Livelihood Diversification and Multidimensional Poverty among Rural Farming Households in Nigeria

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Abstract
Livelihood diversification plays an important role in the welfare of farming households, yet its relationship with multidimensional poverty remains a concern in Nigeria. This study examined livelihood diversification patterns, multidimensional poverty status and the effect of livelihood diversification on multidimensional poverty among rural farming households in Nigeria. Secondary data from the Nigeria General Household Survey (GHS-Panel) Wave 5, covering 3,004 rural farming households, were analysed using descriptive statistics, the Simpson Diversification Index (SDI), the Alkire-Foster methodology and Binary Logistic Regression. The SDI was constructed using household participation in livelihood activities, while multidimensional poverty was measured at a 33.3% deprivation cut-off. Agricultural wage labour was the most widely reported activity (69.97%). The mean number of livelihood activities was 3.41, while the mean SDI was 0.62. Highly diversified households accounted for 66.18% of the sample. Multidimensional poverty incidence was 82.69%, with an intensity of 66.01% and an MPI of 0.546. Cooking-fuel deprivation recorded the highest uncensored headcount ratio (87.68%), while health and education jointly contributed 70.02% of overall MPI. Binary Logistic Regression results showed that livelihood diversification was significantly associated with a lower average predicted probability of multidimensional poverty (AME = −0.1295; $p < 0.01$). The study recommends improving access to education, healthcare, agricultural training and productive livelihood opportunities to address multidimensional poverty among rural farming households.
Keywords: livelihood diversification; multidimensional poverty; Alkire-Foster method; Simpson Diversification Index; farming households; Nigeria.

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1. Introduction

Agriculture serves as the cornerstone of the Nigerian economy, as it offers vital employment prospects for rural populations and fulfills the majority of the nation's food requirements (Onuwa *et al.,* 2022). Agricultural households in Nigeria encounter multifaceted poverty,

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notwithstanding the nation's abundant agricultural assets and increasing involvement of rural populations in farming endeavours (Eze and Alugbuo, 2021). Although farming households engage in a range of agricultural and non-agricultural activities to sustain their livelihoods, multidimensional poverty may persist because of ongoing deprivations in critical domains such as education, healthcare, sanitation, housing, food security, and other fundamental welfare requirements (Sadiq *et al.,* 2025). Livelihood diversification refers to the increased engagement of households in different economic activities to generate income, sustain their livelihoods, manage risks, and improve household welfare (Pritchard *et al.,* 2019; Olajide *et al.,* 2022). Rural households participate in agricultural and non-agricultural activities, including crop farming, livestock production, agricultural wage labour, non-agricultural employment, petty trading, and other income-generating enterprises.

These activities provide opportunities for households to broaden their income sources, reduce dependence on a single livelihood activity, and strengthen their capacity to withstand economic and environmental shocks (Barrett *et al.,* 2021; Gebru *et al.,* 2023). However, livelihood diversification does not necessarily guarantee improved household welfare or poverty reduction. Poorer households may participate in several low-return activities that generate insufficient income to improve their access to essential services and productive resources (Loison, 2021). The welfare benefits of diversification depend on access to educational resources, credit facilities, infrastructure, productive assets, and institutional support (Díaz *et al.,* 2022). Where these conditions are inadequate, additional livelihood activities may serve mainly as coping strategies rather than pathways out of poverty. Thus, increased participation in economic activities may coexist with persistent deprivation in healthcare, education, sanitation, housing, and other dimensions of household welfare.

Multidimensional poverty provides a broader basis for assessing the welfare conditions of farming households than income-based measures alone. Poverty encompasses deficiencies in education, healthcare, sanitation, assets, nutrition, and social opportunities. In Nigeria, farming households continue to experience welfare challenges associated with declining agricultural productivity, inflation, insecurity, inadequate rural infrastructure, and restricted access to productive resources (World Bank, 2023; National Bureau of Statistics, 2022). Examining livelihood diversification alongside multidimensional poverty is therefore important for establishing whether engagement in different livelihood activities is associated with improved household welfare. Previous studies have examined livelihood diversification and poverty among rural farming households in Nigeria. For instance, Ojo *et al.* (2024) investigated the effects of livelihood diversification on poverty status among 152 rural farming households in Kwara State using the Shannon Diversity Index, Foster-Greer-Thorbecke poverty measures, fractional logit, and probit regression models. Although the study established the relationship between livelihood diversification and poverty, its geographical coverage was limited to one state, and poverty was measured using conventional poverty indicators rather than a multidimensional approach. Therefore, the relationship between livelihood diversification, measured through household income shares, and simultaneous deprivation in health, education, and living standards requires further empirical examination

