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EVALUATION OF LIVELIHOOD DIVERSIFICATION STRATEGIES AS A PANACEA TO POVERTY REDUCTION AMONG RURAL FARMING HOUSEHOLDS IN ADAMAWA STATE, NIGERIA

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ABSTRACT

This study examines the evaluation of livelihood diversification strategies as a means to alleviate poverty among farming households in Adamawa State. It explores the nature and extent of livelihood diversification activities among rural farming households usingdiversification indexand Simpsons Index of Diversity (SID), assesses poverty indices using the Foster-Greer-Thorbecke (FGT) measures, and tests the relationship between livelihood activities and poverty status using Pearson's correlation. Data was collected from 270 rural farming households.Findings reveal that agriculture remains the primary income source for rural households, but diversification across both agricultural and non-agricultural sectors is crucial for income stability. Despite challenges such as the removal of fuel subsidies, diversification helps mitigate income fluctuations and reduce poverty incidence. The poverty indices indicate a significant proportion of farming households are poor, with factors like large household sizes and economic challenges exacerbating severe poverty. Moreover, the study finds a positive correlation between livelihood diversification and reduced poverty likelihood. These results underscore the importance of promoting diversified livelihood strategies to enhance household resilience and alleviate poverty in rural areas.Based on the study findings, policymakers and development practitioners should prioritize interventions that support and enhance livelihood diversification among rural farming households in Adamawa State. Furthermore, there is a need for continued research and monitoring of poverty trends to assess the effectiveness of interventions. Long-term strategies should be developed to promote sustainable livelihoods and reduce dependency on agriculture.

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INTRODUCTION

Diversification is a risk management strategy that involves investing in a variety of assets within a portfolio. The rationale behind this approach suggests that a portfolio diversified across different types of investments will, on average, yield higher returns and pose a lower risk than any individual investment within the portfolio. In developing countries, diversification is a crucial tool for poverty reduction. Rural populations in Africa, particularly in Nigeria, have diversified their economic activities to include a range of income-generating activities beyond farming (Idowu *et al.*, 2014).

Livelihood diversification refers to households increasing the number of economic activities they engage in to improve their income (Zhao & Barry, 2013). It can involve increasing the number of income sources, stabilizing existing sources, switching from subsistence farming to commercial agriculture, or diversifying into higher-value crops, livestock, and non-farm activities (Ijaiya *et al.*, 2010; Ibrahim & Onuk, 2009). The goal of livelihood diversification among rural farmers is to enhance their standard of living (Senadza, 2014).

In Nigeria, despite being an agrarian country with about 70% of the labor force engaged in agriculture, many rural households rely on both on-farm and off-farm activities to supplement their income (Chauvin *et al.*, 2012). Agriculture in Nigeria is characterized by small-scale, subsistence farming, but it remains a critical sector, producing 80% of the country's food (Chauvin *et al.*, 2012). The country's varied climate allows for the cultivation of a wide range of agricultural produce (Olayemi *et al.*, 2012).

Poverty, on the other hand, is defined as the inability to achieve a minimum standard of living, including access to basic human needs such as food, shelter, water, healthcare, education, and employment opportunities (Ike & Uzokwe, 2015). Income is a key determinant of poverty, as those with insufficient income to meet these basic needs are considered poor.

Despite the importance of diversification in rural economies, little is known about the specific role it plays in income generation among rural households in developing countries like Nigeria (Ibekwe *et al.*, 2010). Understanding the factors influencing household-level diversification choices is crucial for designing effective poverty reduction and food security policies.

In conclusion, rural non-farm sectors are expanding in developing countries, driven in part by declining trends in agricultural production. This has led to increased livelihood diversification among rural populations (Lencucha *et al.*, 2020). This study analyzes the strategies of livelihood diversification among rural farming households in Adamawa State, Nigeria, and assesses their impact on poverty reduction using indicators such as household food and non-food expenditure.

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The methodology employed in this study involved a mixed-method approach, combining both quantitative and qualitative techniques. A structured questionnaire was used to collect quantitative data from 270 rural farming households selected through a multistage sampling technique. The questionnaire covered various aspects, including household demographics, income sources, assets, and expenditure patterns.

In addition to the quantitative survey, qualitative data were gathered through focus group discussions (FGDs) and key informant interviews (KIIs). FGDs were conducted with selected community members to gain insights into the perceptions and experiences of livelihood diversification. KIIs were held with key stakeholders, including agricultural extension officers and community leaders, to gather expert opinions and additional insights.

