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CLIMATE CHANGE AND FOOD SECURITY IN BOKI LOCAL GOVERNMENT AREA OF CROSS RIVER STATE, NIGERIA

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Abstract:

This study examined climate change and food security Boki Local Government Area of Cross River State, Nigeria. One hypothesis was formulated to guide the study. The research design adopted for this study was the ex-post facto design with a sample of 350 respondents. The stratified and purposive sampling techniques were adopted for the study. A researcher's developed instrument titled "Climate Change and Food Security Questionnaire" (CFSQ), was used for data collection. Cronbach Alpha reliability method was adopted and the co-efficient obtained 0.82. Simple linear regression test statistic was used to analyse the data collected from the field. The findings revealed that climate change significantly predicted food security in Boki Local Government Area of Cross River State, Nigeria. It was recommended among others that

Nigeria needs to adopt some adaptation strategies that will enable her cope with the challenges of climate change to ensure food security in the country. To achieve this, there is urgent need for climate change policy at both National, state and local government levels in Nigeria. It is hoped that if the suggestions as made in this paper are effectively pursued, the country's vulnerability to climate change will reduce appreciably and Nigeria's food security will be greatly enhanced.

Introduction:

Many developing countries, including Nigeria, are concerned about food security. The national level in these countries portrays an image of a food secure population, but the reverse is true at the household level, where individual families are suffering from a lack of sufficient food (Mwaniki, 2012). Food protection is a multifaceted problem that affects almost every aspect of life in many parts of the world. Food security was described at the 1996 World Food Summit as "when all people have access to adequate, secure, nutritious food at all times to sustain a healthy and active life." Food protection is commonly described as having physical and economic access to food that satisfies people's nutritional needs as well as their food preferences.

"Food protection for a household means that all members have access to adequate food for an active, safe life at all times," according to the USDA. At a bare minimum, food security entails: i. the ready supply of nutritionally suitable and nutritious foods; and ii. the guaranteed ability to obtain acceptable foods in socially acceptable ways (i.e. without relying on emergency food supplies, scavenging, stealing, or coping strategies).

Three pillars support food security:

i. Food supply: reliable availability of adequate quantities of food.

ii. Food availability refers to having enough money to purchase enough foods for a balanced diet.

iii. Food use: acceptable use based on basic nutrition and care awareness, as well as access to clean water and sanitation.

Food security is a complicated sustainable development problem that is related to health through malnutrition, as well as economic development, the climate, and trade. Food protection is a hot topic of discussion, with some arguing that:

i. There is enough food in the world to feed everyone adequately; the issue is distribution.

ii. Present levels of production may - or cannot - meet future food needs.

iii. National food security is essential, but it is no longer needed due to global trade.

iv. Globalization may - or may not - contribute to the persistence of rural food insecurity and poverty.

Regardless of the above, the number of people who go hungry on a daily basis remains stubbornly high across the world. Avoiding the trap of food insecurity and understanding the factors that cause widespread hunger and food vulnerability to famines has proven difficult in many developing countries, especially in Africa. Approximately 500 million people in Africa are food insecure, like Nigeria and Cross River State (Food &Organization, 2015).

Many researchers involved in the health of populations have continued to investigate the tools available to mitigate the effects of food insecurity. According to the Food and Agricultural Organization of the United Nations, the International Fund for Agricultural Development, and the World Food Program, 842 million people, or one in every eight, were hungry in 2012, with Africa being the most affected, with one in every four people suffering from chronic hunger.

Household food security is influenced by a variety of global factors. Despite being Africa's leading economy and giant a few years ago, as well as a regional business hub, Nigeria, and especially Cross River State, has yet to eradicate extreme poverty and hunger. Despite the

fact that Cross River State's economy is based on agriculture and even exports, Cross Riverians continue to suffer from chronic food insecurity (Urte, 2014). The government, for its part, has been reacting to the challenges through policy formulations such as mobilization and sensitization drives, improving small irrigation schemes, and providing input subsidies, among other things. Academics have also contributed to these countermeasures through related research and developments in aquaculture, apiculture, livestock management/breeding/nutrition, crop enhancement, water resource conservation, soil conservation, and other fields. Several researchers have stated that socioeconomic factors are the primary causes of household food insecurity, but other researchers have conflicting findings. The aim of this study is to see whether climate change in the Boki Local Government Area is leading to household food insecurity.

