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Analysis of Farmers Awareness of Climate Change and Adaptation Methods in Umuahia North Lga, Abia State, Nigeria

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Abstract **– Climate change has been defined as the measurable increases in the average temperature of the earth's atmosphere, oceans and land masses or the rapid changes in global temperature (Encarta 2009). The study sought the level of awareness to climate change and adaptation methods in Umuahia North L.G.A, Abia State, Nigeria. Data was collected with the use of a structured questionnaire. The data collected was analysed with the aid of descriptive statistics (frequencies, percentages and mean score). The results from the study showed that, majority of the respondents were male (83.3%), 50% of them were middle aged (between 31-50 years). Most of the sampled farmers (67.5%) had a household size of between 4-6 members. Most of the respondents identified personal experience as their highest source of awareness to climate change. The respondents showed their level of awareness to climate change in their mean level of awareness score of $\bar{x} = 3.0$. The respondents identified ten (10) adaptation methods they employed in mitigating the effects of climate change in the study area. They identified mulching of crops to reduce water loss as the most used (93.3%) while they said they rarely employed the planting of drought resistant/tolerant crops (37.5%) as a mitigation method. Based on the findings of this study, it is therefore recommended that extension agents should be mobilized to reach rural areas with information, best practices and mitigation methods to critical issues such as climate change. Equally, improved varieties of crops should be made available and to the reach of local farmers to ensure adequate food production even in the light of climate change.**

Keywords **– Adaptation Methods, Climate Change and Farmers.**

I. INTRODUCTION

The need to improve agricultural productivity and higher crop yield in Nigeria cannot be over emphasized. Nigeria is endowed with abundant human and natural resources which forms the basis for increased food production. It has a population of about 170million people and about 65% of the population are engaged in agriculture. These human and natural resources give hope and opportunity for technological development in tackling all the problems especially in areas of agricultural food production.

The appraisal of the past (Nwachukwu and Onuekwusi, 2005) shows that successive administrations had initiated programmes towards ensuring that food is available, accessible and adequate for the teeming population. Even the present government policy framework encompasses key intervention measures against food crisis and poverty. Despite all the efforts, there has been proven decreasing percentage of contribution of agriculture to the Gross Domestic Product (GDP) of the country as compared to the past when agriculture was the main source of foreign exchange for the country. Agricultural food production has been constrained by numerous challenges such as rural-urban migration especially among the youth, wavering policy formulation and implementation leading to failure of programmes, insufficient infrastructure support for production, processing and preservation, poor input distribution system, poor socio economic status of farmers and over dependence on rain fed farming among others. Present is the problem of climate change and its effect on agricultural development of the country.

Climate change or Global warming has been defined as the measurable increases in the average temperature of the earth's atmosphere, oceans and land masses or rapid changes in global temperature (Encarta, 2009). According to Nelson et.al, (2009), the five main climate change related drivers; temperature, precipitation, sea level rise, atmospheric carbon dioxide content and incidence of extreme events may affect the agricultural sector in the following ways:

- Reduction in crop yield and agricultural productivity in the tropics and sub tropics where crops have reached their maximum tolerance. Crop yields are likely to decrease due to an increase in temperature,
- Increased incidence of disease and pest attacks as a result of increase in temperature.
- An increase in temperature is also likely to be conducive for a proliferation of pest that are detrimental to crop production.
- Limit the availability of water in some parts of the world.
- Exacerbation of drought periods
- Reduction in soil fertility,
- Low livestock productivity and
- High cost of production.

Climate change poses significant effect on agriculture in the areas of food crop production, forestry, fisheries, infrastructure as well as the socio economic status of the people (CTA, 2009). The debate on climate change and its effect on agriculture are very crucial to the very survival of

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the people of Nigeria. As most of the agricultural activities in Nigeria are rain dependant especially those of crop farming, so any adverse change in the climate would likely have a devastating effect on the sector and on the livelihood of the majority of the population. Hence, the call for proper awareness and understanding of climate change for adequate response and adaptation. Climate change is here and most farmers are ignorant of it. There is therefore a need for the yet to be enlightened to be enlightened about climate change. There is also the need to know what farmers are doing to mitigate the effects of climate change. This is because if communities and government take proactive steps to deal with climate change, they can do much to reduce the adverse effects (Human Development Report, 2008). There is also not enough empirical studies on farmers awareness of climate change and their adaptation methods in Umuahia North Local Government Area of Abia state. Farmers' awareness to issues concerning climate change and the best mitigation measures to adopt if agricultural productivity is to be increased is of essence.

In this regard, the general objective of this study is to ascertain farmers' awareness of climate change and adaptation methods in Umuahia North L.G.A. of Abia state. Specifically the objectives include to;

- examine the socio-economic characteristics of the respondents,
- ascertain the sources of awareness of climate change by the respondents,
- determine the level of awareness of climate change by the respondents,
- examine the adaptation methods being used by the respondents in mitigating the effects of climate change in the study area.

