

## ASSESSMENT OF RURAL LIVELIHOOD DIVERSIFICATION AMONG FARMING HOUSEHOLDS IN SOUTHERN BORNO

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### ABSTRACT

The study assessed extent of rural livelihood diversification strategies among farming households in southern Borno. A multistage sampling procedure selected 224 respondents, and data were analyzed using descriptive statistics, the Simpson Index of Diversity (SID), and a Heckman two-step selection model. SID is defined as the Simpson Index of Diversity and ranges from 0 (no diversification) to 1 (very high diversification). Findings showed that most respondents were male (62.9%), aged 31–40 years (54.3%), married (62.4%), and had 7–10 household members (58.4%). Overall, 92.8% of households engaged in some diversification; the average SID was 0.59 (high), while the largest share of households fell in the medium category (34.4%). Determinants that were positive and statistically significant included age ( $\beta = 0.0836$ ,  $p < 0.001$ ), marital status ( $\beta = 0.0298$ ,  $p = 0.007$ ), household size ( $\beta = 0.0375$ ,  $p = 0.046$ ), education ( $\beta = 0.0347$ ,  $p = 0.001$ ), household income ( $\beta = 0.2903$ ,  $p < 0.001$ ), cooperative membership ( $\beta = 0.0910$ ,  $p = 0.028$ ), farm size ( $\beta = 0.2981$ ,  $p = 0.035$ ), savings ( $\beta = 0.2570$ ,  $p < 0.001$ ) and extension contact ( $\beta = 0.1166$ ,  $p = 0.013$ ). Sex had a negative effect ( $\beta = -0.0182$ ,  $p = 0.046$ ). Major constraints included lack of credit/capital (95.9%), limited awareness and training (67.9%), location/patronage (56.1%), and infrastructural deficits (49.8%). Policy options should prioritize access to finance and savings, cooperative development, skills/extension services, and rural infrastructure to enable inclusive, risk-aware diversification.

**Keywords:** Livelihood Diversification, Farming Households, Southern Borno, Nigeria

### INTRODUCTION

Livelihood refers to the capabilities, material and social resources, and activities that people rely on to make a living. It also reflects how structures, policies and processes shape the options available to households (Ellis, 2000). Livelihood strategies are therefore the various activities that generate income and support wellbeing. They include not only what people do to earn a living, but also the resources that enable them to achieve a satisfactory standard of living, the risks they consider in managing those resources, and the institutional and policy environment that either supports or limits their efforts to improve their livelihoods. Very few individuals make all their income from one source, hold all their wealth in the form of single asset, or depend on just one type of asset; therefore, many households adopt livelihood diversification as a strategy to manage risks and strengthen their economic resilience. Livelihood diversification occurs when household members have a portfolio of activities and communal proficiencies to exist and to develop their well-being. Livelihood diversification is grouping of on-farm and off-farm activities to earn a living (Mekonnen *et al.*, 2021). Households that adapt diversified livelihoods can cope with shocks and stresses, use natural resources sustainably and provide opportunities for future generations.

Diversification is not only driven by constraints or the unrelenting struggle for survival of the poor, it can also be determined by incentives. While some diversify, because they have little choice, others may diversify, because they have many choices. Many

contextual factors that might influence the choice of livelihood diversification strategy have been examined on several occasions. Livelihood diversification and rural non-farm employment are influenced by multiple factors, including high population density, improved road networks, and migration inflows, which collectively expand economic opportunities. However, households differ in their ability to diversify due to variations in access to credit and savings, cultural norms, household size and composition, and educational attainment (Akintunde *et al.*, 2022). Other determinants include geographical location, household characteristics, market opportunities, the interplay between farm and off-farm activities, and the role of formal and informal institutions in shaping diversification choices.

Motivations for diversification are often categorized as push or pull factors. Households may be pushed into off-farm activities when farming becomes less profitable or riskier due to population pressure, crop failures, market shocks, or long-term constraints such as land scarcity. The absence of crop insurance and limited access to credit further exacerbate this “distress-push” diversification. Conversely, households may be pulled toward non-farm employment when returns are higher or less risky than agriculture, resulting in “demand-pull” diversification. Evidence from Adekule *et al.* (2022) in Ogun State, Nigeria, shows that nearly half of respondents combined farm and non-farm strategies, while 14.3% and 40% relied solely on farm or non-farm activities, respectively.

