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# WEATHER-INDUCED SHOCKS, POVERTY PERSISTENCE AND VULNERABILITY IN NIGERIA: EVIDENCE FROM CORRELATED RANDOM COEFFICIENT MODEL

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## ABSTRACT
The study examined the relationship between varying weather-induced shocks and their effects on households' vulnerability to poverty in Nigeria. Data sourced from National Bureau of Statistics - General Household Survey, 2012/2013, 2015/2016 and 2018/2019 version were used in the study. Correlated Random Coefficient (CRC) model was applied to analyse the objective of the study. The CRC model showed that weather-induced shocks were observed to be significant in the third wave (2015) with respect to wave 2 (2012), while it was seen to be significant (p=0.076) in 2015 with respect to vulnerability to poverty in 2018. The interaction of weather shocks in 2015 and 2018 was significant (p=0.056), suggesting the influence and effect of weather-induced shocks on vulnerability to poverty in Nigeria. Conclusively, weather-induced shocks exacerbate vulnerability to poverty in Nigeria by disrupting livelihoods, destroying assets and displacing populations. Therefore, a robust framework to reduce the impact of weather-induced shock should be formulated through direct research endeavours and community empowerment.
**Keywords:** Climate, Conflict, Household, Poverty and Shocks.

## INTRODUCTION
Poverty in Nigeria remains a persistent and multifaceted challenge, affecting millions of its citizens and hindering the country's sustainable development efforts. As Africa's most populous nation and one of its largest economies, Nigeria's struggle with poverty has significant implications for regional and global poverty alleviation goals. Nigeria's vast population of over 200 million people is deeply affected by poverty, with a substantial proportion living below the poverty line. The World Bank estimates that more than 40% of Nigerians live in extreme poverty, earning less than $1.90 per day (World Bank, 2021). Despite its abundant natural resources, the uneven distribution of wealth, coupled with challenges in governance, weather effect, conflict and infrastructure, have contributed to a widening wealth gap and exacerbated poverty levels across the nation. Poverty in Nigeria exhibits notable rural-urban disparities. While urban areas, particularly cities like Lagos and Abuja, boast vibrant economic activities and opportunities, rural regions suffer from limited access to basic services, education, and healthcare. The rural population is predominantly engaged in agriculture, which is vulnerable to climate-induced weather variability, leading to fluctuating incomes and reduced economic stability (National Bureau of Statistics Nigeria, 2019).

Despite the effort of local and global stakeholders to eradicate poverty, its increasingly holding grip on the world population. The effect of climate change, and the vulnerability of poor communities to climate change, vary greatly, but generally, climate change is superimposed on

existing vulnerabilities. Climate change will further reduce access to drinking water, negatively affect the health of poor people, and will pose a real threat to food security in many countries in Africa, Asia, and Latin America. In some areas where livelihood choices are limited, decreasing crop yields threaten famines, or where the loss of landmass in coastal areas is anticipated, migration might be the only solution. The macroeconomic costs of the impacts of climate change are highly uncertain, but very likely have the potential to threaten development in many countries.

Many sectors providing basic livelihood services to the poor in developing countries are not able to cope even with today's climate variability and stresses. Over 96% of disaster-related deaths in recent years have taken place in developing countries. Often, extreme weather events set back the development process for decades. With fishing grounds depleting, and droughts, floods, and storms destroying entire annual harvests in affected areas, the El Niño phenomenon serves as a prime example of how climatic variability already affects vulnerable countries and people today. In many developing countries, climate change already increases stresses from climate variability and extremes and will do so increasingly in the future. Climate change will compound existing poverty. Its adverse impacts will be most striking in developing nations because of their geographical and climatic conditions, their high dependence on natural resources, and their limited capacity to adapt to a changing climate. Within these countries, the poorest, who have the least resources and the least capacity to adapt, are the most vulnerable (IPCC 2001). Projected changes in the incidence, frequency, intensity, and duration of climate extremes (for example, heat waves, heavy precipitation, and drought), as well as more gradual changes in the average climate, will notably threaten their livelihoods – further increasing inequities between the developing and developed worlds. Climate change is therefore a serious threat to poverty eradication. However, current development strategies tend to overlook climate change risks.

A primary aim of the United Nations' Millennium Development Goals (MDG) program was to achieve a 50% reduction in the number of individuals experiencing hunger and food insecurity by the year 2015. A lot of nations have made great strides toward accomplishing this objective. But the majority of the nations that have lagged behind are fragile, violent, and conflict-ridden states. For instance, nearly 75% of children under five who have stunted growth and 60% of the world's hungry reside in nations where there is ongoing violence (George *et al.,* 2019).