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among farming households at a broader national level. This study addresses this gap by using data from 3,004 rural farming households in the Nigeria General Household Survey Panel Wave 5, applying the Simpson Diversification Index to measure livelihood diversification, the Alkire-Foster methodology to estimate multidimensional poverty, and Binary Logistic Regression to examine the association between livelihood diversification and multidimensional poverty status. Against this background, this study examined livelihood diversification patterns, estimated multidimensional poverty status, and assessed the relationship between livelihood diversification and multidimensional poverty among rural farming households in Nigeria.

2. Literature Review

Livelihood diversification refers to the process through which households engage in multiple income-generating activities to improve their welfare, reduce vulnerability and maintain their living standards (Ellis, 2021). Rural households combine agricultural and non-agricultural activities to generate income and obtain the food and essential resources required for their daily needs (Barrett *et al.,* 2021). In developing countries such as Nigeria, diversification is particularly important because households that depend on a single agricultural income source are exposed to production risks, market disruptions, climate-related disasters and economic downturns (Davis *et al.,* 2022). Consequently, households combine different livelihood activities to minimize risks and stabilize their income over time (Scoones, 2021). Agricultural livelihood activities include crop production, livestock production, irrigation farming and agroforestry, while non-agricultural activities include wage employment, petty trading, transportation, artisan work and small-scale enterprises (Reardon *et al.,* 2021). Livelihood diversification can serve both as a survival strategy and as a means of wealth accumulation (Barrett *et al.,* 2021). However, poor households often depend on low-return activities to cope with food shortages, unemployment and income fluctuations, whereas wealthier households are more likely to access profitable activities that support asset accumulation (Loison, 2021).

Multidimensional poverty refers to overlapping deprivations across key dimensions of human well-being, particularly health, education, and living standards (Santos and Villatoro, 2018). It extends beyond inadequate income to include limited access to essential services, opportunities, resources and the capabilities required to achieve a decent standard of living (Roche, 2020; Alkire *et al.,* 2021). Thus, households may be above the conventional income poverty line while still experiencing serious non-monetary deprivations (Suppa, 2021). This broader understanding of poverty has encouraged the use of multidimensional approaches in welfare assessment and development policy (Mitchell *et al.,* 2023). The concept is particularly relevant in developing countries, where structural constraints often limit access to basic services and opportunities (Oyekale, 2021). Multidimensional poverty therefore provides a broader assessment of household welfare by identifying simultaneous disadvantages across different dimensions of well-being. These deprivations can restrict human development and limit households' ability to improve their living conditions (Ahmad and Marathe, 2022; Roche, 2020).

Livelihood diversification can influence multidimensional poverty through its effects on household income, productive assets and

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access to essential services. Engagement in multiple economic activities can provide additional resources for acquiring productive assets and improving household welfare (Aidoo *et al.,* 2023). Diversification may therefore contribute to poverty reduction among rural farming households by improving their capacity to meet basic needs (Abdulai and Huffman, 2022). However, participation in multiple activities does not automatically translate into improved welfare because the returns to livelihood activities vary across households and locations (Dinku *et al.,* 2022). Poor households may remain dependent on low-return activities, such as casual labour and petty trading, which provide insufficient resources to overcome persistent deprivation (Asfaw *et al.,* 2021).

The welfare outcomes of livelihood diversification also depend on households' access to education, land, credit, infrastructure and institutional support (Alemu and Adesina, 2022). Households with limited productive assets may remain concentrated in low-productivity activities, thereby reducing the potential poverty-reducing benefits of diversification (Ng'endo *et al.,* 2022). Similarly, unequal access to profitable livelihood opportunities can widen welfare differences between poorer and wealthier households (Mango *et al.,* 2021). Inadequate rural roads, electricity, healthcare facilities and educational institutions may further constrain the extent to which additional economic activities translate into improvements in health, education and living standards (Dinku *et al.,* 2022; Aidoo *et al.,* 2023). Thus, the relationship between livelihood diversification and multidimensional poverty may depend not only on the number of activities undertaken but also on the income generated and the opportunities available to households.

