



## **INDIGENOUS FARMERS' PERCEPTION ON CLIMATE CHANGE IN ZANGO KATAF LOCAL GOVERNMENT AREA OF KADUNA STATE, NIGERIA**

**<sup>1</sup>Zonkwa, K., <sup>2</sup>Okafor, C. C and <sup>3</sup>Nduka, I. C**

<sup>1</sup>Department of Geography, Federal College of Education, Zaria.

<sup>2</sup>Department of Water Resources & Environmental Engineering,  
Ahmadu Bello University, Zaria.

<sup>3</sup>Department of Geography, Federal University Lokoja

Corresponding author: E-mail: [nonsoliso@gmail.com](mailto:nonsoliso@gmail.com).

### **ABSTRACT**

The ability of farmers in Zangon Kataf Local Government Area of Kaduna State to perceive and detect climate change and its consequences is the subject of this study. In spite of the efforts that have been made towards mitigating the effects of climate change, research and policies directed towards the locality, the indigenous knowledge and perception are still highly needed. This research is focused on the perception of the local farmers about their local environment. Structured Questionnaires were used to obtain relevant information for the research. 70% of the respondents (farmers) strongly agreed that the local environment is changing. Only 66.2% are of the opinion that the climate is also changing. The survey revealed that over 57% and 52% of farmers believe temperatures have been increasing while precipitation has been declining respectively. Over 48% of the farmers also believe that the changing climate is also for the environmental problems that are affecting their agricultural practices. There is need to implement proper adaptation strategies, and as such assistance and incentives will be needed to enable the farmers cope with the effects of the changing climate.

**Keywords:** Climate change, Perception, Zangon Kataf

### **Introduction**

Never in the history of mankind has the issue of climate change been as topical at national and international levels as at now. Climate change and its projected impacts on the environment and socio-economic system now constitutes the most important environmental problem that mankind faces since in the 21<sup>st</sup> century (Ayoade, 2003). A change in climate implies a change in the general circulation of the atmosphere on which climate ultimately depends (Ayoade, 1993). According to the Intergovernmental Panel on Climate Change (IPCC, 1996), the concept of global climate change addresses the issues of global warming, sea level rise, changes in precipitation, and evaporation and stratospheric ozone layer depletion. Rising temperature may in turn produce change in weather, sea levels and land use patterns, commonly referred to as climate change (Hopwood and Cohen, 2005).

The global climate issue addresses certain changes in climate; the causes, effects and solutions. However, global climate has changed and is still changing. Temperature is getting warmer every day, some regions in warmer climates receive more rainfall than before, but soils may dry out faster between storms while some regions will experience shortage in the annual amount of rainfall. Soil desiccation may damage food crops and disrupt food supplies in some parts of the world. Plants and animal species may shift their ranges towards the poles or to higher elevations seeking cooler temperatures and species that cannot do so may become extinct. The

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potential consequences of climate change are so great that many scientists are calling for international cooperation and immediate actions to the problems (Houghton *et al*, 2005).

The most devastating adverse impacts of climate change in Nigeria, and other subtropical countries include frequent drought, increased environmental damage, increased infestation of crops by pests and diseases, depletion of household assets, increased rural-urban migration, increased biodiversity loss, depletion of wildlife and other natural resource bases, changes in vegetation type, decline in soil conditions (soil moisture and nutrient), increased health risks and the spread of infectious diseases, changing livelihood systems, among others (Reilly, 1999). The ability of farmers in Zango Kataf Local Government Area of Kaduna State to perceive and detect climate changes and its consequences is relatively low and hence the need to investigate farmers' ability to detect climate change is needed.

Micro-level studies of the impact of climatic variability on people's livelihoods at the farm level, and their consequent responses are relatively few, although Glantz (1988) had some success in linking macro changes with micro effects by researching into the institutional mechanism that respond to environmental perturbations. In light of the uncertainties involved in diachronically modelling climatic events, as well as the general paucity of long term climatic data in developing countries. The research on cultural perception of climate change would yield useful insights (Crumley and Marquarat 1987, Gunn 1994, Orlove *et al*, 2000). In line with this suggestion, most research on people's perception of climate changes were carried out in the developed countries of the world where the synergy between scientists and indigenous people is high (Jan and Anja, 2007). In spite of the fact that efforts have been made to fight climate change scientifically, research and policies directed at indigenous knowledge and perception are still very few.

