

**Analysis of Impact of Climate Change on Growth and Yield of
Yam and Cassava and Adaptation Strategies by the Crops
Farmers in Southern Nigeria**



By

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Presentation Outline



- Introduction
 - Background
 - Objectives
- Data and Methodology
- Results and Discussion
- Challenges
- Conclusion

Introduction and Objective



- To date, agriculture (comprising crop, livestock, forestry and fisheries) remains the main stay of Nigerian economy contributing over 40% of the GDP.
- Among the crop grown, cassava food products followed by yams are the most important staples of rural and urban households in southern Nigeria both in terms of food and cash income generation.
- Despite the importance of these crops to rural economy in Nigeria, the production and yield of these crops are being threatened by climate change.
- One of the two most critical ways of fighting the impending danger of climate change is through adaptation.
- The Study therefore, analyzed the impact of climate change on growth and yield of cassava and yam and determined the adaptation and coping strategies adopted by the crop farmers in southern Nigeria.

Data and Methodology



- **Study Area:** The study area is the South East geopolitical zone of Nigeria covering the derived savannah (South East). The two states randomly selected and studied are Enugu and Ebonyi States
- **Model for Climate Change Impact Study:** Crop model – DSSATv4 was used to evaluate cassava and yam for their vulnerability; implications for future climatic change and project expected magnitude of impacts. The climate data is from experimental sites that are representative of the climatic conditions across the state.
- **Data for calibration for cassava** was obtained from the Root Crop Research Institute Umudike experimental plot located at the crop experimental site of University of Nigeria Nsukka, Enugu State, South East, Nigeria. Daily climatic data was sourced from the metrological records obtained from the experimental site.

Data and Methodology Contd



Sampling of Farmers for the Study: Farmers were sampled from two randomly selected States, namely Enugu and Ebonyi State of South east Nigeria.

Multi-stage random sampling technique will be used for selection of farmers. From among cassava and yam based famers.

First, two agricultural zones, belonging to the same agro ecological zones were selected in each of the two state.

This gave a total of four (4) zones.

From each of the four zones, two (2) local government areas were randomly selected giving a total of 8 local government areas, four for each State.

Furthermore, from each of the eight (8) local government areas, five (5) farming communities were randomly selected giving 40 farming communities.

Finally, from each of the 40 farming communities selected, 10 farmers were randomly selected giving 400 farmers for the study.

Data and Methodology Contd



- **Data Collection from farmers for Adaptation Study:** Tools of participatory research namely semi structured interview schedule, was used in data collection.
- **Measurement of Variables:** In addition to determining the socioeconomic variables, the respondents were asked to indicate yes or no regarding land management practices they have used to address climate change and the year when they started using the practice, among others. Practices that over 50% of the farmers employed were considered.
- **Data Analysis:** The DSSAT-CSM (Decision Support System for Agro-technology Transfer – Cropping System Model), including models for cassava was used in measuring the impact of climate

Data and Methodology Contd



- Descriptive statistics, namely, means and frequency distribution and percentages were also employed in realizing the objective.
- The the decision to adopt a particular land management practice was determined using a probit model. - $Y^* = X'\beta + \varepsilon$ where $\varepsilon \sim N(0, 1)$.
- Y^* is the critical threshold level which if exceeded will indicate that the farmers employs the particular land management practice, in this case, 1 for those that employ and zero otherwise. Thus, use of land management practice $Y=1$ if the critical threshold is 1, zero otherwise.

Results



- The result shows that the majority (92.29%) of the respondents have noticed a significant temperature change. Also, the majority (96.76%) of the respondents have noticed a significant change in rainfall while the majority (90.20%) have heard of climate change before the interview.
- The extent of knowledge of those that have heard of climate change shows that the highest proportion (45.71%) know little about climate change
- The majority (97.97%) of the farmers observed delayed onset of rains, too much rains (68.81%), and higher temperatures (65.59%).

Results Contd



S/No		% of farmers using the practice (those above 50%)
1	Mulching/surface cover	83.55
2	Farm yard manure	60.53
3	Increased Fertilizer	62.50
4	Cover crops	61.84
5	Crop rotation	63.16
6	Intercropping	72.37
7	Fallowing	74.34

Results Contd



- Household size of the respondents positively and significantly influenced the likelihood of the households practicing mulching/surface cover, farm yard manure, increased fertilizer, cover crops, fallowing, crop rotation, and inter cropping.
- The number of years spent in school, positively and significantly (at 0.01 probability level) influenced the likelihood that a household head will be involved in using farmyard manure, increased fertilizer and cover crops.
- Access to climate change information positively and significantly influenced the use of increased fertilizer and crop rotation.

Challenges/Conclusion



- The results generally suggests that government policies and investment strategies that support the provision of and access to education, and information on climate and adaptation measures, labour provision measures (as reflected on large household size being positive to land management), are necessary for better land management to cushion the effects of climate climate change in the region.
- The model runs using Crop model – DSSATv4 is yet to be carried out because the researcher needs some assistance in applying the data collected to the model.