Data analysis was conducted using statistical software for quantitative data, including descriptive statistics and inferential analysis. Qualitative data from FGDs and KIIs were analyzed thematically to identify key themes and patterns related to livelihood diversification and its impact on poverty reduction.

Overall, the combination of quantitative and qualitative methods provides a comprehensive understanding of livelihood diversification strategies and their effectiveness in reducing poverty among rural farming households in Adamawa State."

Problem Statement

In Adamawa State, Nigeria, where agriculture is the primary livelihood for residents, economic diversification through crop production, animal husbandry, and off-farm activities has been a common strategy to alleviate poverty. Despite the widespread adoption of livelihood diversification, rural areas in sub-Saharan Africa, including Adamawa State, have not experienced the expected economic growth. This lack of significant improvement in living standards is evident from the recent National Bureau of Statistics report, which states that 40% of Nigerians live below the poverty line.

Various poverty alleviation programs and policies, such as the Agricultural Development Programmes, National Agriculture and Land Development Authority, and Strategic Grains Reserves Programmes, have been implemented by successive Nigerian governments. However, these initiatives have not made a substantial impact on poverty reduction, primarily due to corruption and ineffective targeting of beneficiaries.

This study aims to evaluate the role of on-farm and off-farm employment in reducing poverty among rural farming households in Adamawa State. Non-farm income is often reinvested in agricultural technology, highlighting its importance in enhancing farm productivity. Despite the

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global and national focus on income diversification to alleviate rural poverty, many rural households continue to live in poverty.

There is a notable gap in understanding the extent of engagement in various livelihood activities by rural farming households. Factors such as limited access to land, market failures for credit and insurance, and the need to diversify risks and seek liquidity for agriculture could be driving forces behind the pursuit of non-farm activities. To formulate effective policies for poverty reduction, it is essential to assess the impact of livelihood diversification strategies on rural farming households in Adamawa State. These study therefore, attempts to achieve the following objectives:To describe the level of diversification of livelihood activities by the respondents, determine the poverty status of the respondents in the study area and determine the relationship between livelihood activities and the poverty status of households in the study area.In Adamawa State, rural farming households face a myriad of challenges that hinder their ability to escape poverty. These challenges include:

1. Limited Access to Land: Land scarcity is a significant issue, as population growth and urbanization reduce the availability of arable land. Many rural farmers have insufficient land for cultivation, limiting their productivity and income potential.

2. Market Failures: Poor infrastructure, including roads and storage facilities, contribute to market failures in rural areas. Farmers often struggle to transport their produce to markets and suffer from price fluctuations and exploitative middlemen.

3. Economic Constraints: Rural farmers in Adamawa State face economic challenges such as high input costs, limited access to credit, and lack of financial literacy. These constraints impede their ability to invest in modern farming techniques and diversify their livelihoods.

4. Climate Change and Environmental Degradation: Erratic weather patterns, exacerbated by climate change, pose a serious threat to agricultural productivity. Farmers often lack the resources and knowledge to adapt to these changes, leading to crop failures and loss of income.

5. Limited Access to Education and Information: Many rural farmers have low levels of education and limited access to information on modern farming practices, market trends, and government policies. This lack of knowledge hinders their ability to improve their farming methods and access support programs.

6. Inadequate Infrastructure: Poor infrastructure, such as lack of access to electricity, clean water, and healthcare, affects the well-being of rural farming households and limits their productivity and ability to engage in alternative livelihoods.

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7. Social and Cultural Factors: Gender inequalities, traditional farming practices, and social norms can also limit rural farmers' ability to diversify their livelihoods and improve their economic status.

These challenges underscore the need for effective strategies to diversify rural farming households' livelihoods and reduce their reliance on agriculture as the sole source of income.

MATERIAL AND METHODS

The Study Area

The study was conducted in Adamawa State, Nigeria, located in the northeastern part of the country between Latitudes 7^0 and 11 ^{0}N of the equator and Longitudes 11^0 and 14^0 E of the Greenwich Meridian. It shares borders with Taraba State to the south and west, Gombe State to the northwest, and Borno State to the north, with an international boundary with Cameroon along its eastern border (Figure 3.1). Adamawa State covers a land area of 38,741 square kilometers with a population of 3,175,950 according to the 2006 national census. It is divided into twenty-one (21) Local Government Areas.

