

Climate Change; Farmers' Awareness, Perceptions and Responses in Lagos State

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Abstract Climate change has been a major challenge to agricultural development in most parts of the world with growing concerns about its impact on food supply and security. This report examines what farmers in urban Lagos, Nigeria (West Africa) think about climate change and how it affects their agricultural activities. The study was carried out in four local government areas of Lagos state, Nigeria; Epe, Ojo, Ikorodu and Alimosho, involving 105 farmers. Our result showed that the level of awareness of changing climate in Lagos has increased, but a large number of farmers still lack good understanding of the concept of climate change. About 30% of the farmers understood what climate change is, 38% think it is natural and nothing could be done about it, some farmers also think climatic conditions will soon return to what they were before. Our survey showed that younger farmers with higher education background understood what climate change is all about while older farmers do not really understand but have been able to develop some adaptation measures based on experience.

Keywords: farmers perception, climate change, Urban Lagos

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1. Introduction

The impact of climate change has continued to increase and has very likely altered some major parts of the ecosystem[1]. Agriculture being the major recipient of these changes will continue to suffer and farmers continue to lose their investments due to a lack of proper adaptation measures when they are not properly educated about what climate change is all about. There is obvious evidence including research results which show that climate conditions are changing and that these changes will impact on natural and human systems if nothing is done. For instance, the environment is becoming hotter and drier, rainy seasons are getting shorter and unpredictable, more violent and increasingly erratic, and different variations have been observed [2,3,4]. All these, have been linked to climate change which has grown to become a major concern for the global sustainable development of agriculture. Although agriculture is a complex and highly evolved sector, it is still directly dependent on climate variables since nutrient sunlight and water are major drivers of crop growth [5,6,7]. Science has made enormous progress in understanding climate change and its causes, and is beginning to help develop a strong understanding of current and potential impacts [8,9,10,11,12]. For several thousands of years, climate variables have tended to change slowly and consistently

which has made it possible for people to predict the trend of things [13,14], but the accumulations of greenhouse gases which is the major culprit implicated in climate change threatens to alter nearly every stable index in the class of variables which has been built around this system. Therefore, farmers need to clearly understand this interdependence of climate variables and agriculture in order to fully understand the concept of climate change. It is important to note that despite the awareness of climate change and its impact on agriculture, most farmers especially in Africa do not really understand this phenomenon, and it has been said that the perception of farmers about climate change will go a long way to determining the extent of adaptation that will be adopted by farmers [15,21]. The primary hypothesis is that farmers adapt to perceived climate change and variability [16]. But, the question to be asked is this : "do the farmers really know that the climate is changing and if yes, how do the farmers perceive climate change and variability and what characteristics differentiate farmers who understand what climate change is about from those who do not?" An answer to this question will further help both potential and current farmers understand their response to certain climate change issues that may arise during their various farming activities [17,18,19,20]. As part of a more recent trend of adaptation research, this study seeks to understand what farmers think about climate change in urban Lagos which is one of the largest cities in Africa and Nigeria's most industrialised city; it will capture the

extent of farmers' awareness and perceptions of climate variability and change and the types of adjustments they have made in their farming practices in response to these changes. The analysis in this work is based on a survey of farmers in urban Lagos who either have farming as their major occupation or as a second occupation, but will be restricted to crop farmers alone with emphasis on four local governments in Lagos state namely Ojo, Alimosho, Ikorodu and Epe.

2. Methodology and Study Area

Lagos State is located at 6°35' North latitude, 3.45° East longitude in the south-western part of Nigeria. It has the smallest in area of Nigeria's states and containing the nation's largest urban area with a population of about 25 million people. It has 5 major division out of which four of the division were discussed in this work. In Lagos state, 22% of its 3,577 km² are lagoons and creeks and host about 75% of the country's industrial establishments. Lagos has a tropical wet and dry climate which favor's agricultural practice. All our investigations started with a preliminary visit to the study areas. Target respondents