Increases in average temperatures have been observed around the world as a result of climate change, and there is fresh and better evidence that the bulk of the warming seen in the last 50 years is due to human activities (Field, Mortsch, Brklacich, Forbes, Kovacs, Patz and Scott, 2017). Climate change, which is a long-term shift in weather patterns defined by shifts in temperature, precipitation, winds, and other indicators, is to blame for these changes (Garnett, 2011). Unless drastic action is taken, these changes have the potential to impact the climate, communities, and economy.

Unless immediate action is taken, these changes have the potential to damage the climate, communities, and economy. Climate variability has been observed globally, with the expected rise in average temperature for the period 2016–2035 likely to range between 0.3 and 0.7 degrees Celsius as compared to the reference period 1986–2005. (Kirtman, Power, Adedoyin, Boer, Bojariu and Camilloni, 2013). Furthermore, since these areas are highly sensitive to changes in rainfall patterns, the overall net impact of climate change on agricultural production is expected to be negative, especially over the long term.

Furthermore, since food is important in keeping families together and maintaining functioning communities, studies have concentrated on climate change because of its importance on household food security. Despite their effect on household food security, they have yet to be thoroughly investigated in Nigeria's Cross River State's Boki Local Government Region.

Literature review:

Farming households in Cross River State are suffering serious consequences as a result of climate change, with increased seasonal mean temperatures in many areas of the state, including the Boki Local Government Region (Okumu, 2013). Given the importance of agriculture in the economy, it's critical to understand how climate change affects food security so that smallholder farmers can be properly led. The agricultural sector employs the majority of the population, according to the GoK (2009), with household food production. Furthermore, there are a large number of smallholder farmers in areas classified as arid or semi-arid, which are unsuitable for rain-fed agriculture due to poor and inconsistent rainfall (GoK, 2010). As a result, they have a lot of crop failures and poor crop and animal productivity.

Climate change is being exacerbated by global warming, and since small-holder farmers depend on rain-fed agriculture, even minor changes in weather from what they are used to can have a significant impact on their livelihood. These reforms have a negative impact on agricultural farmers, and household food security is jeopardized. This is because climate variability and change affect 62 weather patterns and seasons, which has an effect on households' ability to secure food. According to Miano, David, Rose, and Lawrence (2010), climate change

has become more pronounced in recent years, negatively affecting smallholder farmers' lives and livelihoods.

Climate change has the potential to negatively impact crops at any level of development, from planting to harvest. Crop yields are reduced when crops are adversely affected by water scarcity (insufficient rainfall) or heat stress (extremely high temperatures), increasing the risk of hunger and starvation. Crop yields decrease dramatically as temperatures rise and rainfall patterns become more erratic. Extreme weather events such as thunderstorms, strong winds, and flooding wreak havoc on farmlands, resulting in crop failure and severe agricultural losses, both of which have a detrimental impact on food security. Rainfall patterns in Nigeria impact crop production in a variety of ways, depending on where you are. Even if there is enough rain, however, the irregularity of the rain can have a negative effect on yields. To put it another way, if the rains come late or fail to arrive during the vital growing stage of the crops, yields will certainly be harmed, posing a threat to food security. Changes in crop production and phonology as a result of climate change may shorten or lengthen crop cycles, resulting in lower or higher productivity ((Ifeanyi-Obi, Etuk, & Jike-Wai, 2012).