The state has a tropical climate characterized by dry and rainy seasons. The rainy season typically starts in April and ends in October, while the dry season starts in November and ends in April. Mean monthly temperatures range from 26.7oC in the south to 27.82oC in the northeast. The mean annual rainfall ranges from 700 mm in the northwest to 1600 mm in the southeast, with a general mean annual rainfall of less than 1000 mm in the central and northwest parts, and over 1000 mm in the northeast and southern parts.

The soils in Adamawa State are classified as ferruginous tropical soils with horizons containing an abundance of free oxides, typically deposited as yellow or red concretions. The vegetation comprises Southern Guinea savannah, northern Guinea savannah, and Sudan savannah types (National Population Census [NPC], 2007; Adebayo, 2020).

Agriculture is the major occupation of the inhabitants, with major food crops including maize, sorghum, rice, groundnuts, cowpea, Bambara-groundnuts, yams, cassava, sugarcane, and cotton. Major livestock reared are cattle, sheep,pigs, paultry and goats. Other income-generating activities in the study area include fishing, hunting, trading, civil service, hairdressing/barbing, carpentry, and bricklaying (Adamawa State Economic and Development Strategy [ADSEEDS], 2004).

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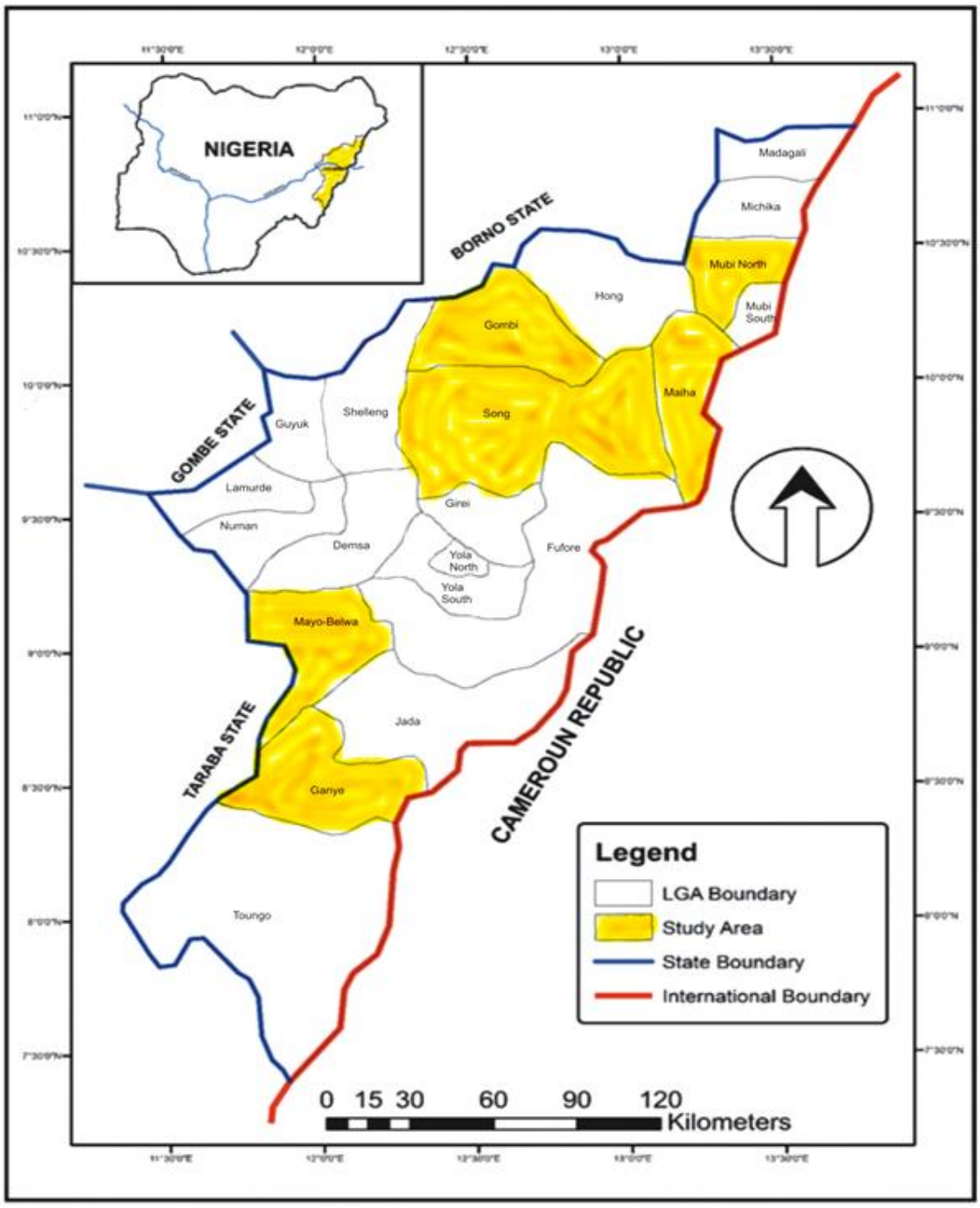