included both large and small-scale farmers with the focus on crop farmers ranging from the literate to illiterate farmers. Four areas of Lagos state with a total of 105 farmers were studied namely Ojo with 18 farmers, Alimosho with 13 farmers, Epe with 17 farmers and Ikorodu local government area with 57 farmers giving a total of 105 respondents. Information about farmer's opinion and perception were collected from a direct field study, interviews and questionnaires. Data collected were subjected to both descriptive, exploratory and inferential statistical analysis. All data about climate change impact and adaptation strategies were obtained from a very broad range of studies and developed using different methods. A 4-point like- type scale (Yes, No, I don't know, I am not sure) were used to investigate and measure the perception of farmers about climate. In analyzing farmers' opinions, a statistical evaluation of each response was made and compared, different graphical representations were used to describe the trends and details of each data to show both qualitative and quantitative information. Farmers' perceptions were analyzed based on certain climatic variables like rainfall, temperature. All conclusions were inferred using a logistic method of analysis.



3. Result and discursion.

3.1. Socio-economic Characteristics of the Respondents

Our study showed examined 105 farmers out of which 22.86% were above 55 years of age, 27.62% fell between the ages of 46-55, 23.81% were between the ages of 36-45, 17.14% (18 farmers) were between the age ranges of 26 and 35, while 8.57% (9 farmers) were less than 25 years

of age. Data further shows that about 87.62% of the respondents were male, 17.14% were literate, 38.10% are semi-formally educated while 44.76% are not formally educated and 74.28% of the respondents had been involved in farming for more than 10 years. This implies that majority of the respondents had been farming for many years. This result confirms that majority of the farmers in Lagos are not formally educated and so might lack information about the impact of climate change. Most of the farmers are adults who have had a long time experience of farming and are aware of the continued trend of the changing climate at least for more than a

decade and have been able adapt in one way or the other to the changes.

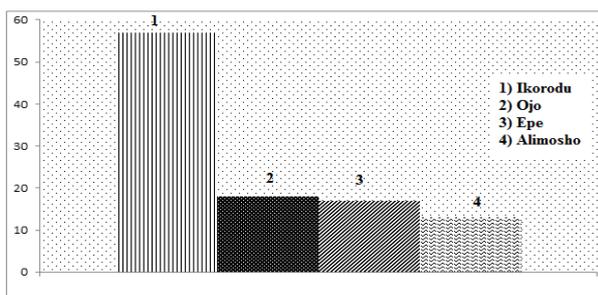


Figure 1. The socio- ecological distribution of the respondents

3.2. Assessing Farmers' Perceptions about Climate Change

A descriptive statistics based on the summary from the questionnaire was used to provide insights into farmers' perceptions of climate change and variability. Farmers' responses about their perception based on the events of variations in temperature, rainfall/precipitation, drought, wind and crop yield were analyzed. Figure 2 shows the summary of all responses from the farmers when asked about what they think about climate change. Only about 37% of all the farmers are fully aware of what climate change is all about, the rest are aware of the impact but do not understand cause. Most of the correspondents who were fully aware, were formally educated unlike the other illiterate farmers, majority of whom did not know what climate change was. The comparison of the results showed that about 90% of non-formally educated farmers are not aware of what climate change means

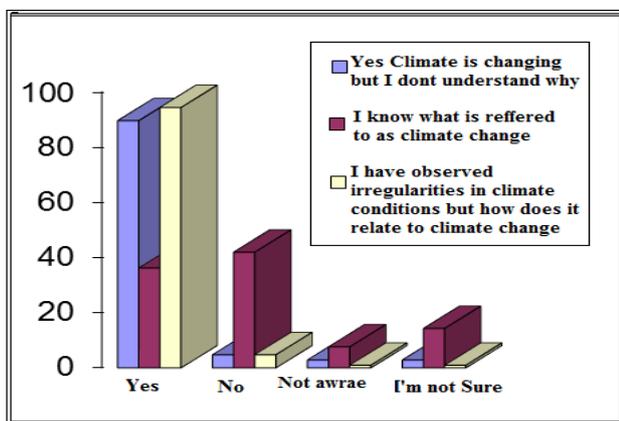


Figure 2. Farmers responses to questions about climate change with respect to their perception about climate change

3.3. Farmers' Perceptions about Impact of Climate Change on Temperature

About 93.33% of the respondents confirmed that the intensity of average daily temperature has increased over the last 10 years, about 4.76% said there has been no increase in temperature, 1.91% were either not sure or have not paid attention. As a matter of fact, irregularities and increase in temperature has been a major concern to the farmers due to greater heat which has been generated during this period which has led to huge loss of seedlings caused by the intensity of the direct sunlight on the tender

growing crops. Figure 3 below shows the response of farmers when asked if they had noticed any increase in temperature.