It is a well-known reality that climate change affects areas, whether they be regions, populations, or sectors; inadequate responses to these changes result in resource shortages, which in turn increase the possibility of one or more structural conflicts. There is a simple causal mechanism that connects Nigerian violence with climate change. Nigeria is seeing increasing variations in temperature, precipitation, storm activity, and sea level due to climate change. If these climate-related issues were ignored, already scarce resources like water and land would become even more so (Aaron, 2011).

Weather variability in Nigeria have significant and interconnected impacts on poverty and agriculture. The combination of climate-induced extreme events and protracted conflicts poses significant challenges to the country's agricultural sector, which is a critical source of livelihood for many Nigerians. Nigeria experiences weather variability, including extreme events such as droughts and floods, which directly affect agricultural production. Droughts can lead to water scarcity and reduced crop yields, while floods can destroy crops, farmlands, and infrastructure, disrupting the entire agricultural value chain (van Ginkel and Biradar, 2021). Displaced farmers lose access to their farmlands, further exacerbating poverty and food insecurity.

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Globally, people are feeling the effects of climate change (CC), but notably in tropical regions (Idowu *et al.,* 2011; Williams *et al.,* 2018). According to the Intergovernmental Panel on Climate Change (IPCC), in 2014, these have caused a wide range of physical and biological changes that have had a severe impact on agriculture, people, and the environment worldwide. It's crucial to remember that, according to the Notre Dame Global Adaptation Initiative (ND-GAIN) 2021, while lower-middle-class and low-income countries—especially those in Africa—are more vulnerable to the effects of climatic variation, their readiness to increase resilience is comparatively low.

Since the 1990s, climatic stresses, such as erratic rainfalls, unpredicted floods, and storms, have adversely affected crop yields and productivity globally. Lately, increases in temperature, hot waves, prolonged droughts, and cold spells are the other challenges faced by the populations across many country (Le, 2018; Hoang *et al.,* 2020; Leartlam *et al.,* 2021; McKinley *et al.,* 2021; Nguyen *et al.,* 2021). This situation becomes even more severe because of climate change, which then influences food security and the livelihoods of the whole communities, especially those in the rural areas.

## MATERIALS AND METHODS

### The study area

The study was carried out in Nigeria. Nigeria lies about 3.0 meters above sea level, with a land mass area of 923,768km², a total coastline length of 850km and the Atlantic Ocean bounders the southern coast of Nigeria (National Communication, 2003). The study employed panel data from the General Household Survey (GHS). GHS is a Living Standard Measurement Survey (LSMS) data set that has been collected in four waves between 2010 and 2019. The waves are 2010–11, 2012–13, and 2015–16, 2018-19 and they include two visits each: a post-planting visit during the autumn months and a postharvest visit during the spring.

### Analytical Techniques

In the analysis of vulnerability to poverty following a household's exposure to covariate and idiosyncratic shocks, the study assesses the effect of weather-induced shocks by using Correlated Random Coefficient (CRC) analysis. CRC is expressed by Wooldridge (2020) as;

$$y_{it} = x_{it}\beta + d_t\gamma + c_i + u_{it},\ t = 1,\ldots,T \quad \ldots(1)$$

$C_i$ are unobserved random variables (heterogeneity).
Time period dummies;

$$d_t = (d2_t,\ldots,dT_t)$$

Used to flexibly control for aggregate factors.

$$y_{it} = x_{it}\beta + d_t\gamma + c_i + d_t h_i + u_{it} \quad \ldots(2)$$

$x_{it}$ only includes variables that have variation across i and t.
$\beta$ is of interest
Use fixed effects estimation to remove $c_i$.
Sometimes called "two-way fixed effects," but $\gamma$ are parameters, $c_i$ are not. The use of conflict and weather shock indicators derived by exogenously measured number of conflict events, fatalities, temperature and precipitation distribution addresses this endogeneity problem. Following

Cabanillas *et al.* (2018), the study estimate CRC when all weather stressors and conflict histories and their interaction are included, this allows for the assumption that there is no correlation between the weather stressors and conflict histories and vulnerability to poverty. This model was fitted using the user generated "randcoef" command in STATA 17 appendix. CRE and CRC models calculate CRC model with an additional endogenous covariate. Two-period versions of these models are developed in Suri (2011). To fix these ideas, we outline the calculations of a three-period model. The methodology does not depend on the number of periods in the data but rather on the specifics of the structural equations, reduced-form equations, and variance–covariance matrix, which do vary depending on the number of periods.

