

# Climate Change and Food Security in Ikeduru Local Government Area Imo State, Nigeria: The Way Forward

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**Abstract:** *This work examined the impact of climate change on food security in Ikeduru Local Government Area of Imo State. Agriculture is one sector that is affected by changes in climatic variables. Rainfall and temperature data was collected from Nigeria meteorological Agency. The primary data was collected through the use of questionnaire. Different statistical tools were used to analyze the different data retrieved. Analysis of variance was employed to investigate the impact of rainfall and temperature on crop yield within the past ten (10) years. Result showed that change in temperature and rainfall pattern affects food production and security significantly in the study area within the period under study. The result also indicated that the mitigation measures adopted by the people have not reduced the impact of climate change in the study area. Crops greatly affected include cassava, yam and maize. Based on the findings the paper recommends the use of drought resistant crops, construction of dams & water reservoir to supply water when the need arises. It also recommends that farmers should not depend on the first rain for early planting but allow rain to be more consistent before planting etc*

**Keywords:** food security, climate change, mitigation measures, drought resistant crops, reservoir

## 1. Introduction

The United Nations Framework Convention on Climate Change (UNFCCC) observed that Climate change is a change in climate attributed directly to human activities that alter the composition of the global atmosphere in addition to natural climate variability over a considerable time periods[1]). Human activities produce green house gases responsible for the warming of the earth's surface. They are the primary cause of global warming and have over the years resulted in the emission of great volumes of gaseous materials into the atmosphere. Some of these gases include carbon monoxide (CO), Carbon dioxide (CO<sub>2</sub>) and Methane (CH<sub>4</sub>) etc. Changes in the onset of rains in the past decades have led to situations where crops planted with the early rains are smothered in the soil by unexpected dry spell following early planting. The late arrival of rains due to climate change also results in harvest failures especially in places where agriculture is dependent on rain. Population explosion coupled with adverse weather change has made food production inadequate for the growing population. This situation threatens the food security of the country.

Food and Agricultural Organizations[2],[3] tried to explain food security as a situation that exists when all people have physical, social and economic access to sufficient, safe and nutritious food that meets dietary needs and food preferences for an active and healthy life.

Global warming and change in rainfall patterns reduce access to food and economies of the agrarian communities in our nation (including Ikeduru) who depend on food production for their sustenance.

The consequences of climate change that affects food security include flood, drought, erosion etc these impacts on crop production negatively. Assessment of the impact

of climate change on agricultural activities in Ikeduru will help farmers adopt better farming practices that will maximize agricultural production.

## 2. Statement of Problem

The indigenes of Ikeduru engage in a variety of agricultural activities. They cultivate crops like cassava, yam, maize, cocoyam, vegetables etc during rainy season in the area. Increase in soil temperature does not suit staple crops like yam, maize, cassava etc. It leads to poor germination and low crop yield. Global warming equally encourages the growth and multiplication of pests and diseases that destroys crops. This paper looked at the impact of climate change on food security in the study area by specifically looking at the role temperature and rainfall play in the production of crops.

## 3. Study Area

Ikeduru is located in the Western part of Imo state. It is one of the 27 local government areas of Imo state. It shares boundaries with Isiala Mbano on the north, Owerri North Local Government Area on the South, Aboh Mbaise and Ahiazu local government areas on the West. Ikeduru has fifteen (15) autonomous communities. They are; Iho, Umudim, Inyishi, Amatta, Uzoagba, Akabo, Ngugo, Auvuv, Amakohia, Okwu, Ugiri-ike, Atta, Eziana, Amaimo and Ikembara sharing common culture, boundaries and markets.

The population of Ikeduru is 199,316 people according to [4] National Population Census. It is located on longitudes 7° 04' E and 7° 14' and latitudes 5° 29' N and 5° 39' N. It is in the humid tropics with over 2000mm of rainfall per annum and a mean annual temperature of about 27°C. The rainy season commences in March/April and ends in

October/November. Ikeduru belongs to the tertiary period of the geological era with coastal plain sands which are unconsolidated and sandy. The area is drained by series of rivers and streams namely; Mbaa, Oramirikwa and Okitankwo. These are the major water resources in the area. These rivers are characterized by dry valleys which are usually covered by flood during rainy season when the aquifer is recharged. The economic activities of the people include farming and trading. There are a few civil servants that work at the local government head quarter located at Iho.

#### 4. Climate Change and Food Security

Agriculture in the developing countries (of which Nigeria is one) is directly dependent on climate and as a result reacts to changes in the climatic variables. The level of technological advancement of these developing countries could be a factor hence agriculture is highly vulnerable when exposed to the risks and impacts of changing climate. An uncertainty in rainfall due to variability leads to poor harvest and crop failure hence food shortage.

[1] observed that developing countries including Nigeria will be more vulnerable to climate change due to its economic, climatic and geographical settings and rain fed agriculture will certainly experience low yield.

Places in Northern Nigeria with prolonged dry season, lacks adequate water and experience high temperature will face difficulties. In some of these places for example where cowpea and maize and other grains are dominant food crops grown, lack adequate water is a serious problem because farming is largely rain fed in the area. There is a shift in the areas of production of some crops with possible negative consequences.