Temperature and rainfall variations expose crops to new crop pests and diseases that thrive at specific temperatures and humidity levels. These pests and diseases pose new threats to food safety, defense, and human health. Some experts, such as Cheikh, Anette, and Awa (2009), believe that global temperatures will continue to rise unless the factors causing climate change are tackled immediately. Furthermore, severe weather events (such as floods, landslides), droughts, hurricanes, and sea levels, environmental degradation, pest and disease infestations of agricultural crops and animals, low agricultural productivity, poverty, hunger and malnutrition, and food insecurity are all likely to become more common.

Oceans, seas, lakes, and rivers, as well as the animals and plants that live in them, are all affected by climate change. Millions of people in Africa (including Nigeria) depend on fishing and aquaculture for their livelihoods, which are threatened by climate change. This is because, as a result of water scarcity, certain fish resources are becoming scarcer, and important species are migrating to areas where they are less accessible to fish farmers. Changes in temperature, salinity, wind speed and direction, ocean currents, and upwelling strength, all of which are influenced by climate change, dramatically alter the abundance, distribution, and availability of fish in the country (Ifeanyi-Obi, Etuk, & Jike-Wai, 2012).

Furthermore, changes in ocean dynamics alter fish migration patterns, potentially reducing fish landings, especially in coastal fisheries. Increased extreme weather events, droughts, and warming waters pose a challenge to aquaculture practices. All of this has a negative effect on food security and survival, as many fishing communities find it more difficult to feed their families or make a living from fish farming. Coastal populations are being displaced as sea levels rise, pushing them to find new homes and new ways to make a living. All of these factors have a direct or indirect effect on the livelihoods of Nigerian fish farmers, their immediate families, and their dependents, as well as food security. It also has an effect on the income of those who work or trade with fishery products. Changes in the marine environment have a huge impact on fisheries services. While fish have always been able to adapt to changes in the environment, future climate changes are likely to be so drastic that they will be difficult for them to cope with. As a result, identifying appropriate mitigation and adaptation methods is a top priority for ensuring Nigeria's continued food security.

Nigeria's forest reserves are not immune to the danger posed by climate change. Higher temperatures, increased carbon dioxide concentrations, precipitation increases, increased weeds,

and increased pests and diseases of plants are all effects of climate change on agriculture and forestry. All of these factors have a negative impact on Nigeria's food production and security in various ways. Deforestation, or the cutting down of trees faster than they are replaced, is a significant contributor to climate change. Since trees consume carbon dioxide as they grow and use it for the synthesis of organic food compounds, deforestation accounts for 20% of global carbon emissions. Carbon dioxide can build up in the atmosphere as there are fewer plants left to absorb carbon dioxide. Various farming practices, industrialization, and population growth not only wreak havoc on the earth's ability to consume carbon dioxide, but they also create their own emissions. Furthermore, for whatever reason, cutting down forest vegetation allows wild life to migrate to new habitat. This has an effect on hunters who rely on these animals for a living. As a result, deforestation has an effect on food security, as meat becomes less affordable to the general public.

Methodology:

The Ex-post facto research design was considered suitable for the study. Ex-post facto literally means 'after the fact'. It basically studies phenomenon after they have occurred. The research area of this study is Boki Local Government Area. It has a population of about 249, 400 and a contiguous territories border with the republic of Cameroon (National Population Commission, 2018). Boki bears a national and international reputation for being a major commercial centre where forest and internationally quoted agricultural commodities such as cocoa, coffee, timber, palm products, cassava's, banana's, plantains, etc. are sourced and supplied for international consumption.

Boki Local Government Area is bounded in the North by Obudu, South by Ikom Local Government Area, East by the republic of Cameroon and West by Ogoja Local Government Area. With Boje its' headquarters, Boki has about fourteen major communities including Iso-Bendeghe, Bansan-Osokom, Nsadop, Abo, Okundi, Irruan, Bateriko, Bumaji, Orimekpang, Wula, Buwansheba, Ntamante and Kakwagom. The sampling techniques that were adopted for this study were stratified and accidental random sampling techniques. The total sample for the study was 350 respondents drawn from eleven (11) council wards in Boki Local Government Area of Cross River State. The sample consists of youth, literate men and women, ranging from 15-65 years.