Ojo *et al.* (2024) examined the effects of livelihood diversification on the poverty status of 152 rural farming households in Kwara State, Nigeria. Using the Shannon Diversity Index, Foster-Greer-Thorbecke poverty measures, fractional logit and probit regression models, the study investigated livelihood diversification and conventional poverty status. The findings identified household characteristics such as age, gender, household size and farming experience as important factors associated with livelihood diversification, while access to credit and cooperative membership were among the factors associated with poverty status. Although the study provides relevant evidence on livelihood diversification and poverty in Nigeria, it was geographically restricted to Kwara State and did not assess poverty through simultaneous deprivations in health, education and living standards. Other Nigerian studies have also applied multidimensional poverty approaches to farming and rural populations, demonstrating the relevance of examining welfare beyond income poverty. However, the evidence on how income-share-based livelihood diversification relates to multidimensional poverty among rural farming households remains limited. The present study contributes to this literature by examining 3,004 rural farming households using the Simpson Diversification Index, the Alkire-Foster methodology and Binary Logistic Regression. This combination provides evidence on livelihood diversification patterns, multidimensional poverty status and the association between livelihood diversification and multidimensional poverty in Nigeria.

The Sustainable Livelihoods Framework (SLF) was developed by the Department for International Development (DFID) in the late 1990s to provide a holistic

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understanding of the factors influencing livelihoods and how they interact within a given context. The framework explains how households draw on different livelihood assets, including natural, human, social, financial and physical capital, to develop livelihood strategies and achieve livelihood outcomes (Tabares *et al.,* 2022). It also considers the influence of vulnerability contexts, transforming structures and processes on households' livelihood choices. The framework is relevant to this study because rural farming households combine agricultural and non-agricultural activities in response to available resources, economic opportunities and livelihood risks. Their access to productive assets and institutional support influences the types of activities they undertake and the welfare outcomes they achieve. Thus, the framework provides a basis for examining the livelihood diversification patterns of rural farming households and the conditions that shape their livelihood outcomes.

The Capability Approach, developed by Amartya Sen, provides a framework for understanding welfare, poverty and human development beyond income measures (Sen, 1999). The theory views poverty as deprivation of the basic capabilities and freedoms required by individuals to achieve the kinds of lives they value. These capabilities include opportunities to be educated, healthy, adequately nourished and socially included (Robeyns, 2021). It also recognizes that individuals and households differ in their ability to convert available resources into well-being because of personal, social, environmental and institutional circumstances. Consequently, households with similar income levels may experience different welfare outcomes depending on their access to education, healthcare, infrastructure and productive resources (Sen, 1999). The Capability Approach provides the principal theoretical foundation for measuring multidimensional poverty in this study. It supports the assessment of deprivation across health, education and living standards rather than relying exclusively on household income. The Alkire-Foster methodology operationalizes this multidimensional perspective by identifying households experiencing simultaneous deprivations across selected indicators and dimensions.

This study draws on the Sustainable Livelihoods Framework and the Capability Approach to explain the relationship between livelihood diversification and multidimensional poverty. The Sustainable Livelihoods Framework explains how household assets, vulnerability conditions and institutional factors influence livelihood choices, while the Capability Approach explains how the resources and opportunities arising from these choices relate to household well-being. Accordingly, access to livelihood assets and opportunities influences households' diversification strategies, while the returns from these activities may affect their ability to overcome deprivations in health, education and living standards. The relationship is therefore examined empirically using the Simpson Diversification Index as the measure of livelihood diversification, the Alkire-Foster methodology as the measure of multidimensional poverty, and Binary Logistic Regression to examine their association.

3.0. Methodology

3.1. Study Design and Data Source

This study adopted a quantitative research design and utilized secondary data obtained from the Nigeria General Household Survey Panel (GHS-Panel), Wave 5 (2024), conducted by the National Bureau of Statistics (NBS) in collaboration with the

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World Bank under the Living Standards Measurement Study–Integrated Surveys on Agriculture (LSMS-ISA) programme. The analysis focused on 3,004 rural farming households selected from the survey dataset based on their rural household classification and engagement in farming activities. The final analytical sample comprised 3,004 households, and all 3,004 observations were retained for the Binary Logistic Regression estimation. The study employed descriptive statistics, the Simpson Diversification Index, the Alkire–Foster methodology and Binary Logistic Regression to address the three specific objectives.

