Nexus between Climate Change Adaptation Strategies and Poverty:
Evidence from Rural Farming Households in Kwara State, Nigeria

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Abstract

Climate change has continuously threatened the sustainability of food production among rural farming households in sub-Saharan Africa, coupled with the increasing number of individuals living in outrageous poverty. Thus, this study empirically examined the relationship between climate change adaptation strategies and rural households' poverty in Kwara State, Nigeria. Primary data collected from six rural communities, descriptive statistics, Foster Greer and Thorbecke's (FGT) poverty measure, and Logistic regression were used in the data analysis. The study shows that there are more males, 67.50%, with 80% being married, with the mean household size of the farmers being 7 members. Most of the farmers, 34%, were aged 61-80 years, 36.67% had secondary education, 32.5% had no education, and only 25.83% had access to credit. The FGT analysis shows that the poverty line of the rural farming household was 1143.63, 68.33% of the rural farmers fall into the core-poor category, 15.00% are moderately poor, and 16.67% are non-poor. For the binary logistic regression analysis, sex, age, years of education, annual farm income, farming experience, access to agricultural information, and access to credit, being core and moderately poor, influence the adoption of the five CCAs strategies among rural farming households. The study proposed that government and development partners in agriculture should focus on practical ways of disseminating better production systems and CCAs to rural farming households. Also, credit support facilities should be made available to the farmers across ages, and continuous education of the farmers on the appropriate CCAs that can be adopted in a particular locality should be encouraged.

Keywords: ***Poverty, Climate Change, Adaptation Strategies, Rural Farming Households***

1.0. Introduction

Like most other African nations, poverty is a depressing problem in Nigeria, particularly in rural areas. Nigeria is considered the "poverty capital" of the world, with over 94 million people living in extreme poverty (World Poverty Clock, 2019). Due to its pervasive, regionally varying, and deeply established poverty, Nigeria is among the 25 poorest nations in the world (Wilkinson & Peters, 2015). A virus or epidemic affecting Homo sapiens on any continent might be used to compare poverty. Poverty is a social problem since it has societal foundations. It is both rural and urban and has no regard for nations or regions (Skoufias, 2011). As many as 4 out of 10 Nigerians live below the poverty line, according to the most current World Bank publications on the profile and causes of poverty in Nigeria (World Bank 2022). However, rural households are frequently significantly more affected by poverty than urban households. As of 2019 (Bunclark et al., 2018), most of Nigeria's poverty population comprised farming households in rural areas. Many not impoverished Nigerians are only a minor setback away from being destitute. Those already poor (core and moderately poor) could simultaneously be forced into even greater deprivation.

Floods, heat waves, higher temperatures, erratic rainfall, droughts, and other climate-related shocks are dangerous because they jeopardize the daily rain-fed agricultural and pastoral operations carried out by people below or over the poverty line. By deterring the adoption of high-risk, high-reward technologies or investment in human and physical capital, uncertainty about when such shocks may occur and a lack of coping strategies or insurance can trap households in poverty (Dercon, 2002). The possible effects of climate change on Nigeria's efforts to combat poverty must be considered. Poverty may become a bigger problem for the nation if floods and droughts grow more regular and severe. Conflicts have multiplied due to the increasing climate shocks, displacing communities, upsetting markets, and interfering with daily living. Agriculture and food security in Nigeria have suffered due to the violence, making life extremely harder for those living in low-income households. This is supported by reports from Awodola & Oboshi

(2015), Van Den Hoek (2017), Jelilov et al. (2018), and Blankespoor (2021). We must find answers to reduce suffering and advance stability and development in Nigeria. According to Corral et al. (2020), the primary cause of violence in Nigeria, particularly among rural households, has been climate change. Violence is a significant barrier to the country's efforts to reduce poverty. By 2016, over 2.5 million people were either refugees or internally displaced due to the farmer-herder disputes and the Boko Haram insurgency, which cut off their access to sources of livelihood and income (World Bank and UNHCR, 2016).

Most of the empirical studies conducted in Nigeria focus on how people perceive climate change and how to adapt to it (Alidu *et al.,* 2022; Heilmann *et al*., 2021; Bunclark *et al*., 2018; Kogo *et al*., 2021). Few studies have evaluated the effect of climate-smart adoption on poverty in Nigeria. Among such studies are (Joshua *et al. (*2015) and Osasogie & Alabi (2015); these and other related studies used a variety of methodologies conducted in other nations. Wilkinson and Peters (2015), Bunclark *et al.* (2018) and Kogo *et al.* (2021) concluded that adaptation to climate change would reduce the population living below the poverty line and complement efforts to end poverty. These studies generally concur that extreme weather events and climate change have a considerable overall detrimental impact on household welfare and agricultural productivity. However, there are no conclusive studies on how climate change adaptation strategies relate to the poverty status of rural households. Therefore, this study examines the relationship between factors influencing climate change adaptation strategies and household poverty status among rural farming households in Kwara State, Nigeria.