The instrument for data collection was a 20 items questionnaire developed by the researcher. The Cronbach Alpha Coefficient method was used to determine the internal consistency of the instrument which was found to be 0.82 meaning the instrument is reliable. In order to analyse the data, the raw scores of all the items in the variable were summed together to show the result for each variable. Data was analyzed using Statistical Package for Social Sciences (SPSS) program version 20. Results were presented in inferential statistics using the simple linear regression test statistic as the hypothesis was tested at 0.05 level of significance (i.e. 95% confidence interval).

Result and discussion:

The hypothesis states that climate change does not significantly predict food security in Boki Local Government Area of Cross River State. The independent variable of this hypothesis is climate change while the dependent variable is food security. Simple linear regression statistics was used in testing the hypothesis and the results are presented in table 1.

The simple linear regression analysis in table 1 of climate change on predicting food security produced an adjusted R^2 of .023. This implies that only 23.0 percentage of the variance can be predicted from the independent variable (climate change) in predicting food security. The F-value of the Analysis of Variance (ANOVA) obtained from the regression table was F = 2.134 having a p-value .000 with 1 and 349 degrees of freedom at .05 level of significance. The null hypothesis was retained. This result therefore signifies that climate change significantly predicted food security in the study area, as the climate change predicted 23.0% of food security in the study area.

The outcome of this study is in consonance with Miano, David, Rose, & Lawrence, (2010) that climate change has become more pronounced in recent years adversely affecting the lives and livelihoods of smallholder farmers. Climate change can adversely affect crops at any stage of production starting from cultivation through growing period to harvest. When crops are adversely affected by water shortage (insufficient rainfall), or heat stress (excessive high temperature) crop yield becomes poor and there is increased risk of hunger and starvation. As temperature increases and rainfall patterns become more unpredictable, crop yields drop significantly. Extreme weather events such as thunderstorms, heavy winds and floods devastate farm lands causing crop failure and serious agricultural losses and this impact negatively on food security. Variations in rainfall patterns in Nigeria also affect crop production in varying ways depending on location. However, even if there is sufficient rain, its irregularity can affect yields adversely. In other words, if the rains arrive late or fail to arrive during the crucial growing stage of the crops, yields will definitely be affected and this in turn impacts on food security.

TABLE 1: Summary of data and simple regression analysis climate change and food security

R	R Square	Adjusted R Square	Std. Error of the Estimate
.051	.003	.023	10.001

Model	Sum of squares	DF	Mean Square	F	Sig
Regression	217.993	1	217.993	2.134	.000
Residual	82119.730	349	100.024		
Total	82337.723	350			

a. Predictors: (Constant): Climate change
b. Dependent Variable: Food security

Conclusion:

This paper concludes that climate change significantly predicts food security in Boki Local Government Area of Cross River State. It upholds that climate change is real and that Nigeria is highly vulnerable to climate change. Climate change is impacting negatively on food security in Nigeria and the study area as shown by low agricultural productivity. A large number of Nigerians are still malnourished, hungry, starving and poor and have various health problems due to food insecurity caused by climate change.

Recommendations:

Based on the finding of the study, it is recommended that

1. Nigeria needs to adopt some adaptation strategies that will enable her cope with the challenges of climate change to ensure food security in the country. To achieve this, there is urgent need for climate change policy at both National, state and local government levels in Nigeria. It is hoped that if the suggestions as made in this paper are effectively pursued, the country's vulnerability to climate change will reduce appreciably and Nigeria's food security will be greatly enhanced.
2. Financial support (loans) should be given to farmers affected by disasters caused by climate change to enable them start off again. 3. Government should establish a National climate change commission to handle issues related to climate change.
3. Government should help farmers to secure agricultural insurance and loans in situations of disaster to enable them take off again. 10. Farmers should be encouraged to engage in other businesses other than farming so that incase of disaster, they will still have something else to fall back on.

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