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Climate Change and Household Food Security in Ikot Ekpene Local Government Area, Akwa Ibom State, Nigeria

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Abstract
This descriptive qualitative study examined how climate change has impacted on household food security in Ikot Ekpene local government area in Akwa Ibom State, Nigeria. The study used the Household Economic Approach as a theoretical framework to explain the food security challenges households face as a result of climate change. Data were generated from open-ended interviews conducted with 30 participants in three communities in Ikot Ekpene local government area,Akwa Ibom State. The study also relied on secondary data from books, reports, and journal articles. From the analysis, results showed that reduction in crop yields, increased rates of diseases and pests destroying stored food items, poor road infrastructure to access food leads to food insecurity for households in Ikot Ekpene local government areas. Furthermore, the study has also revealed food rationing, relocation of households and supplemental work as coping mechanism of households to mitigate the impacts of climate change on food security. Based on the foregoing, the study recommends that communities should build small scale irrigation systems to increase water availability for crops during droughts and improve household crops. Similarly, local government authorities should create a workshop to educate households on climate-smart storage techniques such as hermatic-storage bags to protect food from pests and reduce spoilage.

Keywords: Climate change, Food Security, Household, Food access, Food availability

Introduction
Climate change is a worldwide phenomena that poses a danger to food security. According to the research "Climate Change and Food Security" (Food and Agricultural Organization et al., 2018), there is rising concern about how climate change affects family food security. In order to mitigate the detrimental effects of climate change on food security, particularly in vulnerable populations, the research highlights the urgent need for action. There is a threat to food security everywhere because of the newly discovered phenomena brought on by climate change (Nelson et al 2009). Developing countries are more susceptible to the consequences of climate change, particularly

those in sub-Saharan Africa (Akinnagbe & Irohibe, 2014), this is because of their geographical location and climatic conditions, high dependence on agriculture, natural resources-driven activities, and weak adaptive capacity to the change in climate (Eriksen 2008). Africa is the region where climate change and variability have had the biggest impact on acute food insecurity and malnutrition, affecting 59 million people in 24 countries (FAO et al 2018). More specifically, according to Okekenrin et al. (2021) food insecurity afflicted about 28.8% of the 115.7 million people living in West Africa in 2020, up from 8.6% in 2014. This makes the area the most affected on the continent.

Nigeria's food insecurity status is rated high on the severity chart by the 2020 Global Food Security Index (Grebmer et al; 2020). Despite the fact that more than half of employment in Nigeria is dependent on agriculture, the Federal Ministry of Agriculture reported in 2014 that 65% of the population experiences food insecurity (El-ladan 2014). Among several other factors, heightened food insecurity among households is caused by limited access to it, poor storage facilities that impede food availability, and negative environmental influences such as erosions and floods (El-ladan 2014). Climatic changes already have an antagonistic influence on food security with the number of chronically undernourished people in the world estimated to have increased by 38 million in 2016, in addition to 777 million recorded in 2015 (FAO et al 2017).

Interestingly, Studies such as Ebele & Emodi (2016) reported that the projected impact of climate change on West Africa's agricultural productivity could lead to a 4% reduction in the region's Gross Domestic Product (GDP); in Nigeria, the adverse impact of climate change on food security is evidenced by the changes in plant duration and output of cereal crops, reductions in aquatic life (Abdulkadir et al 2017), and livestock failure (Elum 2017). Consequently, the impact of climate change are likely to be felt more acutely by vulnerable groups in the region such as women and children. As such, households in Ikot Ekpene are faced with the challenge that accompanies food insecurity such as malnutrition, hunger and poverty. Therefore, there is an urgent need to understand the interplay between climate change and household food security in Ikot Ekpene local government area. Previous research on climate change and food security in Nigeria has focused on the national and regional levels, but there is limited knowledge about the specific impacts of climate change on household food security at the local level.

Therefore, this paper asks the impact of climate change on household food security in Ikot Ekpene local government area? Specifically, what is the impact of climate change on household food availability in Ikot Ekpene local government area? What is impact of climate change on house hold food availability in Ikot Ekpene local government area? Lastly, what are the coping mechanisms of households to cushion the impacts of climate change in Ikot Ekpene local government area? Unearthing these questions is very important for the local government because the climate-induced hardship has worsened food security in the region. Providing answers to the questions raised above is the basic thrust of this paper. Specifically, the study contributes to the extant literature by providing fresh evidence on the impact of climate change on household food security at the local level.