Figure 3.1: Map of Adamawa State Showing the study area in shaded portion

Source: Adamawa State in Maps: Adebayo, 2020.

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Source and Method of Data Collection

The data used for the study was from primary sources. The primary data was collected with the use of structure questionnaire and interview schedule which was administered on rural households in the study area. Other relevant information especially literatures were obtained from journals, conference proceedings, periodicals and textbooks, published and unpublished thesis.

Sampling technique

Multi stage sampling technique was employed in selecting respondents for the study. Adamawa State is divided into four agricultural zones of Agricultural Development Programme (ADP) namely Mubi Zone (Zone 1), Gombi Zone (Zone 2), Mayo-Belwa Zone (Zone 3) and Guyuk Zone (Zone 4). In the first stage three out of the four agricultural zones was random selected. In the second stage two local government areas were randomly selected from each zone and one blocks each from local government was randomly selected. The third stage was the random selection of three cells from each blocks making a total of twenty-one cells. Finally, 270 rural farming household was randomly selected from the twenty-one cells proportionate to the number of the household in each cell. The sample for this study was drawn from the total population which was used to represent the entire population in such a way that the information gotten about the whole population. However, the Yamane (1967) formula was used to determine the sample size of the study.

$$n = \frac{N}{1 + N\left(e\right)^2} \quad (1)$$

Where:

n = Sample size

N = Population size

e = Level of precision of sampling of error; which is ± 5%

Level of precision = 5% was used

Confidence level = 95% was used

Degree of Variability = 5% was used

Using the total population of selected Sample frame of 831 and error margin of 0.05, the sample size was calculated as follows.

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$$n = \frac{831}{1+831(0.05^2)} = 270$$

Hence, sample size of 270 was taken.

Method of Data Analysis

The tools that used in analysing the results of the research include inferential statistics such as diversification index, Foster-Greer-Thorbeeke (FGT) and Pearson correlation was used to test the hypothesis.

Diversification Index

The pattern of diversification strategies that will be adopted by farming households in the study area was analysed using diversification index. To measure income diversification, the on-farm and off-farm income share in total household income was used, together with a transformation of the Herfindahl index referred to as the Inverse Herfindahl Index (IHI). The IHI has the advantage of estimating both the number of household income sources and the contribution of each income source to total household income (Aihonsu *et al.*, 2011; Ersado, 2006; Patil & Taillie, 1982; Zhao & Barry, 2013). The IHI ranges from one (where a household is highly specialized with complete dependence on a single income source) to the maximum possible diversity of income sources (highly diversified). It rises with increasing number of income sources and its value is maximized for a given number of income sources when all income sources are equally distributed. The index measures income diversification as an increasing mix of income sources away from complete dependence on a single source.

The diversification index is derived as the inverse of the herfindahl index. Following Kaija (2007) and Idowu *et al.* (2011);

$$D = \frac{1}{Hefindahl\ index} = \frac{1}{\sum_{i=1}^{n} S_i^2} \qquad (2)$$

Where D is the diversification index and S_i^2 represent the share of the total income source i in total income while n is the total number of the income sources.

The Simpsons Index of Diversity (SID) was used in this study to estimate the degree of income diversification among rural households. The SID takes into consideration both the number of income sources as well how evenly the distributions of the income between the different sources are (Minot *et al.*, 2006; Joshi *et al.*, 2003). This reason justifies the choice of the SID as applied in this study over other measures of diversification such as the Herfindahl, Shannon etc. The SID

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ranges between Zero (0) and One (1). Thus, 0 denotes specialization and 1 the extremity of diversification. The more the SID value is closer to one, the more diversified the household is.

The SID general formula is given as:

$$SID = \sum_{i=1}^{n} P_i^2 \qquad (3)$$

Where: SID = Simpson Index of Diversity, *n* = number of income sources, *Pi* = Proportion of income coming from the source *i*, the value of SID ranges from Zero (0) to One (1), however, if there is only one source of income, P*i* =1, then SID = 0.