2.0. Material and methods

The study was conducted in Kwara State, Nigeria. It is bordered to the east by Kogi State, to the north by Niger State, and in the south by Ekiti, Osun, and Oyo states, while its western border makes up part of the international border with the Benin Republic. The State lies on 8º30'N and 5º00'E of the equator and has a land area of about 36,825 km2 (14,218 sq mi), with a population of around 2.365 million people (National Population Commission, 2006). Primary data was collected from rural farming households in Kwara State, which mainly practice subsistence farming, using a multi-stage sampling technique. A Cochrane formula was used to select 120 registered farmers from zone A of the four agricultural zones in the State.

Analytical Techniques: The Foster Greer Thorbercke (FGT) poverty measures determined farming households' poverty status. Following Foster Greer and Thorbeck (1984) as used by Amao and Fasakin (2020), this index is computed with the mathematical formula stated below:

$$p_{\propto} = \frac{1}{\mathrm{n}} \sum_{i=1}^{\alpha} \left[\left(\frac{z-y}{z} \right) \right]^{\propto} \qquad (1)$$

Where

P = Foster, Greer, and Thorbercke index ($0 \leq P \leq 2$)

N = total number of households or respondents, i.e. farming households sampled

Y = total Household monthly expenditure of the i^{th} household

Z = Poverty line (the poverty line was arrived at by calculating the 2/3 of the Mean per Capita Monthly Household Expenditure). Note that

$$MPCHE = \frac{Total\ Household\ Expenditure}{Household\ Size} \qquad (2)$$

Logit regression: The various factors influencing the farmers' climate change adaptation strategies were analyzed using the Logit regression Model. The logit function for the farmers' likelihood of adopting a climate adaptation strategy is specified below:

$$Y_i^* = \propto + X_I' + u_i, \qquad (3)$$

Where, X ′i represents a vector of explanatory variables influencing a given climate change adaptation strategy. Proportional ∝, the constant term, is a vector of parameters to be estimated associated with farm-specific socio-economic, and demographic attributes, while u_i is the error term. Five climate change strategies, minimal or no tillage, crop rotation, cover crops planting, agroforestry, and silvopasture, were used as the independent variables and were operationalized as a dummy. (0 = not using the adaptation strategy 1 = using the adaptation strategy). The following socio-economic variables were used age of household head (years), age squared, sex of household head (sex = 1 if male, 0 = otherwise), marital status (married =0, 1, otherwise), education (yes=0, 1=otherwise), cooperative association (yes=0, 1=otherwise), annual income (naira), households size (numbers), farming experience (years), farm size (acres), access to agriculture information (yes=0, 1=otherwise), access to credit (yes=0, 1=otherwise), core-poor, moderately poor, and non-poor(yes=0, 1=otherwise).

3.0. Results and Discussion

The socio-economic characteristics of the farmers show that there are more males, 67.50%, than female farmers, 32.50%. Of the farmers, 80% are married, with 20% not married. The mean household size of the farmers is 7 members, indicating that the household sizes are relatively large, with the mean and maximum household sizes being 2 and 25, respectively. The age distribution of the farming households shows that the majority, 34%, of the farmers are within the age range of 61–80 years, with the mean, minimum, and maximum ages of the farmers being 51, 24, and 75 years, respectively. A more significant percentage of the farmers, 36.67%, had secondary education, 32.5% had no education, 27.50% had primary education, and only 3.3% had tertiary education. The distribution of the farmers by access to credit shows that 25.83% had access to credit, with 74.17% having no access to credit, indicating an apparent credit shortage among the rice farmers. The FGT analysis shows that the poverty line of the rural farming household was N1143.63, 68.33% of the rural farmers fall into the core-poor category, 15.00% are moderately poor, and 16.67% are non-poor. The post-estimation results for the binary logistic regression analysis showed that the Wald Chi was significant for all five CCA strategies. At the same time, the Chi-square goodness of fit was also substantial for all CCA strategies, indicating that the data fit well with the model. Significant variables that influence minimum tillage are education level, farming experience, agriculture training, and being in core-poor categories; cover cropping was influenced by income, access to credit, and being moderately poor; agroforestry was influenced by age, income, access to agriculture information, and moderately poor, silvopastoral was influence by marital status, and access to credit, and crop rotation was influence by income and the farmers being in the moderately poor category.

4.0. Conclusion and Outlook

In light of the above findings, the study concluded that there is a connection between climate change adaptation strategies and rural poverty. Farmers in rural areas are usually affected by the adverse effects of climate change because they are poorer and have low resources (socioeconomic resources) to counter the effects. Thus, it is recommended that government and development partners in agriculture focus on practical ways or channels of disseminating better production techniques and CCAs to rural farming households. Additionally, credit support should be made available to the farmers across ages, and continuous education of the farmers on the appropriate CCAs that can be adopted in a particular locality should be encouraged.

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