Review of Empirical Literature

This section undertakes the review of the empirical studies on the relationship between climate change and food security. Ogunpaimo et al. (2021) used panel data on farming families from 2010 to 2016 from the Nigerian General Household Survey (GHS) to evaluate how climate change adaptation has influenced food security in Nigeria. The panel probit model (PPM), propensity score matching (PSM), and difference-in-difference (DID) regression were used to evaluate the data. According to PPM, the likelihood of using CCA alternatives rose with farm size, marital status, and extension contact, but fell with the head of the household's age. Credit availability, farmland ownership, household size, number of years of education, assets in the home, and geography all had a noteworthy, albeit inconsistent, impact on CCA decisions. According to PSM, agricultural households that implemented CCA measures had a 9% increase in food security compared to those that did not. Furthermore, the result of the DID model revealed a significant positive effect of CCA on household food security. It was recommended that education and

provision of quality advisory services to farmers is crucial to foster the implementation of CCA options.

Additionally, Mekonnen et al. (2020) looked at how southern Ethiopian households' food security and adaptation plans were affected by climate change. 185 farmers in all were chosen by simple random sampling, and focus groups and interviews were conducted with them. Together with the logit regression model, descriptive and inferential statistics were used to examine the data. Over the past three decades, it has been discovered that households' levels of food security have been negatively impacted by climate change. Insufficient rainfall, significant erosion, and rising temperatures limited crop yields. Other contributory variables were pests, illnesses, and the unpredictable nature of rainfall. The calorie intake method revealed that 60.5% of selected respondents experienced food insecurity. These findings show that improving climate change awareness, facilitating the participation of female-led households in income generation, and strengthening existing adaptation measures have positive impacts on food security. The study suggested government should design new production oriented and commercialization policies that are focused on improved agricultural system, provision of timely climate information, widening the income sources and adopting improved varieties are the most important ones that should be taken in to account to reduce the food security risks of the area in the time of climate change.

The relationship between food security and climate change in the Sub-Saharan African Region (SSA) was investigated by Adesete et al. in 2022. The study used dynamic panel data analysis with a focus on thirty nations in the area, utilizing the one-step and two-step system generalized method of moment's model (GMM). The period of time under observation was from 2000 to 2019. According to the study, SSA's food security would decline as greenhouse gas emissions increased and the incidence of malnourishment increased. Furthermore, in Sub-Saharan Africa, food security is positively impacted by wealth and food supply, but negatively by climate change and food prices. The findings also revealed that the decline in carbon emission is expected to boost agricultural supply and productivity, reduce the prevalence of malnourishment rate and promote food security. Thus, the study recommends that SSA region should be more deliberate about meeting its targets towards achieving zero net emission. Furthermore, the region should improve its domestic food production capacity by implementing policies that will support improvement in agricultural production in the region.

Duada (2021) investigated Nigeria's food security and climate change. The study demonstrated the nation's susceptibility to and ability to adapt to climate change. It was discovered that climate change is having a disastrous effect on food insecurity, average dietary energy and protein intake, undernutrition rates, and agricultural production. The degree of the impact of climate change was presented together with pertinent policy recommendations to address the issue and lower the incidence of food insecurity in Nigeria.

In a recent study, Ojo et al. (2022) investigated whether adopting a strategy to adapt to climate change improves food security. A multistage sampling strategy was employed by A Case of Rice Farmers in Ogun State to choose 120 smallholder rice farmers within the research region. Using a probit model and an endogenous switching probit model (ESPM), the factors influencing the adoption of climate change adaptation methods and their effects on household food security among smallholder rice farmers in Ogun State were investigated. A better degree of food security is experienced by those who implement climate change adaptation measures compared to those who do not, as indicated by the findings of the household dietary diversity score (HDDS). The ESPM's findings indicate that participation in cooperatives, gender, off-farm income, and access to market information and extension agencies. Despite the increased empirical efforts on the

impact of climate change on food security, there appears to be a dearth of studies in local government areas of developing countries compared to what is available in the developed world. This study extends the body of literature by seeking to shed more light on the complicated relationship between climate and Household food security in Ikot Ekpene local government area.

Theoretical Framework

The study adopted Household Economy Approach (HEA) to explain the impacts of climate change on household food security in Ikot Ekpene local government area. HEA is a livelihood-based framework for analyzing how a particular demography or livelihood zone can have access to necessities of live during periods of crisis. It is based on the idea that events are best understood in the context of people's typical socioeconomic life and any implications for changes that could arise from unexpected threats or shocks. (Sassi, 2014). 1. To what degree can individuals have access to food during times of disaster, regardless of disparities in socioeconomic status? This is the main claim made by HEA. 2. What opportunities and limitations could present themselves during times of crisis? 3. What resources and coping techniques can a household easily depend on during these times? Based on this principle, HEA defines and provides a picture of how assets are distributed in a specific geographical entity during periods of crisis, with emphasis being placed on who gets what, when, how, and from whom. In other words, understanding the livelihoods of a particular group of people is an essential criterion required for measuring the changes households could experience due to social, economic, political, environmental, or health crisis such as climate change. In the context of this study, The HEA framework considers external shocks and stresses, including climate change, which affects household food security. The framework's focus on food security aligns with the research topic, enabling analysis of how climate change impacts household food availability, access and coping strategies. Furthermore, the HEA examines household livelihood strategies, which is crucial in understanding how households in Ikot Ekpene adapt to climate change and ensure food security.

