Artisan	40	10.90
*Farming	23	6.30
Students	18	4.90
Unemployed	34	9.20
Housewife	25	6.80
Total	367	100.00

Source: Field Survey, 2011

*The survey focused mainly on people whose primary occupations are not farming.

Awareness of Climate Change and Knowledge of its Causes

Majority of the respondents from the whole state (Table 3) indicated that they are aware of climate change. Only about 10% claimed they are not aware of the issue. This shows that there is a high level of awareness of climate change among the citizens of the state. Over 70% indicated that they know the causes of climate change while about 30% said no. According to the table, majority agreed that they have noticed long terms changes in temperature and rainfall in their areas. This corroborates the findings of Ishaya and Abaje (2008) in Jemaa local government area of Kaduna state, Nigeria that majority of the local people are aware of changes in climate.

Table 3: Awareness of Climate Change

Aware of Climate Change	Number	Percentage
Yes	330	89.9
No	37	10.1
Total	367	100
Know causes of climate change	**Number**	**Percentage**
Yes	258	70.3
No	109	29.7
Total	367	100
Notice changes in Temperature	**Number**	**Percentage**
Yes	337	91.8
No	30	8.2
Total	367	100
Notice changes in Rainfall	**Number**	**Percentage**
Yes	339	92.37
No	28	7.63
Total	367	100

Source: Field survey, 2011

When asked to assess the trend of temperature (hot days) in recent years, about 82% of the respondent claimed that the number of hot days are increasing. On the other hand, over 70% claimed that amount of rainfall and number of rain days is decreasing (Table 4). These findings corroborated the experts reports that the mean temperature is increasing while annual rainfall is decreasing in Nigeria (Adebayo, 2010; Odjugo, 2009; Umar, 2011).

In order to assess the influence of the socio economic variables on the awareness and knowledge of the causes of climate change, the data were subjected to chi square test. Table 5 shows the summary of the chi square results. The table shows that occupation, educational level and age of the respondents have significant associations with awareness of climate change. That implies that these variables have influence their awareness. However, gender does not have significant association with awareness meaning that males do not have better awareness than female.

Table 4: Assessment of Climatic Elements

Temperature	Number	Percentage
The same	26	7.1
Decreasing	42	11.4
Increasing	299	81.5
Total	367	100
Rainfall/ Rain days	**Number**	**Percentage**
The same	42	11.4
Decreasing	259	70.6
Increasing	66	17.9
Total	367	100

Source: Field survey, 2011

The result for the knowledge is similar to that of the awareness. That is, all the variables except gender have significant association with knowledge of the causes of climate change. This conforms to the finding of Olajide et al (2011) who found a significant association between age and knowledge of global warning among undergraduate students of Obafemi Awolowo University (OAU), Ile Ife, Nigeria. The case of gender is however at variance with the findings of the same study that there exists a significant association between gender and knowledge of global warming among undergraduate students of OAU, Ile Ife.

Table 5: Summary of Chi Square Test of Association between Socio Economic Characteristics and Awareness and Knowledge of Causes of Climate Change

Socio Economic Variable	Chi Square	Probability	Remark
a. Awareness			
1. Occupation	30.51	0.01	Significant
2. Education	29.33	0.01	Significant
3. Age	33.99	0.01	Significant
4. Gender	0.82	0.36	Not significant
b. Knowledge of causes			
1. Occupation	16.65	0.02	Significant
2. Education	63.64	0.01	Significant
3. Age	86.42	0.01	Significant
4. Gender	1.88	0.17	Not significant

Source: Computer analysis, 2011

Respondents Perception of the Impacts Climate Change and their Adaptation Strategies

Climate change affects the respondents' domestic activities in several ways. Table 6 shows that sourcing water is the domestic activities mostly affected by climate change. This is might be due to the decreasing rainfall and increasing dry spells in recent years.

Fuel wood sourcing is the second domestic activities affected by climate change. As a result of high rate of deforestation, people have to travel far to source fuel wood. In the same vein, Maharjan et al (2011) reported that Tharu community of Nepal suffered loss of timber and firewood species due climate change.

Table 6: Domestic Activities Mostly Affected by Climate Change

Options	Number	Percentage
Sourcing for water	178	48.5
Fuel wood harvesting	106	28.9
Sourcing animal folders	54	14.7
Others	29	7.9
Total	367	100

Source: Field survey, 2011

Though most of the respondents are not full time farmers, they are also engaged in part time farming. When asked about their adaptation strategies, majority of the respondents (49%) resorted to adjusting planting date while about 19% opted for saving food and seeds. Other adaptation strategies include switching to other crops and application of irrigation (Table 7).

Table 7: Adaptation Strategies Adopted by Respondents

Options	Number	Percentage
Adjusting planting date	180	49.0
Switching to other crops	62	16.9
Applying irrigation	53	14.4
Saving food, seed	72	19.6
Total	367	100

Source: Field survey, 2011

When asked how they can mitigate climate change (Table 8), majority (51.2%) indicated tree planting while 25.3% suggested prayer. Other options given are changing crop type (20.4%) and do nothing (2.9%).

Table 8: Ways to Mitigate Climate Change

Options	Number	Percentage
Prayer	93	25.3
Plant trees	188	51.2
Changing cropping	75	20.4
Do nothing	11	2.9
Total	367	100

Source: Field survey, 2011

Table 9 shows the respondents suggestions on what government should to reduce the impact of climate change. Majority of the respondents (48.8%) indicated education and awareness campaign, 24.3% suggested preventive measures while 15.8% opted for provision of early warning system. On type of assistance expected from the government, majority indicated agric insurance for farmers (Table 10). Other options in order of priority include subsidizing the prices of food items, loan to start or diversify business, provision of relief materials and resettlement of flood victims.

Table 9: What Government should do to Reduce the Impacts of Climate Change

Options	Number	Percentage
Early warning system on	58	15.8
Education & awareness	179	48.8
Provide relief measures	41	11.2
Provide preventive measures	89	24.3
Total	367	100

Source: Field survey, 2011

Table 10: Assistance Expected from Government

Options	Number	Percentage
Subsidizing the prices	79	21.5
Loan to start business	51	13.9
Agric insurance for farmers	131	35.7
Resettlement of flood victims	36	9.8
Provision of relief materials	41	11.2
Others	29	7.9
Total	367	100

Source: Field survey, 2011

CONCLUSIONS AND RECOMMENDATIONS

The conclusion drawn from this study is that the general public in the state are aware of climate change and its impacts on domestic and agricultural activities and they are making efforts to adapt to the challenge. The following recommendations are proffered towards effective mitigation of and adaptation to climate change in the state.

i. Tree planting should be pursued vigorously by all stake holders with government providing the necessary inputs and encouragements.
ii. Government, Non Governmental Organisations (NGOs) and civil society organizations should intensify environmental education and awareness campaign on climate change impacts, mitigation and adaptation.
iii. The state Ministry of Environment should prepare a strategic plan for combating climate change and other environmental problems.

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