3.2. Method of Data Analysis

The analytical techniques adopted in the study were determined by the specific objectives. Descriptive statistics and the Simpson Diversification Index were used to examine the patterns and extent of livelihood diversification; the Alkire–Foster methodology was employed to estimate multidimensional poverty; while Binary Logistic Regression was used to examine the association between livelihood diversification and multidimensional poverty status. Descriptive statistics, including frequencies, percentages, means and standard deviations, were used to summarize the socioeconomic characteristics of the farming households and identify the livelihood activities in which they participated. These measures also provided an overview of the distribution of livelihood activities among the households. The Simpson Diversification Index was employed to measure the extent of livelihood diversification among farming households. The index accounts for the distribution of household income across different livelihood activities and measures the degree to which households depend on multiple income sources. The index was specified as:

$$SDI_i = 1 - \Sigma_{j=1}^{\eta} P_{ij}^2 \quad (1)$$

SDI = Simpson Index of Diversification; P_i = Proportion of income derived from the i^{th} household activity; η = Number of livelihood activities engaged in by the households. The index ranges from zero to a value approaching one. A value of zero indicates complete specialization in one livelihood activity, while a higher value indicates a more diversified distribution of household income across livelihood activities. The index was used to examine the extent of livelihood diversification among the sampled farming households in line with the first objective. The Alkire–Foster (AF) methodology was employed to estimate the multidimensional poverty status of rural farming households in Nigeria. The approach identifies poverty by considering simultaneous deprivations experienced by households across education, health and living standards. The household was used as the unit of analysis, and eight indicators were selected across the three dimensions. The dimensions were equally weighted, while indicators within each dimension were assigned equal weights.

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Table 1. Dimensions, Indicators, Deprivation Criteria and Weights of the Multidimensional Poverty Index

Dimensions	Indicators	Deprivation Criterion	Weight
Education	Education	A household is deprived if no member aged 15 years or above has completed at least six years of schooling, or a school-age child is not attending school.	1/3
Health	Health access	A household is deprived if the nearest health facility is more than 30 minutes away on foot.	1/3
Living standards	Cooking fuel	A household is deprived if it primarily uses wood, charcoal, dung or other traditional solid fuels for cooking.	1/18
Living standards	Sanitation	A household is deprived if it does not have access to an improved sanitation facility or uses an improved facility shared with other households.	1/18
Living standards	Drinking water	A household is deprived if it does not have access to an improved source of drinking water.	1/18
Living standards	Electricity	A household is deprived if it has no access to electricity.	1/18
Living standards	Housing	A household is deprived if its dwelling has inadequate housing materials, such as natural or rudimentary materials for the roof, walls or floor.	1/18
Living standards	Assets	A household is deprived if it does not own a car or truck and owns fewer than two of the specified household assets.	1/18
Total	8 indicators		1.00

Source: Adapted from the study's MPI specification and Alkire–Foster methodology

The three dimensions were assigned equal weights of one-third each. Since education and health were each represented by one composite indicator in the eight-indicator specification, each received a weight of one-third. The six living-standard indicators shared the one-third weight assigned to that dimension, giving each indicator a weight of one-eighteenth. This weighting structure ensures that the total indicator weights sum to one. The deprivation status of each household was first determined for the eight indicators. A household's weighted deprivation score was then calculated by summing the weights of all indicators in which it was deprived. The poverty identification cut-off was set at (k=0.333). Consequently, a household was classified as multidimensionally poor if its weighted deprivation score was equal to or greater than 0.333, while a household with a score below 0.333 was classified as multidimensionally non-poor. Following Alkire and Foster, the multidimensional poverty measures were estimated as follows:

$$H = {}^{q}/_{N} \quad (2)$$

Average Intensity of Poverty (A):

$$A = \Sigma_{i=1} {}^{q_{ci}}/_{q\ x\ d} \quad (3)$$

Multidimensional Poverty Index (MPI):

$$MPI = M_0 = \text{H x A} \quad (4)$$

Where

q = number of multidimensionally poor households;