The SID model is expressed as:

$$SID = 1 - \sum_{i=1}^{8}\left[\left(\frac{cpi}{thi}\right)^2 + \left(\frac{livsti}{thi}\right)^2 + \left(\frac{fwi}{thi}\right)^2 + \left(\frac{nfwi}{thi}\right)^2 + \left(\frac{sei}{thi}\right)^2 + \left(\frac{csi}{thi}\right)^2 + \left(\frac{rei}{thi}\right)^2 + \left(\frac{othersi}{thi}\right)^2\right] \qquad (4)$$

Where: *cpi* = Crops income (Naira)

livsti = Livestock income (Naira)

fwi = farm wage income (Naira)

nfwi = Non-farm wage income (Naira)

sei = self-employment income (Naira)

csi = civil service income (Naira)

rei = remittance income (Naira)

thi = Total household income (Naira)

othersi = other income sources (Naira), such as carpentry, brick laying, barbing, tailoring, butchery, mechanic, grinding, trade and revenue on leasing out land/rent.

This was used to achieve objective iii of the study.

Foster-Greer-Thorbecke (FGT)

The study employed the popular FGT measures of poverty to assess the poverty status of farming households in the study area. The FGT measures are widely used in poverty analysis and help determine the extent and severity of poverty.

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In this study, the poverty status of farmers was evaluated based on their consumption and expenditure patterns resulting from livelihood diversification. The poverty line, which separates the poor from the non-poor, was used to classify the households.

The calculation of the poverty line involved two main components: food consumption/expenditure and non-food consumption/expenditure. It is well known that as individuals become poorer, a higher proportion of their overall expenditure is spent on food. Therefore, the study focused on determining a food poverty line, which is the minimum level of food consumption/expenditure required for subsistence.

To calculate the total poverty line, a non-food minimum allowance was added to the food poverty line. This total poverty line was used to determine the magnitude and intensity of poverty among the farming households in the study area.

The Foster-Greer-Thorbecke (FGT) (1984) indices was used to measure the magnitude, depth and severity of poverty. The P_α class of poverty according to Foster *et al.* (1984) can be addressed in respect of poverty incidence $(\alpha = 0)$; depth of poverty $(\alpha = 1)$; and severity of poverty $(\alpha = 2)$, the higher the value of α, the greater the weight given to the severity of poverty. For $\alpha = 0$, FGT reduces to headcount ratio (H) and when $\alpha = 1$, it reduces to poverty gap and if $\alpha = 2$, we have poverty severity index.

Following Greene (2003) as well as Adigun *et al.*(2015) and Dia *et al.* (2022) general class of a poverty measure which combines these three characteristics of poverty can be written as:

$$P_\alpha(y, z) = \frac{1}{n}\sum_{i=1}^{q}\left(\frac{z - y_i}{z}\right)^\alpha \quad (3)$$

Where:

$n =$ Total number of households in a population

$q =$ The number of poor households

$z =$ The poverty line (Naira)

$y_i =$ Household per capita expenditure (Naira)

$\alpha =$ Poverty aversion parameter and takes values, 0, 1, 2

$\left(\frac{z - y_i}{z}\right)$ = Proportionate shortfall in income below the poverty line

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α takes on the value 0, 1, 2, to determine the type of poverty index.

When $\alpha = 0$, the expression reduces to

$$P_o = \left(\frac{1}{n}\right)q = \left(\frac{q}{n}\right) \quad (4)$$

Where:

P_o = poverty incidence

$n =$ total number of households in a population

$q =$ the number of poor households

This is referred to as the Headcount Ratio (poverty incidence) describing the proportion of the population that falls below the poverty line. This measure gives equal weight to all poor irrespective of the intensity of their poverty. The headcount ratio has been criticized for focusing only on the number of the poor being insensitive to the severity of poverty and changes below the poverty line. That is, it treats all the poor equally whereas not all the poor are equally poor. Also, neither a transfer from the less poor to poorer, nor a poor person becoming poorer would register in the index, since the number of the poor would not have changed.