## **Materials and Methods**

**Types of Data Collected:** Structured Questionnaires were used to obtain relevant information for the research. The questionnaires were structured such that the responses enabled the understanding of the farmers' perception of climate change issues in the study area. The questionnaires had both open and close ended questions to obtain information from the respondents on the following:

- i. their views on the concept of climate change;
- ii. their views on the causes of the climate change;
- iii. what they think are the effects of climate change on their livelihood

**Sampling Design and Questionnaire Administration:** Zango Kataf Local Government Area has a population of 318, 991 (NPC, 2009). The study area is made up of eleven (11) wards, namely; Gidan Jatau, Gora, Ikulu, Kamanton, Madakiya, Unguwan Gaya, Unguwan Rimi, Zango Urban, Zamandabo, Zonkwa and Zonzon (Figure 1). The number of questionnaires used was based on population of the study area and determined by the Krejcie and Morgan (1970) method of determining sample size. Based on this premise, the sample size used for this research was 382, and the units of observations were the wards. Systematic random sampling techniques were used to select 5 wards out of the 11. The 5 wards are Gora, Kamanton, Unguwan Gaya, Zango Urban, Zonkwa. The 382 questionnaires were purposely administered proportionately to the people of each ward but only to household heads above the age of forty (40) years, who must have lived for at least thirty (30) years within the study area; and are farmers. The reason for this decision is that those within the age bracket will have the information needed. The questionnaires were administered orally to the semi-literate and the illiterate farmers.

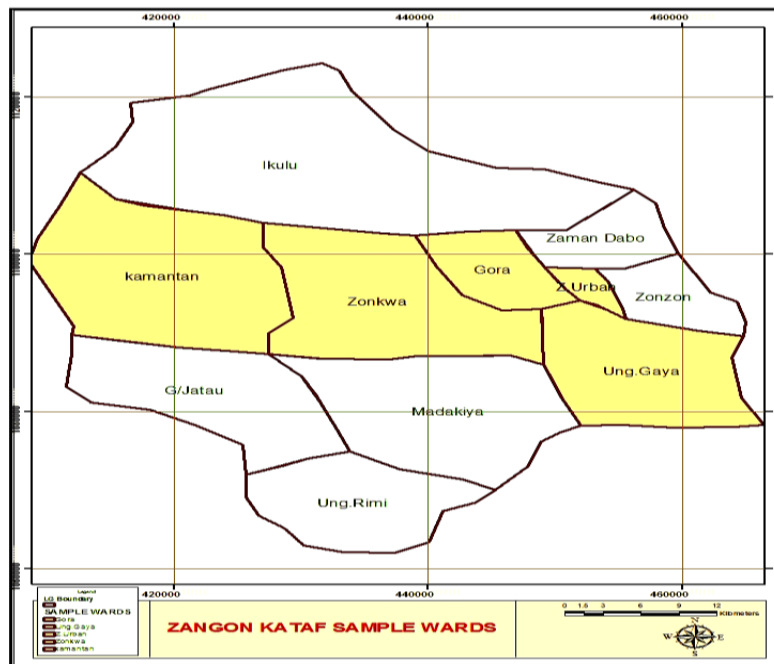


Fig 1: Map of Zangon Kataf Showing the Sampled Wards

**Techniques of Data Analysis:** Data collected from the respondents through the questionnaires were analysed using descriptive and inferential statistics. The data were summarized and presented in tables. Chi – square, a non parametric test were used to test the hypothesis which states that the farmers have adequate knowledge on the local and global climate change issues.

**Results and Discussions**

The perception of the farmers on environmental and climate change within their area of dwelling is high, having recorded 70.7% and 66.2% respectively on the environmental and climate change respectively as it is shown in Table 1.

**Table 1:** Responses from the indigenous farmers

Variable	Perception of environmental change		Perception of climate change		Perception of temperature changes		Perception on Decreasing Rainfall	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Disagree	60	15.7	55	14.4	87	22.8	99	25.9
Undecided	52	13.6	74	19.4	74	19.4	82	21.5
Agree	270	70.7	253	66.2	221	57.8	201	52.6
<b>Total</b>	382	100	382	100	382	100	382	100

Source: Field survey 2011

Table 1 also shows that the farmers are also aware of the changes in the temperature and the decreasing rainfall. Moreover, farmers’ perceptions of decreasing rainfall may be attributed to their observance of frequent extreme climate events, especially drought. Reports from weather stations show that the distribution of rainfall has been characterized by a very high level of variability over the last 50 years.