Given the poverty situations in rural communities and uncertainties associated with the largely nature-dependent economy of traditional agricultural practices, the need for rural household livelihood diversification is centred on the need for assurance of household food security, generation of additional income, control of available additional income, reduction of poverty and vulnerability among others (Ayele & Tadesse, 2022). From the foregoing, the issue of farming households diversifying their sources of income has come to light. It is known that households with several sources of income or who diversify their sources of income would earn more money and have access to enough food, which will enhance the welfare of households. The diversification of livelihood has been acknowledged as a crucial method for decreasing poverty, raising household incomes, and subsequently enhancing food security by both academics and development practitioners. Diversifying households are expected to have more flexibility and resilience capacity than agriculturally dependent rural households since they can continue to operate a diverse range of businesses.

Although livelihood diversification is increasingly practiced in Southern Borno as a strategy to enhance food security and supplement agricultural income, there is limited empirical evidence documenting its extent, patterns, and determinants in the region. Existing literature largely focuses on other parts of Nigeria or broader national trends, leaving a gap in understanding the socio-economic factors, constraints, and effectiveness of diversification strategies specific to Southern Borno. This lack of localized data hinders the development of targeted interventions and policies to improve household resilience and income diversification in the study area.

The main objective of the study is to assess the extent of rural livelihood diversification among farming households in southern Borno, while the specific objective is to:

- i. Examine the extent of livelihood diversification by farming households?
- ii. Ascertain the factors affecting extent of livelihood diversification among farming household?
- iii. Identify the constraints to livelihoods diversification by farming households?

## METHODOLOGY

The study was conducted in Southern Borno, comprising nine Local Government Areas (Askira/Uba, Bayo, Biu, Chibok, Damboa, Gwoza, Hawul, Kwaya Kusar and Shani). A multistage sampling technique was applied: three LGAs (Askira/Uba, Biu and Hawul) were purposively selected for accessibility; nine communities were then chosen for high diversification; finally,

respondents were randomly selected by balloting. Following Krejcie & Morgan's table, a sample of 224 was adequate for a population of 1,390; Yemane's formula validated this sample size.

Primary data was collected using a structured questionnaire, supplemented by secondary sources. Descriptive statistics (frequencies, percentages, means) were used for (Objective iii). The Simpson Index of Diversity (SID) measured the extent of diversification (Objective i). A Heckman two-step selection regression model identified determinants of diversification (Objective ii), addressing potential selection bias.

$$SID = 1 - \sum_{i=1}^n P_i^2 \dots\dots\dots 1$$

Where SID=Simpson index

n = total number of income sources

P<sub>i</sub> = income proportion of i<sup>th</sup> income source

Based on the SID values, the extent of livelihood diversification were defined as follows:

- i. No diversification (SID ≤ 0.01)
- ii. Low level of diversification (SID = 0.01 - 0.25)
- iii. Medium level of diversification (SID = 0.26 - 0.50)
- iv. High level of diversification (SID = 0.51 - 0.75)
- v. Very high level of diversification (SID > 0.75)

### Heckman (two-step) Selection Regression Model

$$Y_i = B_0 + B_1 X_1 + B_2 X_2 + B_3 X_3 + B_4 X_4 + B_5 X_5 + B_6 X_6 + B_7 X_7 + B_8 X_8 + B_9 X_9 + e_i \dots\dots\dots$$

Where,

Y<sub>i</sub> = 1 if household diversify their livelihood, and 0 otherwise

X<sub>1</sub> = age (years)

X<sub>2</sub> = marital status (1 or 0)

X<sub>3</sub> = household size (No)

X<sub>4</sub> = level of education (years spent)

X<sub>5</sub> = household income (N)

X<sub>6</sub> = cooperative membership (1 or 0)

X<sub>7</sub> = farming experience (years)

X<sub>8</sub> = household savings (N)

B<sub>0</sub> ... B<sub>9</sub> = estimated coefficient

e<sub>i</sub> = error term

## RESULTS AND DISCUSSION

### Extent of livelihood diversification by farming households

The result on the extent of livelihood diversification engaged by farming households is presented in Table 1. The result reveals that 9.5% of the respondents had very high level of diversification (SID > 0.75), 29.4% had high level of diversification (SID = 0.51 - 0.75), 34.4% which constituted the majority had medium level of diversification (SID = 0.26 - 0.50) and 19.5% had low level of diversification (SID = 0.01 - 0.25). Respondents with no diversification (SID ≤ 0.01) were only 7.2%, meaning that they earned income from just one source for their livelihoods. The study recorded an average diversification index of 0.59.