II. Methodology

The study was carried out in Umuahia North L.G.A of Abia state, Nigeria. Umuahia North is made up of 3 blocks: the Ibeku, Ohuhu and Umuahia capital city blocks. According to the 2006 population census, Umuahia North LGA has a population of 222,660 with a land size of 423,290km^2 and a total area of 245km^2. It is bounded to the north by Bende LGA, Umuahia south LGA to the south, Ikwuano LGA to the east and Isiukwuato LGA to the west. The area is situated in the tropical rainforest of the country, and characterized by distinct periods of rainfall and dry season.

Two blocks (the Ibeku and Ohuhu blocks) were purposively selected based on the rural nature of the areas where farming is actually done. From each block, six (6) villages were randomly selected making a total of twelve villages from each block. Ten (10) farmers were also randomly selected from each village resulting to the selection of sixty (60) farmers from each block and a total of 120 farmers for the study. A structured questionnaire was used for primary data collection. Educated farmers were allowed to complete the questionnaire themselves while the contact agents assisted the less educated ones. Data collected were subjected to descriptive statistics (frequencies, percentages and mean score).

III. Results and Discussion

Socio-economic Characteristics of the Respondents

Table 1 describes the socioeconomic characteristics of farmers in Umuahia North Local Government Area of Abia state, Nigeria.

Gender

Table 1 shows that majority (83.3%) of the farmers were male and 16.7% were female. This shows the importance of males in this patriarchal system which sets high value on birth of sons.

Marital Status

Greater proportion (92.5%) across the communities were married. This is consistent with Ekong (2010) when he noted that getting married is a highly cherished value among rural dwellers in Nigeria, not only for children and continuation of family, but also because of women and children form a vital sources of unpaid family labor.

Age

From Table 1, majority (50%) were of the active productive age bracket (31-50yrs). This is line with Okurut and Bategeka (2005) who noted that this age bracket is called "working age" and when the farmer is of working age, the likelihood of high level of awareness of climate change since age have an influence on his experience over time.

Household Size

With regard to household size, 67.5% of the respondents were of medium household size. The household size was medium implying that the household had a ready but relative source of abundant labour. Iheke (2006) asserts to this as he noted that rural household rely more on members of their household than hired labour supply on their farm.

Educational Level

Table 1 also shows that 39.2% of the farmers had primary level of education while 31.7% and 29.2% had secondary and tertiary level of education. The more educated a farmer is, the more he can adopt innovation. The higher the education levels of a farmer, the greater his awareness level to climate change. This will be due to his ability to source information that will improve his productivity.

Major Occupation

As indicated from Table 1, 36.7% of the respondents were found to have farming as their major occupation and this forms the majority. This is in line with Akpabio (2005) who asserted that the major occupation in most rural areas of the world is farming. There are of course, non agricultural occupations in rural areas, but these are of secondary economic importance. In many rural areas, farming operates largely as a family occupation.

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Farm Size

From table 1, majority (54.2%) of the respondents have farm size ranging from 1-2hectares. This is common among small scale farmers who still operate at subsistence level. Their farm size will influence their experience and thus, their level of awareness to climate change.

Cooperative Membership

With regard to cooperative membership, table 1 reveals that majority (85%) of the respondents belongs to one form of cooperative society or the other .it is on record that cooperatives provides education and training for their members.

Farming Experience

As shown in table 1, majority of the respondents had high farming experience of 21yrs and above. According to Nwaru (2004), the number of years a farmer spends in the farming business may give an indication of the practical knowledge he has acquired. High farming experience influence respondents level of awareness to climate change. It is expected that respondents' age, level of education, farming experience and membership of cooperatives influences their level of awareness to climate change in agriculture.

Table 1: Socio-economic characteristics of the respondents

Variables	Frequency	Percentage
Sex		
Male	100	83.3
Female	20	16.7
Total	120	100
Marital status		
Single	9	7.5
Married	111	92.5
Total	120	100
Age		
Young; 30yrs &below	10	8.3
Middle; 31yrs-50yrs	60	50
Old; 51yrs & above	50	41.7
Total	120	100
Household size		
1-3	25	20
4-6	31	67.5
7-9	14	1.7
10&above	0	0
Total	120	100
Level of Education		
No formal education	0	0
Primary education	47	39.2
Secondary education	38	31.7
Tertiary education	35	29.2
Total	120	100
Major occupation of farmers		
Farming	44	36.7
Civil servant	33	27.5
Others(trading, carpentry, etc)	43	35.8
Total	120	100
Farm size		
1-2ha	65	54.2
2-3ha	45	37.5
3-4ha	10	8.3
Total	120	100
Cooperative membership		
Yes	102	85
No	18	15
Total	120	100
Farming experience		
1-10yrs	20	16.6
11-20yrs	36	30
21yrs & above	64	53.3

Source: Field data, 2016.

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Respondent's Sources of Awareness to Climate Change

Table 2 shows that the main source of the respondents awareness to climate change across the communities were through personal experience of the farmers (84.2%), followed by fellow farmers (8.3%) and radio (7.5%).

Majority of the farmers have personal experience as main source of their awareness of climate change as they see these changes as it manifest in their environment.