## RESULTS AND DISCUSSION

### Summary Statistics of some selected variables used

The result as presented in Table 1 showed the summary statistics of the respondents. The description of the variables included in the model were displayed. From this statistics, the farm size describes the actual hectares of farmland cultivated by the respondents. Utilities are the cost expended on utilities used in the households, education also stands for the number of years spent in school acquiring formal education. Other variables (such as sex, poor rain, flooding, pest invasion, inter-communal crisis, farmer-herder crisis, and loss of properties) on the table comes as binary response variable except utilities which showed the cost expended by the respondents on the utilities.

**Table 1: Summary Statistics of some selected variables used**

| Variables | Description |
|---|---|
| Utilities | Cost expended on utilities |
| Farm size | Actual hectare(s) of farm cultivated during the last production season |
| Dependency ratio | Number of dependants to the household population |
| Education (years) | Number of years spent having formal education |
| Age | Age of the respondents (years) |
| Sex | Sex of the respondent 1 = male, 0 otherwise |
| Poor rain | 1, respondent experienced poor rain during the last production season, otherwise 0 |
| Flooding | 1, respondent experienced flooding during the last production season, otherwise 0 |
| Pest invasion | 1, respondent experienced pests invasion during the last production season, otherwise 0 |
| Loss of property | 1, Loss of property as a result of climate shocks, otherwise 0 |
| Inter-communal crisis | 1, if respondent experienced inter-communal clash, 0 otherwise |
| Farmer-herder crisis | 1, if respondent experienced farmer-herder clash, 0 otherwise |

**Source:** Author's computation, 2023

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**Effect of conflict and weather shocks on vulnerability to poverty in Nigeria**

Results from OLS and fixed effects versions of the vulnerability to poverty regressions with various sets of controls are presented on Table 2. The OLS result showed significant effect of weather shocks to vulnerability to poverty together with some other covariates. As farm size and age of the respondents reduces vulnerability to poverty, other variables such as utilities, dependency ratio, household size, sex, poor rainfall, pest infestation and farmer-herder conflict positively influence vulnerability to poverty. Also, the fixed effect estimation was encouraging like that of OLS. It showed that the increase in assets and farm size of the respondents results to considerable reduction in incidence of vulnerability to poverty. In line with the a-priori

**Table 2: Weather-induced shocks influence on Vulnerability to poverty**

| Variables | OLS Regression | | | Fixed effect Regression | | |
|---|---|---|---|---|---|---|
| | Coefficient | Std. Err | T | Coefficient | Std. Err | t |
| lny_Assets | -0.00044 | 0.0062 | -0.72 | -0.0828 | 0.0240 | -3.45*** |
| lny_Utilities | 0.0323 | 0.0049 | 6.50*** | -0.0020 | 0.0122 | -0.16 |
| Farm size | -0.0154 | 0.0080 | -1.92* | -0.0158 | 0.0095 | -1.66* |
| Dependency_ratio | 0.1651 | 0.0344 | 4.80*** | 0.0446 | 0.049 | 0.91 |
| Household size | 0.1550 | 0.0346 | 4.47*** | 0.0917 | 0.0490 | 1.87* |
| Education_yrs | 0.0006 | 0.0041 | 0.15 | -0.0034 | 0.0059 | -0.57 |
| Age | -0.0024 | 0.0012 | -1.85* | -0.0013 | 0.0014 | -0.94 |
| sex_repondant | 0.1893 | 0.0418 | 4.52*** | -0.1912 | 0.1268 | -1.51 |
| Poor_rain | 0.2562 | 0.0605 | 4.23*** | 0.1417 | 0.0575 | 2.46** |
| Flooding | -0.0987 | 0.1089 | -0.91 | 0.2272 | 0.1104 | 2.05** |
| Pest_invasion | 0.49446 | 0.1535 | 3.22*** | 0.0992 | 0.1582 | 0.63 |
| Property loss | -0.1292 | 0.1490 | -0.87 | -0.0002 | 0.1367 | -0.00 |
| Inter-communal crisis | 0.0944 | 0.0674 | 1.40 | 0.0501 | 0.0254 | 1.97** |
| Farmer-herder conflict | 0.0047 | 0.0023 | 2.07** | 0.0416 | 0.0227 | 1.84* |
| Migration | 0.0103 | 0.0041 | 2.54*** | 0.0277 | 0.010 | 2.83*** |
| _IYear_2015 | 0.0264 | 0.0487 | 0.54 | 0.0389 | 0.0363 | 1.07 |
| _IYear_2018 | 0.0953 | 0.0488 | 1.95** | 0.0037 | 0.0434 | 0.09 |
| _Izone_2(Northeast) | 0.0890 | 0.0716 | 1.24 | | | |
| _Izone_3(Northcentra) | 0.1599 | 0.0592 | 2.70*** | | | |
| _Izone_4(Northwest) | -0.0649 | 0.06495 | -1.00 | | | |
| _Izone_5(Southwest) | 0.1605 | 0.0717 | 2.24** | | | |
| _Izone_6(Southsouth) | -0.1767 | 0.0894 | -1.98 | | | |
| _cons | 12.3772 | 0.3764 | 32.88 | 12.7815 | 0.4702 | 27.18 |