**Table 1: Distribution of Respondents by Extent of Livelihood Diversification**

Diversification index	Frequency (No.)	Percent	Mean
No diversification (SID <= 0.01)	19	7.2	0.59
Low level of diversification (SID = 0.01 - 0.25)	43	19.5	
Medium level of diversification (SID = 0.26 - 0.50)	76	34.4	
High level of diversification (SID = 0.51 - 0.75)	65	29.4	
Very high level of diversification (SID > 0.75)	21	9.5	
<b>Total</b>	<b>224</b>	<b>100.0</b>	

Source: Field Survey, 2023

The result implies that majority of households had diversified livelihoods at medium level and have more than one livelihood activity. This finding corroborates with that of Arowolo *et al.* (2022) who reported that majority of the rural households diversified livelihoods into several activities and earned significant amounts of income from multiple sources.

**Factors affecting extent of livelihood diversification by rural households**

The results on factors affecting the extent of livelihood diversification among farming households is presented in Table 2. The rho of the regression model indicated the overall goodness of fit of the model and it was statistically significant at 1% level. The Wald test is  $(\chi^2 (10) = 76.02)$  confirmed that the coefficients of the level of diversification were significantly different from zero; indicated that the model fulfilled condition of good fit. The value of lambda and sigma are also statistically significant; this clearly indicated the model reliability.

The coefficient of age was found to have a statistically significant effect on livelihood diversification. However, evidence from recent studies suggests that this effect is often negative rather than positive. Older household heads may have limited physical capacity and risk-taking ability, which can reduce their participation in diversified income-generating activities. For example, empirical findings from Ethiopia indicate that age negatively and significantly influences the probability of engaging in non-farm activities, as younger household heads are generally more flexible and willing to adopt new livelihood strategies (Washo *et al.*, 2021; Minyiwab *et al.*, 2024). Nevertheless, in some contexts, age can be associated with accumulated experience and social capital, which may enhance access to certain opportunities, particularly in traditional or skill-based sectors (Habib *et al.*, 2023).

Similarly, marital status has been shown to exert a positive and significant influence on livelihood diversification. Married household heads often face greater responsibilities for family welfare, which creates incentives to seek multiple income sources to ensure household food security and stability. Studies in Ethiopia and Nigeria confirm that marital status significantly increases the

likelihood of participating in off-farm and non-farm activities, as these households aim to meet higher consumption needs and mitigate income risks (Washo *et al.*, 2021).

The coefficient of household size was found to be positive and significant, influencing the decision for livelihood diversification at the 5% level. An addition of one member to the household could lead to an increase in the probability of livelihood diversification of households by 3.8%. This implies that farmers who operate on a relatively large household size maintained higher levels of diversification, probably due to large volume of labour which led to allocation of multiple tasks across different types of livelihood activities. Some empirical evidence indicated that the number of household members positively affected diversification of farming households, subsequently increasing household income (Ayele & Tadesse, 2022).

The coefficient of education level was positive and significant at the 1% level. An increase in formal education by one year led to a 3.5% increase in the level of diversification of the households. This clearly implies that education of household heads in the study area enhances their ability to adopt new and complex livelihood activities beyond farming, thereby improving household income. This finding aligns with evidence from Nigeria: Chinalurum *et al.* (2024) reported that education level significantly influences livelihood diversification among farming households.

Household total income variable was found to have positive and significant influence on household's livelihood diversification strategies at less than 1% level. The positive coefficient implied that households with better income are more likely to diversify their livelihood enterprises. The possible reason could be because farm households with better income can easily invest in non-farm activities.