Where $\alpha = 1$, the expression in the equation (equation 4) reduces to:

$$P_1 = \frac{1}{n}\sum_{i=1}^{q}\left(\frac{z - y_i}{z}\right) \quad (5)$$

Where:

P_1 = poverty gap

$n =$ total number of households in a population

$q =$ the number of poor households

$z =$ the poverty line (Naira)

$y_i =$ expenditure of the poor household less than the poverty line (Naira)

And this is called Poverty Gap (depth of poverty) each poor is weighed by his or her distance from the poverty line, relative to z.

Where $\alpha = 2$, the expression now becomes

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$$P_2 = \frac{1}{n}\sum_{i=1}^{q}\left(\frac{z-y_i}{z}\right)^2 \quad (6)$$

Where:

P_2 = poverty severity

n = total number of households in a population

q = the number of poor households

z = the poverty line (Naira)

y_i = expenditure of the poor household less than the poverty line (Naira)

Equation (7) is called poverty severity index. In this measure, the weight given to each poor is proportional to the square of his or her income shortfall from the poverty line. This index weighs the poverty of the poorest individual more heavily than those just slightly below poverty line. This measure all the three indicators of the poverty stated earlier.

Testing of Hypothesis

Hypothesis was tested using Pearson correlation coefficient to measure a relationship between poverty status and livelihood activities. The correlation coefficient is a number that summarizes the direction and degree (closeness) of linear relations between two known variables. The correlation coefficient is also known as the Pearson Product-Moment Correlation Coefficient (PPMCC). Mathematically expressed as:

$$r = \frac{\sum XY - \frac{\sum X \sum Y}{n}}{\sqrt{\left[\sum X^2 - \frac{\left(\sum X\right)^2}{n}\right]\left[\sum Y^2 - \frac{\left(\sum Y\right)^2}{n}\right]}} \quad (13)$$

Where:

r = Pearson's correlation coefficient

n = number of paired scores

X = number of livelihood activities of the respondents

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Y = poverty status of the respondents

XY = the product of the two paired scores

To do this test, the null hypothesis was formulated against alternative hypothesis as follows:

H_o= Diversification of livelihood activities does not affect poverty status of the respondents

H_1 = Diversification of livelihood activities affect the poverty status of the respondents

The data will indicate which of these opposing hypotheses is most likely to be true. We can thus express this test as:

$$H_o: \rho = 0$$

$$H_1: \rho \neq 0$$

The pearson product-moment correlation coefficient can values between -1 through 0 to +1. If the value is near ± 1, then it is said to be perfect correlation, as one variable increases, the other tends to also increase (if positive) or decreases (if negative). That is if the correlation is positive when one variable increases so does the other. If the correlation is negative, when one variable increases the other variable decreases ,if it is zero it means there is no correlation at 95% degree of freedom.

RESULTS AND DISCUTIONS

Nature of Livelihood Diversification Activities

Overall, agriculture remained the primary source of income for rural farming households in the study area. This finding is consistent with previous studies by Oyewole *et al.* (2015), Dia *et al.* (2022), and Dia & Dia-Johnson (2023), which highlighted arable crop production as the main income source for rural households in Nigeria.

Farming households adopt a multifaceted approach to sustain their livelihoods, relying on a variety of activities within both the agricultural and non-agricultural sectors. This diversity is essential, as very few households solely depend on one activity. Instead, they leverage opportunities across farming and non-farming domains. The survey conducted revealed that all farming households reported supplementary income from non-farming endeavors, whether through formal employment or part-time engagements when not tending to agricultural duties.

The distribution of rural farming households, as depicted in Table 3, illustrates their engagement in various livelihood activities and the corresponding average annual incomes. Within on-farm activities, 98.52% of households were involved in arable cropping, yielding an average annual

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income of N652,392.99. Additionally, 56.30% engaged in livestock sales, earning an average of N392,380.36 annually.

Turning to non-farm activities, the data revealed a diverse range of pursuits. Notably, 19.26% of households were employed in civil service or the private sector, earning an average annual income of N437,644.17. Meanwhile, 16.30% were engaged in wage labor on other farms, earning N162,787.50 per year. Other notable activities included bricklaying (7.41% participation, average income N436,900.00), land leasing and property renting (7.04%, average income N167,345.86), tailoring (5.93%, average income N390,965.67), and barbing/hairdressing/plaiting (5.93%, average income N127,670.85), among others.

Agriculture remains the primary income source for rural farming households, consistent with previous studies by Oyewole *et al.* (2015), Dia *et al.* (2022), and Dia&Dia-Johnson (2023). These studies underscore the significance of arable crop production, predominantly subsistence-oriented, as the primary income generator for rural households in Nigeria.