**Source:** Author's computation, 2023

expectation, the result has significant implication on poverty reduction in Nigeria. Since most of the rural populace depend on agricultural activities as a mean of livelihood. Likewise, the coefficient of household size was positive and significant at 10 percent level of confidence; an implication of increase in vulnerability to poverty at any instance of increase in the household size. There are elements of weather shocks that significantly influence vulnerability to poverty. Both incidence of poor rainfall and flooding were positively significant determinant of vulnerability to poverty on this fixed effect model. This incidence of poor rainfall and flooding is an indication of increasing vulnerability to poverty.

Lastly, the cases of inter-communal clashes and farmer-herder conflict was seen to have fuel rise in vulnerability to poverty in Nigeria. The OLS result could justify how noticeable these crises are in Nigeria. The significance of this in year 2018 is an evidence especially in the north central and south west zone of the country. There cases and report from different quarters on the rise level of inter-communal clashes in the north-central zone, Nigeria while farmer-herder clashes are reported in southwest. Though we have cases of these challenges in other zone of the country, Boko-haram insurgence in the North east has displace so many farmers and their household members in that zone and plunge many into severe poverty.

While the OLS and fixed effects results are encouraging, they may be biased if vulnerability to poverty is correlated with weather shocks incidence. As expected with the fixed effect model, the result displayed on the table indicated that the coefficient of assets and farm size negatively influences vulnerability to poverty. Meanwhile, others control variables (household size, poor rain, flooding, inter-communal crisis and farmer-herder conflict cases) showed positive relationship. These variables have the potential of influencing vulnerability to poverty in Nigeria.

**Correlated Random Coefficient (CRC) reduced form and Structural estimates**

Table 3 showed the reduced form of the structural estimate of CRC of influence of weather shocks on vulnerability to poverty. The influence of weather shocks on vulnerability to poverty was observed in the three waves (2012, 2015 and 2018). Weather shocks was observed to be significant in the third wave (2012) with respect to wave 2 (2012), while it was seen to be significant at 10 percent and 1 percent in 2015 with respect to vulnerability to poverty in 2018. The interaction of weather shocks in 2012 and 2018 showed significant influence to vulnerability on both 2012 and 2015 models. Likewise, in 2018, the interaction of weather shocks in 2015 and 2018 was significant at 10 percent level of confidence. Meanwhile the interaction of the three years showed significant effect with respect to year 2015 model. The further affirm the influence and effect of weather shocks on vulnerability to poverty in Nigeria.

In 2012 model, only three variables were found significant; education (1%) and age (5%) were negatively influence vulnerability to poverty while poor rain was positive and significant at 10%. The result showed than education and age of the respondents has significant influence in reduction of vulnerability to poverty. Respondents who are older are more likely to be less vulnerable to poverty than the younger counterpart. In conformity with the finding of Mba *et al.* (2021), where age of the respondents showed negative coefficient, although, the study still found out that there exists non-linear relationship between age and vulnerability, due to positivity of the square of age in the model. But, a contrary result was obtained by Alayande and Alayande (2004), the study discovers that increasing age increases vulnerability to poverty and also confirm linear relationship between the duo. In the same way, education could spin out individuals who are incline from poverty circle, provided all other factors are held constant. More so, poor rainfall's

coefficient revealed the impact of the weather shocks on household vulnerability to poverty in Nigeria. This variable significantly implied a rise in vulnerability to poverty as there are increasing cases of poor rainfall in the study area. Agriculture in Nigeria is mostly rain-fed and a fall short of the expected amount of rainfall could be deterrent to agricultural productivity which will consequently impact livelihood outcome.