Member of Cooperative was significant and positively influenced the probability of household heads to diversify their sources of livelihood. Being a member of a cooperative increases the probability of farming households to diversify their livelihood by 9.1%. This is probably because membership of cooperative provides a better chance of accessing capital and information to set up a new business enterprise to enhance households' income.

Estimated coefficient of farm size has positive and significant effect on livelihood diversification decision of the farming households. An addition of one hectare of land brought to an increase in the probability of livelihood diversification by 29.8%. This implied that large farm size might enable households to allot their lands to multiple sources of income generating activities. This coincides with that of Onunka and Olumba (2017), who observed that farm size was found to have a significant effect on livelihood diversification among farming households in Enugu State Nigeria.

Household savings, whether informal or formal, were found in our study to positively affect livelihood diversification by 25.7%. This likely reflects the fact that many households use their own

savings as capital to finance off-farm businesses as alternative income sources. Extension contacts also positively and significantly affected livelihood diversification at the 5% level: households with extension contact had an 11.7% higher probability of diversification. This shows that extension services, by providing access to new technologies, information, and linkages, facilitate the adoption of diversified livelihood strategies. These findings are broadly consistent with external evidence: Do (2023) shows that households with greater savings are more likely to diversify income portfolios, and Ongachi & Belinder (2025) conclude that agricultural extension services play a pivotal role in enabling diversification and rural development.

**Table 2: Factors influencing the extent of livelihood diversification**

Variables	Coefficient	Std. Err	Z
Age	0.0836	0.0100	8.4***
Sex	-0.0182	0.0093	-2.0**
Marital status	0.0298	0.0111	2.7***
Household size	0.0375	0.0188	2.0**
Educational level	0.0347	0.0108	3.2***
Household Income	0.2903	0.0841	3.5***
Membership of Cooperative	0.0910	0.0409	2.2**
Farm size(ha)	0.2981	0.1446	2.1**
Household saving	0.2570	0.0578	4.5***
Extension contacts	0.1166	0.0460	2.5**
_cons	-0.0701	0.0275	-2.6***
Lambda	0.1858	0.0538	3.5***
Rho	0.0786	0.0299	
Sigma	0.2450	0.0662	
Wald chi2(10) =	76.02		

Note: \*\* and \*\*\* are significant at 5% and 1% respectively

Source: Field Survey, 2023

**Constraints to livelihoods diversification by farming households**

Result on constraints to livelihood diversification is presented in Table 3. The result revealed that the major constraints to livelihood diversification in the study area include lack of credit facilities or capital (95.9%), lack of awareness and training (67.9%), and location and patronage (56.1%). Risk involved in the diversification (3.6%),

was the least constraint to livelihood diversification. The study agrees with that of Zewdie (2021), who identified inadequate capital/credit access, lack of training/skills, and systemic constraints as major barriers to livelihood diversification among rural households. Capital is a backbone of any livelihood activity because, without it, input cannot be procured.

**Table 3: Constraints to Livelihood Diversification by Farming Households**

Problems	Frequency	*Percentage
Lack of credit facilities or capital	212	95.9
Lack of awareness and training	150	67.9
Location and patronage	124	56.1
Infrastructural problem	110	49.8
Culture and religion	80	36.2
Risk involves in the diversification	8	3.6

Source: Field survey, 2023.

\*Multiple responses existed

## CONCLUSION AND RECOMMENDATIONS

Based on the findings, it is concluded that livelihood diversification among farming households in southern Borno constitutes a pivotal adaptive strategy for mitigating economic vulnerability and enhancing household resilience. The evidence demonstrates that households engaged in diversified livelihood portfolios exhibit comparatively higher income stability and improved socio-economic outcomes than those dependent exclusively on farming activities only as a source of income.

The study, therefore, makes the following recommendations:

- i. Livelihood diversification to be encouraged among farming household by agricultural extension agents. This will go along away in enhancing livelihood diversification as farmers can take opportunity to build resilience and diversify.
- ii. Agricultural extension service providers should incorporate the promotion of various sources of income into their extension programs. This can help farmers diversify their sources of income and increased resilience.
- iii. It's critical that development actors concentrate on providing basic infrastructure, such as electricity, access roads, portable drinking water, health facilities, and schools, among others, to promote diversification of livelihood.

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