Methodology

The descriptive cross sectional research design was adopted for this study; it aided the data collection on the impacts of climate change on household food security in Ikot Ekpene. The study adopted a multistage sampling. At stage one Ikot Ekpene was stratified into urban and Amanyam Clan that already exist. Then at stage 2, 3 villages were randomly selected in each of the clan and these villages were Ifuho, Ikot offiong, and Ikot Abia Idem Villages. At stage 3, 10 households were purposively selected in each village. Ikot Ekpene was purposefully selected because of the vulnerability to climate-related hazards like rising temperatures. Similarly, the area is heavily reliant on agriculture and agricultural produce, with most households engaging in subsistence farming, making them vulnerable to climate-related shocks. Ikot Ekpene's geographical location and socio-economic characteristics makes it a good representative study area for this topic.

The target population for this study was household heads. They were chosen because they are perceived providers and decision-makers in household and they have in-depth knowledge of how climate change has affected household food security. The study interviewed a total of 30 participants from across the selected communities. The data for this study is a qualitative data and was collected through in-depth interview. This study made use of purely qualitative of data collection. An In-depth Interview was used to collect data. Data was collected in either vernacular or English based on the convenient of the participants. The data collected in Annang language was transcribe to English and interpreted according to the objectives of the study. The interviews focused on the research objectives of the study and data obtained for the study were thematically

analysed. Ethical measures were strictly adhered to by ensuring anonymity and confidentiality of respondents. To ensure reliability, pilot testing of the interview guide was done in Ikono local government area. This study also relied on literature review of books, journal articles, reports and policy papers for its secondary data.

Results and Discussion of Findings

This section presents the research findings of the data collected from the respondents**.** The results for the study were obtained based on the analysis of qualitative data on climate change and household food security in Ikot Ekpene local government area. The thematic methods of analysis were employed to analyse the data.

Impact of climate change on household food availability in Ikot Ekpene local government area

Analysis from interviews showed that climate change has impacted on household food security in Ikot Ekpene local government area. Ringler et al. (2010) concluded that climate change will have adverse impact on crop yield and growth which will lead to rise in food prices which will lower food affordability, reduced calorie availability, and growing childhood malnutrition in Sub-Saharan Africa. This was the similar finding in an interview conducted in Ikot Offiong a community in Ikot Ekpene local government area in Akwa Ibom state, on the impact of climate change on household food security. One of the respondents revealed;

> The impact is quite enormous. The crops are failing, and the little i can get from our farms isn't enough for the family. We are five in my household, meaning I have to buy food items at inflated rates because of the impact of climate change on crop yield. Food items are on the high side, meaning there is less food available compared to before **(IDI/ MALE/ Household Head Respondent 1/ July, 2024).**

Many households who farm for subsistence or small-scale commercial production struggle to have enough for consumption, let alone for sale. Thus, this has resulted in inflation of food- items and hunger. Another household respondent averred;

> If you go to the market today, there prices of food items have gone up, and the marketers insists there is less availability of Food which they blame on Climate Change. For instance, Garri, a food item gotten from Cassava, which sold for 70 Naira per cup last year, now goes for 350 Naira per cup this year.**(IDI/ FEMALE/ household head Respondent 2/ July, 2024).**

Another reason for less availability of food is the variability in climatic condition which poses serious challenges to food storage. Ikem (2018) in his study found that changing climatic conditions which has often resulted in high temperatures and persistent heave waves in sub Saharan Africa has made some farmers and farm produce merchants to incur heavy losses as a result of spoilage of farm produce. He also noted that most of the affected farmers and merchants lack the capacity to put up storage facility that would assist in conditioning the storage environment to prevent spoilage. Ufot (2019) stated that changing climatic condition has some adverse effects of the storage of roots, tubers and vegetable crops. His finding correlates with that of Ikem (2018) as he also noted that increasing atmospheric temperature quickens decomposition process for crops such as yams, potatoes, tomatoes, onions, carrots, cabbage, pepper, pumpkins and other vegetables crops. A respondent in Ikot Akpan Abia community concluded that:

> The heat is too much, causing our stored food to spoil faster. Food that we stored up to a year, now rotten within months making it difficult to have available food all year round.**(IDI/ MALE/ HOUSEHOLD HAED Respondent 3/ July, 2024).**

Another respondent revealed that:

> Due to the floods damaging my storage facilities, it has become very difficult for me to store food. I mean, storage ensures food availability. This means I have to end up buying more food than I used to. To make matters worse, I am a subsistent farmer and the changing patterns are bringing new manifestations of pests and diseases we have never seen before which destroys the food items. With these experiences why won't food items prices go up, when there is less food available. **(IDI/ MALE/ household head Respondent 4/ July, 2024).**

Furthermore, with the reduction in crop yield and its subsequent impact on food availability the study has revealed many households spend a larger portion of their income on food thereby leading to financial strain and reduced spending on other essential needs.