N = total number of households;

(ci) = weighted deprivation score of poor household (i);

d = total number of indicators (eight);

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H = multidimensional poverty headcount ratio;
A = average intensity of deprivation among multidimensionally poor households; and
M_0 = adjusted headcount ratio or Multidimensional Poverty Index.
The contribution of each deprivation indicator to the overall MPI was also examined to identify the relative importance of the different sources of deprivation. The percentage contribution of indicator (j) was calculated as:

$$C_j = (W_j \text{ x } {h_j^c}/{M_0}) \, x \, 100 \qquad (5)$$

Where:
(C_j) = percentage contribution of indicator (j) to the MPI; (w_j) = weight assigned to indicator (j); (h_j^c) = censored headcount ratio of indicator (j); and (M_0) = Multidimensional Poverty Index.
The censored headcount ratio captures the proportion of all households that are both multidimensionally poor and deprived in a particular indicator. This decomposition identifies the indicators contributing most to multidimensional poverty among the sampled farming households.

Binary Logistic Regression was employed to examine the association between livelihood diversification and multidimensional poverty status among rural farming households in Nigeria. The model was considered appropriate because the dependent variable was binary, distinguishing between households classified as multidimensionally poor and those classified as multidimensionally non-poor. The dependent variable was defined as Y_i = 1, if household i is multidimensionally poor; 0, if household i is multidimensionally non-poor. The probability of a household being multidimensionally poor was specified as:

$$P(Y_i - 1) = {1}/{[1 + \exp(-Z_i)} \qquad (6)$$

Where:

$$Z_i = \beta_0 + \beta_1 SDI_i + \Sigma_{j=2}^{k} \beta_j X_{ji} \qquad (7)$$

The model can also be expressed as:

$$Z_i = \beta_0 + \beta_1 SDI_i + \beta_2 Age_i + \beta_3 Sex_i + \beta_4 HHS_i + \beta_5 Education_i + \beta_6 NFE_i + \beta_7 DR_i + \beta_8 Farmsize_i + \beta_9 Plots_i + \beta_{10} Remittance_i + \beta_4 Training_i + \beta_4 Shock_i + \Sigma_r Region_{ri} \qquad (8)$$

Where:
$P(Y_i{=}1)$ = probability that household (i) is multidimensionally poor;
SDI_i = Simpson Diversification Index of household (i), representing the principal explanatory variable;
Age_i = age of the household head;
Sex = sex of the household head;
HHS_i = household size;
$Education_i$ = educational attainment of the household head;
NFE_i = participation in non-farm enterprises;
DR_i = household dependency ratio;
$Farmsize_i$ = size of cultivated farmland;
$Plots_i$ = number of farm plots cultivated;
$Remittance_i$ = receipt of remittances by the household;
$Training_i$ = participation in agricultural training;
$Shock_i$ = experience of agricultural shocks;
$Region_{ri}$ = geopolitical-zone dummy variables;
β_0 = intercept; (β_1,….. β_{12}) and (γ_r) = parameters to be estimated; and
k = number of explanatory variables in the model.
The estimated marginal effects were used to establish the direction and magnitude of the association between the explanatory variables and the probability of multidimensional poverty. In particular, a negative marginal effect of the Simpson Diversification Index indicates that an increase in livelihood diversification is associated with a lower predicted probability

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of a household being multidimensionally poor, holding other explanatory variables constant. A positive marginal effect indicates an association with a higher predicted probability. The model was estimated using all 3,004 sampled households.

4. Results and Discussion

4.1 Patterns and extent of livelihood diversification among rural farming households in Nigeria

Table 2 presents the livelihood activities undertaken by farming households in the study area. Agricultural wage labour was the most commonly reported activity (69.97%), followed by self-employment (65.95%), fishing (48.30%), crop farming (40.91%), petty trading (37.68%), remittances (27.30%), non-agricultural wage labour (26.73%) and livestock production (23.80%). The prominence of agricultural wage labour relative to crop farming indicates that participation in agricultural livelihoods extends beyond the cultivation of household-owned farms. Members of farming households may combine activities on their own farms with paid agricultural work on other farms to supplement household income. Thus, being classified as farming household does not necessarily imply that every economically active member works exclusively on the household's farm. The percentages exceed 100% because respondents could report more than one livelihood activity. The results therefore represent the proportion of households participating in each activity rather than mutually exclusive livelihood categories. The prevalence of agricultural wage labour and self-employment reflects the importance of combining different income-generating activities among rural households.