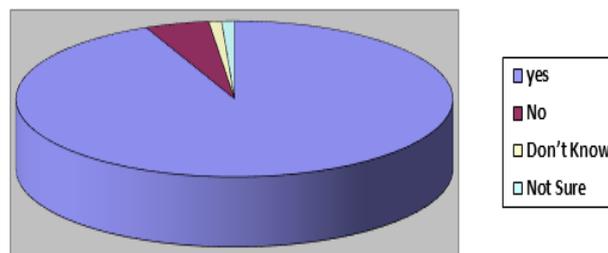


Figure 3. Graphical representation of farmer's perception about increase in temperature

3.4. Farmers' Perceptions about Impact of Climate Change on Rainfall.

As shown in Figure 4, farmers generally perceived climate change in terms of erratic rainfall distribution within the last 20 years. Our result showed that, 79.04% of the respondents observed a downward change in rainfall patterns over the past 10 years. Almost 20.06% of the respondents do not believe that there is a reduction in the amount of rainfall but almost all the farmers were aware of the change in the rainfall pattern /system when compared with the previous 5- 10 years. During a chat with some of the farmers, some of them mentioned that they observed that the main rainfall season, which is between May and August, is coming late and is also shorter.

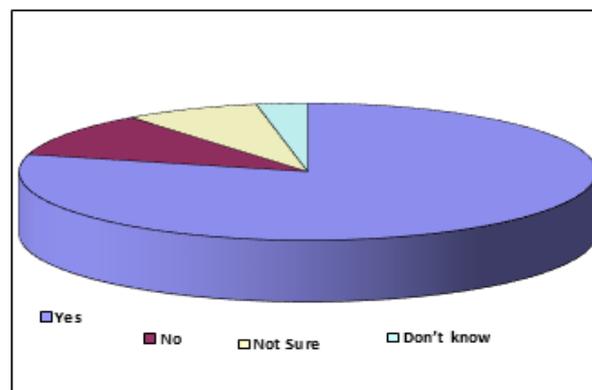


Figure 4. Graphical representation of farmers' perceptions about decrease in rainfall

We compared the 2 major and prevailing climate variables (temperature and rainfall) to understand the trend of awareness by the farmers and to understand what they think about any changes they have observed so far; it was confirmed that in both cases, there is a strong awareness about the changing environment. Over 80% agreed that the impact of the changing temperature has been noticeable while over 75% also agreed that the level of rainfall has been altered over the past years; some farmers could not say if they noticed a considerable amount of change while some who noticed changes could not ascertain the cause and reason for the changes. But overall, a greater percentage knew the changes currently occur. Figure 5 gives a graphical representation of the comparisons made.

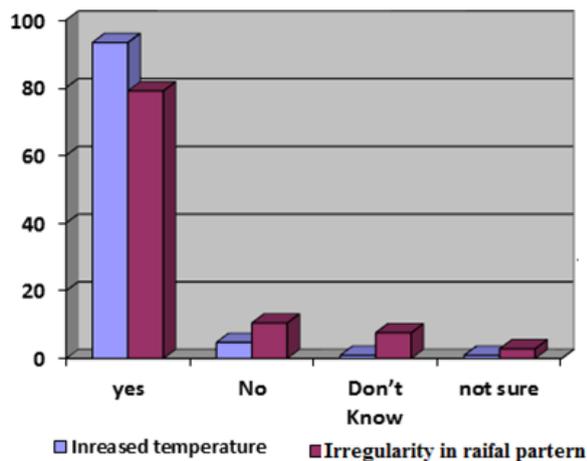


Figure 5. Comparison of farmer's response to change in temperature and rainfall in Lagos showing that farmers are aware of the impact of climate change