Table 1: Distribution of the Respondents According to Nature of Livelihood Diversification and their Average Income Generating Capacity Per Annum

Livelihood Activities	Frequency*	Percentage	Average Annual income (₦)
Farm Activities			
Arable Cropping	266	98.52	652,392.99
Livestock Sales	152	56.30	392,380.36
Non-farm Activities			
Civil Service & Private Salaried	52	19.26	437,644.17
Wage on Agricultural labour on other people's farm	44	16.30	162,787.50
Revenue from renting out land	19	7.04	167,345.86
Trade	13	4.81	269,487.27
Carpentry	12	4.44	351,333.33
Tailoring	16	5.93	390,965.67
Remittances income	6	2.22	150,183.33

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Grinding	13	4.81	458,300.00
Mechanic	10	3.70	216,670.98
Butchery	15	5.56	236,670.83
Barbing /hair dressing / platting	16	5.93	127,670.85
Brick laying	20	7.41	436,900.00

Source: Field Survey, 2024

*Multiple Responses were allowed, Percentage total greater than 100

Degree of Livelihood Diversification

Table 4 presents the extent of livelihood diversification among rural farming households in the study area, indicating the number of different activities these households engage in to sustain their livelihoods. The results as presented in table 4 indicate that a significant majority (59.60%) of the rural farming households have a low level of diversification, depending on no more than two sources of livelihood. In contrast, 30.40% of these households show a moderate level of diversification, relying on three sources of livelihood. Only a small proportion, 8.9%, exhibit no diversification, depending solely on one source of livelihood, while a mere 1.1% are highly diversified, depending on more than three sources of livelihood.

This data suggests that the recent challenges faced in the country, such as the removal of fuel subsidies, have had a substantial impact on household incomes, making it difficult for many to diversify their livelihoods. This is unsurprising, as establishing and owning a business typically requires a significant amount of capital. Livelihood diversification has been a key strategy for ensuring a secure livelihood and reducing poverty among rural households. It helps to smooth the flow of income by reducing both predictable and unpredictable fluctuations.

Predictable fluctuations, such as those occurring seasonally, can be mitigated by engaging in enterprises and activities that generate returns at different times of the year. Unpredictable fluctuations, which result in unexpected income losses, can be reduced by maintaining a diversified portfolio of economic activities (Saha & Bahal, 2014). These findings align with a study conducted by Challa *et al.* (2019) in rural Ethiopia, which also found that most rural households had a low level of income source diversification. However, they differ from studies conducted by Idowu *et al.* (2014) and Oyakhilomen and Kehinde (2016), which reported that farming households mostly exhibited a moderate level of livelihood diversification.

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Table 2: Distribution of Diversification Index among Rural Farming Household

Diversification Index	Frequency	Percentages
No Diversification	24	8.9
Low Diversification (Up to 0.50)	161	59.6
Moderate Diversification (0.51 - 0.69)	82	30.4
High Diversification (0.70 and above)	3	1.1
Total	270	100
Mean	0.43	

Source: Field Survey, 2024

Poverty Indices of Rural Farming Households

The Foster-Greer-Thorbecke (FGT) poverty measures were used to assess the poverty status of rural farming households. Table 5 shows that total household expenditure determined the poverty status, with poverty incidence (Po), poverty gap index (P1), and poverty severity (P2) as key metrics. A relative poverty line of N109,829.82 was set based on annual food and non-food expenditure. Households with average annual expenditure above this line were considered non-poor, those between N54,914.91 and N109,829.82 were moderately poor, and those below N54,914.91 were very poor.

The poverty incidence (Po) was 0.61, indicating that 61% of farming households were poor, while 39% were not. Out of 270 sampled households, 164 were poor, suggesting poverty was prevalent, likely due to insufficient income among household heads.

The poverty gap index (P1) was 0.30, indicating a 30% shortfall in per capita expenditure for the poor to become non-poor, equivalent to a N32,948.95 increase per capita. The poverty severity index (P2) was 0.18, with 48 out of 164 poor households classified as extremely poor, constituting 18% of the total.

Factors contributing to severe poverty included large household sizes and economic challenges such as fuel subsidy removal and commodity price hikes, which hindered income diversification. The squared poverty gap highlighted not just the distance from the poverty line but also the inequality among the poor.

Comparing to a previous study by Dia *et al.* (2022), the poverty index in Adamawa State has worsened, with a higher poverty gap (P1) of 0.30 and poverty severity (P2) of 0.10 in 2019.