Table 2: Distribution of Farming Households by Livelihood Diversification Activities

Livelihood diversification activity	Frequency	(%)
Crop farming	1229	40.91
Livestock production	715	23.80
Agricultural wage labour	2102	69.97
Non-agricultural wage labour	803	26.73
Self-employment	1981	65.95
Fishing	1451	48.30
Petty trading	1132	37.68
Remittance	820	27.30

Source**:** Computed from GHS Wave 5 data, 2026
*Multiple Responses

The extent of livelihood diversification was measured using the Simpson Diversification Index (SDI). The results in Table 3 show a mean SDI of 0.62, with a standard deviation of 0.264 and observed values ranging from 0 to 0.875. The mean value indicates that farming households generally combined several livelihood activities rather than depending entirely on a single source of livelihood. An SDI of zero represents complete concentration in one activity, whereas values approaching one indicate greater diversification across activities. The standard deviation and observed range further show that diversification varied considerably across households. While some households depended predominantly on one livelihood activity, others spread their economic activities across several sources. The mean SDI should therefore be interpreted as an overall measure of diversification and not as evidence that every household had the same level of livelihood diversification.

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Table 3: Simpson Diversification Index among Farming Households

Variable	Mean	Std. Deviation	Minimum	Maximum
Simpson Diversification Index (SDI)	0.62	0.264	0.000	0.875

Source: Computed from GHS Wave 5 data, 2026

4.2. Multidimensional Poverty Status of the Farming Households

Table 4 presents the multidimensional poverty status of the sampled farming households. Out of the 3,004 households examined, majority (82.69%) were classified as multidimensionally poor, while 17.31% were non-poor. This indicates that a substantial proportion of farming households experienced simultaneous deprivations in the selected dimensions of wellbeing. The high incidence demonstrates that poverty among the households extends beyond inadequate income and includes limitations in access to essential human development and living-standard conditions.

The multidimensional poverty status of the farming households is presented in Table 4. The result shows that the majority (82.69%) of the farming households were multidimensionally poor, while 17.31% of the respondents were multidimensionally non-poor. This indicates that a substantial proportion of farming households experienced simultaneous deprivations in the selected dimensions of wellbeing. The high incidence demonstrates that poverty among the households extends beyond inadequate income and includes limitations in access to essential human development and living-standard conditions.

Table 4: Multidimensional Poverty Status of the Farming Households

Multidimensional Poverty Status	Frequency	%
Multidimensionally Poor	2484	82.69
Multidimensionally Non-poor	520	17.31
Total	3004	100.00

Source: Computed from GHS Wave 5 data, 2026

The Alkire–Foster results in Table indicate a multidimensional poverty incidence (H) of 82.69%, an intensity of poverty (A) of 66.01% and an adjusted multidimensional poverty index (MPI) of 0.546. The incidence represents the proportion of households identified as multidimensionally poor, while intensity measures the average proportion of weighted indicators in which poor households are deprived. The intensity result therefore indicates that poor households experienced, on average, deprivation in approximately 66.01% of the weighted indicators. The MPI of 0.546 reflects the joint effect of the high incidence and intensity of poverty. It is approximately the product of the headcount ratio and intensity of poverty (0.8269 × 0.6601). The result shows that multidimensional poverty among the sampled farming households is both widespread and characterized by overlapping deprivations. Such conditions may constrain household welfare, human capital development and the capacity of farming households to sustain productive agricultural and non-agricultural activities.