Nigeria is a country threatened with food insecurity. Majority of her citizenry live below poverty level and can barely afford balanced diet. The Nigeria vision 2010 report of [5] also revealed that 80% of Nigerians consume less than 1/3 of the required minimum of proteins and vitamins they need. Further increase in temperature will push the prices of food to increase more substantially because of expected deficiency in crop yield. For any particular crop, the effect of increased temperature will depend on the crops optimal temperature for growth and reproduction. When warming exceeds crops optimum temperature, yields decrease. Climatic elements especially rainfall and temperature play key role in crop production and yield. Temperature is very important in the ripening of plants as long as it is within the crops optimal temperature for growth and reproduction. Changes in rainfall patterns could cause erosion, storms, drought and flood thereby affecting agricultural productivity and have negative impacts on food security. Extreme weather events like thunder storm, heavy winds and floods destroy farmland and leads to crop failure.

#### 5. Methodology

Data for this study was obtained through questionnaire and field measurement. A total of two hundred (200) copies of

questionnaire were distributed to the respondents in ten (10) communities in the study area. Out of the 200 copies, one hundred and ninety five (195) copies were returned.

#### 6. Results and Findings

Analysis indicates that Cassava is mostly cultivated in the area followed by yam, then maize, Cocoyam and Okro in order of preference. Results also indicated that about 34.9 percent of the sampled population have observed early onset of rain, 24.1 percent observed early cessation of rain while 17.9 percent observed sudden rain spell. Only 14.4 percent of the sample noted that there was delay in rainfall while the remaining 8.7 percent observed other changes. Whether there are changes in the planting season of the respondents in the area, 24.6 percent of the respondents' plant before the early onset of rain, about 26.7 percent plant in between the rainy season while 23.1 percent plant after the August break. Those who indicated that they plant before the early cessation of rain were just 18.9. The remaining 6.7 percent plant during other periods.

**Table 1.1:** Resultant effect of extreme weather events on respondents crop yield

<i>Effects</i>	<i>No. of Respondents</i>	<i>Percentage</i>
Stunted growth of crops	55	28.2
Wilting of crops	47	24.1
Fermentation of crops	32	16.4
Drying of stems, seeds and tuners	38	19.5
All of the above	23	11.8
Total	195	100

Source: Authors Field Work, 2014

Information from table 1.1 shows that 28.2 percent of the respondents crop had stunted growth as a result of extreme weather events, 24.1 percent had crops wilted, while 19.5 percent said crops had dried stems, seeds and tuber. 16.4 percent had their crops fermented. The remaining 11.8 percent were affected by all the problems of extreme weather event in the study area.

#### 7. Mitigation Measures Adopted by the Respondents

The mitigation measures adopted by the respondents against extreme climatic condition in the study area are presented in table 1.2

**Table 1.2:** Mitigation measures adopted

<i>Mitigation Measures</i>	<i>No. of Respondents</i>	<i>Percentage</i>
Improved fertilizer use	61	31.3
Mulching	27	13.8
Genetically modified highbred stem/tuber	56	28.7
Conservation tillage	35	17.9
Vegetable soil cover	16	8.2
Total	195	100

Source: Authors Field Work, 2014

31.3 percent of the sample use fertilizer for their crops to increase production, those using genetically modified high

breed stem and tubers which were 28.7 percent while 17.9 percent use conservation tillage for their farm land. 13.8 percent adopted mulching while 8.2 percent adopted vegetated soil cover to mitigate against the extreme weather events in their farms for better yields.

## 8. Crops Mostly Affected By Rainfall Variability in the Study Area

The crops mostly affected by rainfall variability in the study area are cassava 32.3 percent, yam 27.7 percent, maize 21.0 percent, cocoyam 11.3 and okro which accounts for only 7.7

The result for ANOVA for temperature and rainfall change (as obtained from NIMET) on food production shows that critical value (f-crit) is 2.93 while the calculated value (f-ratio) is 335.33. With calculated value of 335.33 greater than the critical value 2.92, we therefore reject  $H_0$  and accept  $H_a$ . This means that change in temperature and rainfall affect food production and its security in Ikeduru Local government area of Imo state within the past 10 years.

## 9. Summary of Findings, Conclusion and Recommendations

### Summary of Findings

The change in temperature and rainfall pattern has grossly affected food production and its security in the study area within the past 10 years. Cassava, yam and maize are the crops mostly affected by the extreme change in climate. The crops have stunted growth, there is fermentation of crops, wilting and drying of stems and tubers. The finding of this work equally shows that mitigation measures adopted by the people could not stop the effect of climate change on food production.

### 10. Conclusion

Climate change negatively impacts on food production in the study area. Rainfall and temperature have substantial influence on crop yield and food security in the area. Other factors like soil type, fertility and slope may also have their impact. The introduction of improved farming technology, drought resistant. Crops, early maturing crops, irrigation agriculture, etc will go a long way in addressing the problem of food production and security in Ikeduru Local Government area.

### 11. Recommendation

The following recommendations are made to address the issue. Farmers should use their discretion in planting with the arrival of very early rains, they should wait till the rains are consistent to avoid smothering of crops. More studies should be carried out to discover effective adaptation Strategies to help farmers overcome the impact of global warming in the study area. Farmers should be encouraged through agric extension workers to use more of drought resistant crops that can withstand climatic

changes. Government should embark on construction of dams and water reservoirs in areas where farming is mainly rain fed so that farmers will fall back on such facilities as the need arises.

## References

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