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Table 3: Poverty Indices of the Respondents

Poverty Indices	Estimates
Household Food Expenditure	N73,948,475.00
Household Non-food Expenditure	N57,982,560.00
Total Household Expenditure	N131,930,835.00
Per Capita Household Expenditure $= \frac{Total\ household\ Expenditure}{Number\ of\ household\ members}$	N44,481,077.00
Mean Per Capita Household Expenditure	N164,744.73
2/3 Mean Per Capita Household Expenditure (Poverty line)	N109,829.82
1/3 Mean Per Capita Household Expenditure	N54,914.91
Poverty incidence (P_o)	0.61
Poverty depth (P_1)	0.30
Poverty severity (P_2)	0.18
Poor Households	61%
Non Poor Households	39%

Source: Field Survey, 2024

Hypothesis Test

The hypothesis of the study tested the relationship between livelihood activities and the poverty status of households using Pearson's correlation, and the result is presented in Table 9 The result indicated the variables are positively correlated (r = 0.173) and statistically significant at P<0.01 level of significance, imply that increase in livelihood activities increase the likelihood of being non poor and vice versa. This finding imply that rural household that diverse livelihood sources tends to be less vulnerable to poverty compared to those that did not diverse livelihood.

Table 4: Correlation Result of the Relationship between Livelihood Activities and Poverty Status

Variable		Poverty Status	Livelihood Activities
Poverty Status	Pearson Correlation	1	.173***
	Sig. (2-tailed)		.000
	N	270	270
Livelihood Activities	Pearson Correlation	.173***	1
	Sig. (2-tailed)	.000	

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N	305	305

Source: Field Survey, 2024

***. Correlation is significant at the 0.01 level (2-tailed).

CONCLUSION AND RECOMMENDATION

Summary

The study evaluated livelihood diversification strategies as a means to reduce poverty among farming households in Adamawa State. It found that agriculture remained the primary income source for rural households, with most engaging in arable cropping and livestock sales. However, the level of livelihood diversification was generally low, with many households depending on no more than two sources of income. The study used the Foster-Greer-Thorbecke (FGT) poverty measures to assess poverty status, revealing that 61% of farming households were poor. Factors contributing to poverty included large household sizes and economic challenges like fuel subsidy removal and commodity price hikes. However, the study also found a positive correlation between livelihood activities and the likelihood of being non-poor, suggesting that diversifying livelihood sources can reduce vulnerability to poverty.

Conclusion

The study concludes that while agriculture remains a crucial income source for rural farming households, there is a need to diversify livelihoods to reduce poverty. The low level of diversification observed indicates a vulnerability to income shocks, such as those caused by economic challenges. Strategies to enhance livelihood diversification, such as providing access to credit for starting non-farm businesses, could help reduce poverty among rural farming households in Adamawa State.

Recommendations

Based on the findings, the study recommends several interventions to enhance livelihood diversification and reduce poverty among farming households in Adamawa State. The recommendations are as follows:

1. Supporting Agricultural and Non-Agricultural Ventures: Encourage initiatives that promote both on-farm and off-farm activities to provide diverse income streams for rural households. This may involve providing training, access to markets, and financial support for starting and sustaining ventures beyond traditional agriculture.

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2. Microfinance and Access to Credit: Facilitate access to microfinance institutions and credit facilities tailored to the needs of rural entrepreneurs. This can help overcome barriers to starting new businesses or expanding existing ones, particularly for households with limited capital.

3. Infrastructure Development: Invest in rural infrastructure such as roads, irrigation systems, and market facilities to improve access to inputs, markets, and services. Enhanced infrastructure can facilitate the growth of diverse economic activities and reduce transportation costs, thereby increasing profitability.

4. Social Protection Programs: Implement social protection programs targeted at vulnerable households to buffer against income shocks and reduce the severity of poverty. This could include cash transfer programs, health insurance, and education subsidies aimed at improving household welfare and resilience.

5. Policy Support and Advocacy: Advocate for policies that create an enabling environment for livelihood diversification, including supportive regulations, market access, and incentives for rural entrepreneurship. Additionally, monitor and evaluate the impact of existing policies to ensure they effectively address poverty and promote inclusive growth.

By implementing these recommendations, stakeholders can work towards building more resilient and economically empowered rural communities in Adamawa State, ultimately contributing to poverty reduction and sustainable development.

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