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Table 5: Incidence, Intensity and Multidimensional Poverty Index among Farming Households in Nigeria (33.3% Cut-off)

Measure	Value
Number of observations	3,004
Poverty cutoff (k)	1/3
Multidimensionally poor households, H (%)	82.69
Average deprivation intensity among the poor, A (%)	66.01
Multidimensional Poverty Index, MPI (M_0)	0.546

Source: Computed from GHS Wave 5 data, 2026

Table 6 presents the relative contributions of the eight indicators to multidimensional poverty. Health contributed the largest share (37.67%), followed by education (32.35%). Together, these two indicators accounted for 70.02% of total multidimensional poverty. The remaining contributions were cooking fuel (7.43%), assets (6.83%), electricity (5.12%), housing (4.24%), sanitation (4.12%) and water (2.24%). The dominant contributions of health and education indicate that human-capital-related deprivations constitute the major components of multidimensional poverty among the sampled households. Limited access to adequate healthcare and educational opportunities can affect household wellbeing, labour productivity and the ability to adopt improved agricultural practices. The combined contribution of these two indicators therefore demonstrates that poverty reduction among farming households requires attention not only to income-generating opportunities but also to improvements in health and education. This result is consistent with the study Amao *et al.* (2017) who identified education and health as important components of rural multidimensional poverty, although their study found living conditions to have the largest contribution.

Table 6: Relative Contribution of Indicators to Multidimensional Poverty

Dimensions/Indicators	Percentage Contribution (%)
Health	37.67
Education	33.35
Cooking fuel	7.43
Assets	6.83
Electricity	5.12
Housing	4.24
Sanitation	4.12
Water	2.24
Total	100.00

Source: Author's computation using GHS Data, 2026

4.3. Effect of Livelihood Diversification on Multidimensional Poverty among Farming Households: Binary Logistic Regression Results

The binary logistic regression model was employed to examine the relationship between livelihood diversification and multidimensional poverty status among farming households. The dependent variable was coded as 1 for multidimensionally poor households and 0 for multidimensionally non-poor households. Average marginal effects are reported to express the estimated relationships in probability terms. The estimation retained 3,004 observations. The SDI result is central to the objective. Using the negative marginal effect of −0.1295 as the verified estimate, livelihood diversification has a negative and statistically significant relationship with the probability of multidimensional poverty. This implies that greater diversification is associated with a lower probability of a household being multidimensionally poor. A one-unit increase in SDI corresponds to an estimated 12.95 percentage-point reduction in the probability of multidimensional poverty. However, because the observed

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SDI ranged from 0 to 0.875, a full one-unit increase is relatively large compared with the variation observed in the sample and should not be presented as a typical household-level change. For practical interpretation, a 0.1-unit increase corresponds approximately to a 1.30 percentage-point reduction in the predicted probability, using the estimated marginal effect as a local approximation.

Age of the household head had a positive and statistically significant marginal effect, indicating that an increase in the age of the household head was associated with a higher probability of multidimensional poverty. Years of education had a negative and statistically significant effect, showing that additional years of schooling were associated with a lower probability of poverty.

Participation in non-farm enterprises, livestock production and agricultural training also had negative and statistically significant marginal effects. These results indicate that households participating in non-farm enterprises and livestock production, as well as those whose members received agricultural training, had lower predicted probabilities of multidimensional poverty, holding the other included variables constant. Remittance had a negative marginal effect but was statistically significant only at the 10% level ($p = 0.082$). It should therefore be interpreted as weak evidence of an association rather than as a result significant at the conventional 5% level.

The marginal effects of sex of household head, marital status, household size, dependency ratio, farm size, number of plots, extension contact and agricultural shocks were statistically insignificant. This means that the model did not provide sufficient evidence that these variables were independently associated with the probability of multidimensional poverty at the 10% significance level, conditional on the other included variables. Their insignificant estimates should not be interpreted as proof that these characteristics have no relevance to household welfare.

The regional estimates were interpreted relative to North-Central, the omitted reference category. The marginal effects for North-East, North-West and South-South were negative and statistically significant, indicating lower predicted probabilities of multidimensional poverty relative to North-Central. The estimates for South-East and South-West were statistically insignificant. These differences point to geographical variation in the poverty experiences of farming households. The pattern is broadly consistent with national evidence documenting substantial spatial disparities in multidimensional poverty across Nigeria, particularly between northern and southern parts of the country (National Bureau of Statistics, 2022; World Bank, 2022). However, the regional estimates in this study should be interpreted as conditional differences and do not, by themselves, establish the reasons for those differences.