Impact of climate change on household food access in Ikot Ekpene local government area

Our study reveals that climate change has impacted in many ways to food access of households in the study communities. This gives credence to an earlier finding of Ogunpaimo 2021, that in many African countries, especially Nigeria, access to food will be severely affected by climate change. A household head revealed that it increasingly becoming difficult for his family to access the food items as they did some years ago. Another respondent opined in ifuho:

> The issue is that some foods that are particularly sensitive to climate changes such as vegetables become less accessible in this community and this has health implications, as I am a vegetarian and the lack of access to such food items means complicated health issues for me.**(IDI/ MALE/ HOUSEHOLD HEAD Respondent 5/ July, 2024).**

Similarly, the study through a revelation by a household head indicated that climate change has disrupted access to certain nutritious food such as fish. A respondent noted that;

> It is quite concerning that certain food items such as fish that we had access to in the markets have become very scarce and the fisher sellers blame it on weather conditions. Sometimes we travel very far to other markets to buy fish and as such we sometimes make do without our once upon time favorite source of protein.**(IDI/ FEMALE/ household head Respondent 6/ July, 2024).**

In Ikot Abia Idem community, a respondent disclosed that excessive flooding has damaged the major roads in the community thereby restricting households to certain food items. Lack of access to food items as a result of climate change has series of implications for household, in that many households are unable to access sufficient food and may experience malnutrition and increased health risks particularly among children and pregnant women.

Coping Strategies of households in Ikot Ekpene local government area

Results from this study further showed that households in Ikot Ekpene local government area have devised adaptation strategies to curb the impacts of climate change on food security. For instance,

in Ikot Offiong community a respondent revealed that the impact of climate change has forced his household to ration food as a coping mechanism. The idea behind the food rationing strategy is to reduce the portion size or frequency of meals to make the available food last longer. Also, another respondent opined;

> I always feed my family with healthy food. But currently, Nutritious food is a luxury we cannot afford. So in other to cope, we buy cheaper brands of food, and we have cut out some of our favourite foods because we cannot afford them anymore.**(IDI/ MALE/ HOUSEHOLD HEAD Respondent 7/ July, 2024).**

Furthermore, In Ifuho community, a respondent revealed that as a coping strategy he has taken up supplemental work to make more money to afford the already inflated cost of food items. The respondent concluded thus;

> Its not easy, but we are managing. I now work as a labourer on other people's farms, and my wife has started selling handicrafts in the market. Our children help with the farm work during the weekends we had to get creative and find ways to supplement our income just to cope with the food insecurity. **(IDI/ MALE/ household head Respondent 8/ July, 2024).**

Supplemental work as disclosed by the respondents as a coping strategy implies additional work taken on to supplement one's primary occupation. Interestingly, the study also revealed that another coping strategy of households is relocation. Families are forced to relocate to less expensive areas to reduce housing costs and also free up more money for food. A respondent revealed that;

> Relocation was a difficult choice, but we had no choice. The severity of the droughts in our community meant crops are now failing and we cannot cope with the high cost of food items, so to adapt we have to move where the rent will be lesser, so we can afford to feed from the freed up money. **(IDI/ MALE/ HOUSEHOLD HEAD Respondent 9/ July, 2024).**

This finding raises a cause for concern because if the relocation trend continues, it may lead to a range of disruptions to their daily life especially for households with children. As finding new schools for children, adjusting to new environments can lead to feelings of uncertainty and instability.

Conclusion and Recommendations

Based on the findings, the study concludes that climate change is having a significant impact on household food security in Ikot Ekpene local government area. The reduction in crop yields, increased rates of diseases and pests destroying stored food items, poor road infrastructure to access food leads to food insecurity for households in Ikot Ekpene Local Government Areas. The study has also revealed food rationing, supplemental work and relocation of households as coping mechanism of households to mitigate the impacts of climate change on food security. The study recommends that communities should build small scale irrigation systems to increase water availability for crops during droughts and improve household crops. Similarly, local government authorities should create a workshop to educate households on climate-smart storage techniques such as hermatic-storage bags to protect food from pests and reduce spoilage. Future research

should study the impacts of climate change on food security and livelihoods of women farmers in Nigerian communities to gain a more holistic understanding of the gendered impact of climate change on food security. Furthermore, combining quantitative and qualitative data collection methods in future research will provide a complete picture of the impacts of climate change on food security.

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