About 98% of the farmers have been able to adopt a means of adapting to the various impacts observed mostly due to economic reasons and to prevent reduction of yield; the adaptation was not motivated based on the causes of climate change but as a result of the effects which they observed leaving them with the danger of not being able to adapt if the effects go beyond what they could manage. Most farmers have adopted some adaptation methods but less than 40% of the respondents either understand or do not understand what climate change is all about. Majority of the farmers still use pesticides which contribute greatly to the depletion of the ozone layer, and so one could infer that adaptation was not as a result of awareness about climate change because their adaptation does not mitigate against climate change.

3.5. Spatial Clustering of Climate Change Perceptions

We raised the possibility that the fact that many farmers believe the climate has changed might be a case of the respondents being biased when responding to the questionnaires or influences from neighbors. But one would not expect the number of farmers who believe they have observed particular kinds of climate change to exhibit spatial autocorrelation if the results reflected only prominence bias; for instance each of the farmers has got a personal experience based on the interactions with them, then each of them have come a long way to involve a particular adaptation method in response to the changing climate but mostly do not understand what climate change as a phenomenon is, the causes and possible mitigation methods rather than just adaptation. Our result shows varying responses which suggest that most farmers gave their opinion and were not influenced.

3.6. Farmers' Responses about Adaptation Options in the Study Areas.

More than 53% of the respondents cited lack of access to credit, poverty, and lack of information on basic knowledge and infrastructure. A number of adaptation options were identified in the study areas. While some farmers were concerned about what to do and took major steps, others feel it is temporary occurrence and that soon

things will come back to what they used to be. Common adaptation measures included planting different crops, changing crop varieties, changing planting dates, increasing irrigation, diversifying crops among other uses of pesticides and fertilizers. Adopting a new crop variety and changing planting season was the main strategy used to adapt to increasing temperature, building water-harvesting schemes was a popular strategy for coping with decreased rainfall. The farmers with greater management and technical skills were able to cope better with climate variability and change. Large-scale farmers were also seen to be more proactive in adapting to the changes they noticed.

3.7. Farmers' Responses to Climate Change Due to Their Perceptions

Farmers' responses about their perceptions were evaluated based on specific questions aimed at understanding what has been the main driver for the adaptation measures that are currently in use. Our results showed that

- 53% agreed that the Climate is changing but do not understand what climate change is.
- 30% believe that climate change is temporary and think it will soon return to the way conditions were.
- 10.4% believe that climate is changing but there is nothing that can be done about it.
- 30.47% understand what climate change is and are doing everything within their reach to adapt and mitigate against it.
- 64.76% do not really understand what climate change is, but are taking one step or the other to adjust to the observed changing climate variables.
- 17.14% think nothing can be done about climate change and so no adaptation is being carried out by them.
- 11.4% are aware of what the Government is doing to help farmers in adapting to climate change.

The responses clearly showed some adaptation but despite the fact that most farmers have adapted to climate change in a certain way, the strategies imbibed by farmers were not because they understood what climate change is all about but because of the need to sustain their farming activity and reduce the risk of loss of yield [21].

4. Conclusion and Recommendation

Our results show that farmers' awareness and perceptions about climate change are relatively low in Lagos which might be traceable to the level of education among farmers. They are beginning to pay close attention to the reality that climate change tends to bring to their farming activity which will further increase their awareness about climate. Although farmers are aware of the changing environmental conditions but tend not to understand the reasons and the cause of the change. Our study showed that farmers' responses about the impact and their decision to adapt to climate change was majorly to suit their activity. Although there is a thin line between awareness and adaptation, in our report, we can infer that a lot of farmers are aware of the effect of climate change but not of climate change itself, its cause and possible

mitigation options, only about 30 % of farmers have adjusted their farming practices to account for the impacts of climate change. We therefore recommend that an increased awareness and improved environmental management program be made available to farmers, this will help farmers understand what climate change is all about and how it relates to their farming activity and will influence their choice of decisions and understanding, for example in the use of pesticides.

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