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Table 7: Binary Logistic Regression Showing the Effect of Livelihood Diversification on Multidimensional Poverty Status among Farming Households

Multidimensional Poverty Status	dy/dx	Standard Error	Z	P>/Z/
Livelihood diversification index	-0.1295	0.0229	-5.64	0.000***
Age	0.0009	0.0004	2.25	0.024**
Sex of the household head	-0.0181	0.0243	-0.75	0.456
Marital status	-0.0141	0.0225	-0.63	0.531
Years of education	-0.0296	0.0010	-28.20	0.000***
Non-farm enterprises	-0.2128	0.0621	-3.43	0.001***
Livestock production	-0.0416	0.0155	-2.68	0.007***
Remittance	-0.0260	0.0149	-1.74	0.082*
Household size	-0.0003	0.0033	-0.09	0.926
Dependency ratio	0.0013	0.0033	0.40	0.686
Farm size	-0.0018	0.0022	-0.81	0.419
Number of plots	0.0000	0.0065	0.01	0.989
Extension contact	0.0101	0.0134	0.75	0.451
Agricultural training	-0.1581	0.0434	-3.64	0.000***
Agricultural shocks	0.0164	0.0136	1.20	0.229
North-East	-0.1000	0.0204	-4.90	0.000***
North-West	-0.0877	0.0201	-4.37	0.000***
South-East	-0.0059	0.0203	-0.29	0.773
South-South	-0.0737	0.0215	-3.43	0.001***
South-West	0.0075	0.0266	0.28	0.778

Note: *, ** and *** represent significance at 10%, 5% and 1%, respectively.
Source: Author's computation using LSMA-ISA (GHS-Panel Wave 5), 2026

5. Conclusion and Policy Implications

The study examined the patterns, extent and effects of livelihood diversification on multidimensional poverty among farming households in rural Nigeria, using secondary data from the General Household Survey (GHS) Wave 5 supplied by the National Bureau of Statistics. A total of 3,004 farming households were covered in the analysis. Descriptive statistics, the Simpson Diversification Index (SDI), the Alkire-Foster method and Binary Logistic Regression were employed in line with the three research objectives. The first objective examined the livelihood diversification activities and the extent of diversification among farming households. The findings showed that agricultural wage labour, self-employment, fishing and crop farming were among the most prevalent livelihood activities, while the mean number of activities was 3.41. The mean SDI of 0.62, with values ranging from 0.000 to 0.875, further indicated substantial variation in livelihood diversification across households. The result demonstrates that farming households commonly combined agricultural and non-agricultural activities as part of their livelihood strategies. The second objective assessed the multidimensional poverty status of farming households. The findings revealed that 82.69% of the households were multidimensionally poor, with an average deprivation intensity of 66.01% and an MPI of 0.546 at the 33.3% poverty cut-off. Health and education accounted for the largest shares of household deprivation, indicating that these dimensions constitute major components of multidimensional

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poverty among farming households. The third objective examined the effect of livelihood diversification and other socioeconomic factors on multidimensional poverty. The findings showed that livelihood diversification was negatively associated with the probability of multidimensional poverty, with a marginal effect of −0.1295 ($p < 0.01$). Years of education, non-farm enterprise participation, livestock production and agricultural training also reduced the predicted probability of multidimensional poverty. Remittance had a negative marginal effect and was statistically significant only at the 10% level ($p = 0.082$). Age was positively associated with multidimensional poverty, while significant regional differences were observed relative to the North-Central region. Overall, the findings indicate that livelihood diversification and selected household socioeconomic characteristics are important factors associated with multidimensional poverty among farming households in rural Nigeria.

The study concludes that livelihood diversification is an important strategy for reducing multidimensional poverty among farming households in rural Nigeria. However, the high level of poverty, particularly health and education deprivations, requires integrated interventions. The study therefore recommends improved rural healthcare and educational opportunities, support for viable non-farm enterprises and livestock value chains, strengthened agricultural training and extension services, and better access to productive resources and rural infrastructure. These interventions will enhance livelihood opportunities and improve household welfare. The study contributes to knowledge by linking the extent of livelihood diversification, measured using the Simpson Diversification Index, with overlapping welfare deprivations measured through the Alkire–Foster method, thereby providing empirical evidence on how livelihood diversification relates to multidimensional poverty beyond conventional income-based assessments.

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