Table 2: Respondent's Sources of Awareness to Climate Change

Sources	Frequency	Percentage
Extension agents	0	0
Radio	9	7.5
Television	0	0
Personal experience	101	84.2
Fellow farmers	10	8.3

Source: Field data, 2016.

Respondents Level of Awareness to Climate Change

Table 3 shows the level of awareness of climate change by the respondents. The respondents showed high of awareness to 17 out of the 18 possible effects of climate change posed to them as they showed low level to reduced vegetation cover as a possible effect of climate change ($\bar{x}$ = 2.3). The Table identified that the respondents had a high level of awareness to climate change as shown by their mean level of awareness score of $\bar{x}$ = 3.0. Climate change is likely to cause manifestation of vector and vector borne diseases, where an increase in temperature and humidity will create ideal condition for malaria, sleeping sickness and other infectious diseases that will directly affect that availability of human resources for the agricultural sector (Spore, 2008). The result shows that farmers are fully aware of the changes in the climate and the environment in general due to climate change despite not conversant with the physical framework "climate change". This is shown as a high percentage of the respondents agreeing to most of the possible effects of climate change posed to them to happening in their locality. The high level of awareness of climate change by the respondents was a result of the agrarian nature of the rural areas where agriculture forms the basis of their livelihood and any distortion in their level of production as a result of climate change is readily observed as a problem. Majority of the respondents were of onion that the effects of climate change were a punishment from God due to their sins while some believed that it was a sign of the end of the world.

Table 3: Respondents Level of Awareness to Climate Change

Possible effect of climate change	Response		
	Weighted sum	Weighted mean	Overall response
Increased in temperature	456	3.8	High
Drastic change in weather generally	440	3.6	High
Increased frequency of flooding	340	2.8	High
Increased frequency of drought	423	3.5	High
Planting time of crops unpredictable	387	3.2	High
Increased effect of heat stress on crop	306	2.5	High
Increased effect of heat stress on livestock	329	2.7	High
Increased effect of heat stress on farm family	411	3.4	High
Reduced yield of crops generally	309	2.6	High
Reduced productivity of livestock generally	320	2.7	High
Increased poverty rate of farmers	336	2.8	High
Increased pest and disease incidence on crop	362	3.0	High
Increased pest and disease incidence on livestock	343	2.9	High
Increased loss of agriculture land to erosion	318	2.7	High
Reduced fertility of the soil	378	3.2	High
Increased weed infestation on crops	344	2.9	High
Reduced vegetation cover	276	2.3	Low
Increased rate of sickness/infection	423	3.5	High
Grand mean		**54.1**	
Mean level of awareness		**3.0**	**High**

Source: Field data, 2016.

Respondent's Adaptation Methods to Climate Change

Table 4 shows the adaptation strategies/methods employed by the respondents to coping with the effects of climate change. They identified 10 adaptation methods of which mulching crops to reduce water loss (93.3%) ranked high as the most used methods utilized by the respondents in

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mitigating the effects of climate change. Delaying/changing the time of planting (91.7%) followed in rank as they avoided deforestation/and ensured the planting of tree crops (89.2%) was third in rank. On the other hand, the respondents notified that they rarely employed planting of drought resistant/tolerant crops (37.5%) as an adaptation strategy. Their reason being the fact that they rarely get and couldn't readily afford them.

Table 4: Respondent's adaptation methods to climate change

Possible Adaption Methods/Strategies	Frequency	Percentage
Planting flood resistant/tolerant crops	62	51.7
Planting of drought resistant/tolerant crops	45	37.5
Multi-cropping	102	85
Delaying/changing the time of planting	110	91.7
Rearing heat tolerant livestock	55	45.8
Planting pest and disease resistant crop varieties	85	70.8
Mulching crops to reduce water loss	112	93.3
Irrigation of farmland	75	62.5
Increased use of organic manure	105	87.5
Avoid deforestation/ ensure planting trees crops	107	89.2

Source: Field data, 2016.

IV. Conclusion and Recommendations

Nigeria is endowed with abundant human and natural resources which forms the basis for increased food production. The need to improve agricultural productivity in the country cannot be overemphasized. Climate change has been defined as the measurable increases in the average temperature of the earth's atmosphere, oceans and land masses or the rapid changes in global temperature (Encarta 2009). From the study carried out, the results showed that majority of the respondents were male (83.3%), 50% of them were middle aged (between 31-50 years). Most of the sampled farmers (67.5%) had a household size of between 4-6 members. Most of the respondents identified personal experience as their highest source of awareness to climate change. The respondents showed their level of awareness to climate change in their mean level of awareness score of $\bar{x}$ = 3.0. The respondents identified ten (10) adaptation methods they employed in mitigating the effects of climate change in the study area. They identified mulching of crops to reduce water loss as the most used (93.3%) while they said they rarely employed the planting of drought resistant/tolerant crops (37.5%) as a mitigation method.

Based on the findings of this study, it is therefore recommended that extension agents should be mobilized to reach rural areas with information, best practices and mitigation methods to critical issues such as climate change. Equally, improved varieties of crops should be made available and to the reach of local farmers to ensure adequate food production even in the light of climate change.

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