The cost on utilities, farm size, age and flooding were found to be significant on 2015 vulnerability model. While farm size reduces vulnerability to poverty in the year, the result revealed that other variables (cost on utilities, age and flooding) significantly increases vulnerability to poverty rate in the study area, when other variables are held constant. The expectation of average individuals on the rise farm size is better or higher food production. This is quite achievable when production inputs are put to maximal use and measures are in place to take care of stressors and unexpected (risks). The coefficient of cost of utilities raises vulnerability to poverty. This signifies that more individuals are close to the threshold of poverty entry especially when bills on utility consume is higher. For instance, the removal of fuel subsidy, border closure electricity bill hike and some other astringent policies will see many individual wallowing in poverty. Therefore, measures are needed to reduce the rising price of commodity and consumables. Also, flooding destroys property and assets and the table equally revealed that about 12 percent increase in vulnerability to poverty will be experience with a unit increase in flooding in the study area. The result implied that respondents are more likely to be vulnerable to poverty with increase in flooding.

Lastly, the significance of farm size, dependency ratio, poor rain and loss of property(ies) and farmer – herder conflict was prominent to 2018 model. All these variables positively showed significant coefficient to vulnerability to poverty. As much as other significant variables were in compliance with the a-priori expectation, the coefficient of farm size negated this argument. This could raise a bit concern in the sense that the expected outcome of an increased farm size may not be achieve. With this result, three things are bound to have happen (i) underutilization of productive resources (ii) poor management of other resource in terms of input – output combination and or (iii) unproductive farmland. The third is least expected since agricultural land in Nigeria are reported to be fertile and productive. Another important factor that drives vulnerability is loss of properties. In this study it was observed that the variable pose positive relationship with the dependent variable which indicated that respondents who at a time lose their properties are more likely to be vulnerable to poverty. According to Mba *et al.* (2018), loss can take many forms – becoming or being physically weaker, economically impoverished, socially dependent, humiliated or psychologically harmed.

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**Table 3: Correlated Random Coefficient (CRC) reduced form and Structural estimates**

| Variables | Coefficient | Std. Err | z | Coefficient | Std. Err | z | Coefficient | Std. Err | z |
|---|---|---|---|---|---|---|---|---|---|
| | lny_exp_pov2012 | | | lny_exp_pov2015 | | | lny_exp_pov2018 | | |
| Weather_shocks_2012 | 0.0296 | 0.0148 | 2.00** | 0.0190 | 0.0153 | 1.24 | -0.0150 | 0.0160 | -0.94 |
| Weather_shocks_2015 | -0.0097 | 0.0684 | -0.14 | -0.0167 | 0.0709 | -0.24 | 0.0877 | 0.0523 | 1.68* |
| Weather_shocks _2018 | 0.0227 | 0.0693 | 0.33 | 0.0232 | 0.0719 | 0.32 | -0.0875 | 0.0752 | -1.16 |
| Interaction (2012*2015) | -0.0054 | 0.0093 | -0.59 | -0.0029 | 0.0096 | -0.31 | 0.0006 | 0.0101 | 0.06 |
| Interaction (2012*2018) | -0.0038 | 0.0021 | -1.80* | -0.0050 | 0.0022 | -2.29** | -0.0024 | 0.0023 | -1.06 |
| Interact_(2015*2018) | -0.0564 | 0.1874 | -0.30 | -0.2363 | 0.1943 | -1.22 | 0.3876 | 0.2034 | 1.91* |
| Interact_(2012*2015*2018) | -0.0811 | 0.0999 | -0.81 | 0.2457 | 0.1036 | 2.37** | 0.0478 | 0.1085 | 0.44 |
| lny_Assets_cost | 0.1730 | 0.1804 | 0.96 | 0.0423 | 0.1870 | 0.23 | 0.0486 | 0.1958 | 0.25 |
| lny_Utilities | 0.1376 | 0.2477 | 0.56 | 0.7439 | 0.2568 | 2.90*** | 0.1726 | 0.2689 | 0.64 |
| Farm size | 0.2927 | 0.2334 | 1.25 | -0.8143 | 0.2420 | -3.36*** | 0.4812 | 0.2533 | 1.90** |
| Dependency_ratio | -0.0769 | 0.1051 | -0.73 | -0.0752 | 0.1089 | -0.69 | 0.4305 | 0.1140 | 3.78*** |
| Education (years) | -0.2686 | 0.1041 | -2.58*** | -0.1523 | 0.1079 | -1.41 | -0.0270 | 0.1129 | -0.24 |
| Age | -0.2182 | 0.1097 | -1.99** | 0.0233 | 0.0101 | 2.31** | 0.0032 | 0.0105 | 0.31 |
| sexe_repondant | -0.0024 | 0.0164 | -0.15 | -0.0014 | 0.0169 | -0.09 | 0.0096 | 0.0177 | 0.55 |
| Poor_rain | 0.0250 | 0.0137 | 1.83* | -0.0266 | 0.0142 | -1.87 | 0.2137 | 0.1148 | 1.86* |
| Flooding | 0.0793 | 0.0700 | 1.13 | 0.1150 | 0.0725 | 2.19** | -0.0031 | 0.0759 | -0.04 |
| Pest_invasion | 0.0847 | 0.0706 | 1.20 | 0.0157 | 0.0531 | 0.22 | 0.0200 | 0.0765 | 0.26 |
| Loss_of_property | 0.0068 | 0.0089 | 0.77 | -0.0087 | 0.0092 | -0.96 | -0.1088 | 0.0496 | 2.19** |
| Inter-communal crisis | 0.0528 | 0.2617 | 0.20 | 0.0747 | 0.2712 | 0.28 | 0.3911 | 0.2839 | 1.38 |
| Farmer-herder crisis | 0.1192 | 0.1001 | 1.19 | 0.0547 | 0.1037 | 0.53 | 0.2144 | 0.1085 | 1.98** |
| Migration | 0.1982 | 0.1036 | 1.91* | 0.0163 | 0.0202 | 0.81 | 0.0047 | 0.0164 | 0.29 |
| **_cons** | 12.7975 | 0.7904 | 16.19*** | 11.1669 | 0.8193 | 13.63*** | 12.2892 | 0.8577 | 14.33*** |