Farmers that agreed there is insufficient rainfall for crop production. 54.2% of the farmers testified that some crops are no longer cultivated the way they used to, due to insufficient rainfall is responsible. The farmers that accepted that the weather is drier are 50.8% (table 2).

**Table 2:** Responses from the indigenous farmers

Variable	Perception on drier weather Conditions		Perception on insufficient rainfall for crop production		Climate change has led to crop infestation and disease		Perception on climate change and food crop production	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Disagree	99	25.9	94	24.6	95	24.9	95	24.9
Undecided	89	23.3	81	21.2	98	25.7	87	22.8
Agree	194	50.8	207	54.2	199	48.5	200	52.4
<b>Total</b>	<b>382</b>	<b>100.0</b>	<b>382</b>	<b>100.0</b>	<b>382</b>	<b>100.0</b>	<b>382</b>	<b>100.0</b>

Source: Field survey 2011

Only 48.5% agreed that the climate change is the cause of crop infestation and disease while 52.4% are of the opinion that the climate change and food production are highly linked.

The results indicate that 50.3% of the surveyed farmers have observed that fuel wood has been declining in the last 20-30 years whereas 49.7% observed a decreasing forest resources (Table 3).

**Table 3:** Responses from the indigenous farmers

Variable	Perception on fuel wood scarcity		Perception of climate change leading to decline in forest resources		Perception on increase incidence of floods during the rainy season		Perception of climate change as a cause of change in livelihood	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Disagree	106	27.8	99	25.9	109	28.6	118	30.8
Undecided	84	22.0	93	24.3	70	1.3	85	22.4
Agree	192	50.3	190	49.7	203	53.1	179	46.8
<b>Total</b>	<b>382</b>	<b>100.0</b>	<b>382</b>	<b>100.0</b>	<b>382</b>	<b>100.0</b>	<b>382</b>	<b>100.0</b>

Source: Field survey 2011

The increased incidence of floods during the rainy season was acknowledged by 53.1% of the farmers, while 46.8% attributed the cause of change in livelihood to climate change.

The higher likelihood of perceiving climate change with increasing age of the head of the household is associated with experience, which lets farmers observe changes over time. The farmers generally increase their knowledge and perception of climate change through extensions or other public sources, farmer-to-farmer extension and from relatives in the area. Climate change perception and knowledge play an important role in the formulation of mitigation and adaptation strategies by the local farmers.

## Summary and Conclusion

This study assessed the perception to climate change among farmers in Zangon Kataf LGA. Generally they believe that the climate is changing in a manner consistent with available meteorological evidence. Of course the fact that experienced farmers appear to notice climate change does not mean that they are 'optimally' updating their expectations in the sense of making the most efficient prediction based on the historical information available to them. Consequently, all that can be said is that the available evidence does not enable one to dismiss use of the Ricardian technique for the purposes of predicting the impact of future climate change on agriculture. From the present study, a number of findings emerge that resonate with earlier literature. These relate to the importance of extension services and proximity to the market in determining whether individual farmers respond to the perception of a changed climate. Together these highlight the importance of accounting for alternative channels of learning. But perhaps the single most important finding from

this study is that it is farming experience that determines whether or not farmers perceive climate change.

## Recommendations

From the research findings it appears that many people are aware of climate change and the consequences of climate change effect on the human life. There is shortage of food supply in the country which is due to the climate change which has caused decline in crop yield. Many diseases have become prevalent as a result of climate change effect with many lives at risks.

For these reasons, the following recommendations are offered to help stem the tide of climate change effects;

- i. Farmers perception of climate change should be enhanced by organising them into manageable groups so that information on climate change and other such important information can be easily passed across to them. This group will also enable them to effectively share and come up with different coping strategies.
- ii. Further research can be done in the examination of the different coping strategies of the farmers so as to learn how they are able to adapt to the changing climate.
- iii. There should be an integrated approach to the problem of climate change and the appropriate authorities should consider research reports on global climate issues in their policy planning.

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