**Source:** Author's computation, 2023

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**CRC OMD structural estimates for weather stressors**

As for the weather stressors, the result presented on Table 4 showed the structural parameter estimates λ1 = 0.0012, λ2 = 0.0158, λ3 = -0.0026, λ4 = 0.0201, λ5 = 0.3258, λ6 = 0.2083, and λ7 = 0.2965. The overall weather stressors β = 0.3899 and ϕ = 0.2812 is the coefficient on the individual's experience on weather stressors or comparative advantage in it. The result revealed that the coefficient of the overall weather stressors was significant at 10 percent level of confidence; this indicated that weather stressors has significant influence on vulnerability to poverty in Nigeria. Also, it is an indication that weather stressors are homogenous in the study area and not heterogeneous. The coefficient of ϕ was not significant and it implies that weather stressors does not provided any comparative advantage to individual in the study area.

**Table 4: CRC OMD structural estimates**

| | Coefficient | Std. Err | Z | P>/z/ |
|---|---|---|---|---|
| λ1 | 0.0012 | 0.0010 | 1.20 | 0.234 |
| λ2 | 0.0158 | 0.0353 | 0.45 | 0.654 |
| λ3 | -0.0026 | 0.0125 | -0.21 | 0.834 |
| λ4 | 0.0201 | 0.0375 | 0.54 | 0.594 |
| λ5 | 0.3258 | 0.1255 | 2.60 | 0.040*** |
| λ6 | -0.2083 | 0.2352 | -0.89 | 0.378 |
| λ7 | 0.2965 | 0.2732 | 1.09 | 0.280 |
| B | 0.3899 | 0.2042 | 1.91 | 0.059* |
| ϕ | 0.2812 | 0.2564 | 1.10 | 0.277 |

**Source: Author's computation, 2023**

## CONCLUSION AND RECOMMENDATIONS

In conclusion, this study provides a comprehensive understanding of the socio-economic factors contributing to poverty and vulnerability in the study area. The findings underscore the importance of addressing education, land rights, household size, and access to basic resources like water and energy in poverty alleviation strategies. It is crucial for policymakers and development stakeholders to consider these factors in designing targeted interventions that promote sustainable livelihoods, reduce vulnerability, and foster inclusive growth in Nigeria. By addressing these challenges, there is a greater potential to uplift the well-being of vulnerable populations and advance socio-economic development in Nigeria.

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