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Determinants of Livelihood Diversification among Rural Households in Oyo State, Nigeria

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Abstract

This study examines the factors influencing livelihood diversification among rural households in Ogo-Oluwa Local Government Area, Oyo State. A multistage sampling technique was employed to select 120 rural households, and data was collected through a structured questionnaire. Descriptive statistics were used to analyze the socioeconomic characteristics, while inferential statistics (logit regression analysis) determined the extent of livelihood diversification among respondents. The findings revealed that the average household size was six members, with an average age of 47 years and an average farming experience of 24.5 years. The mean farm income was $558,750, and 54.17% of respondents were engaged in diverse livelihoods. The results indicated that gender had a statistically significant and negative influence at the 10% level. Education level positively influenced diversification, with statistical significance at the 1% level. Similarly, the dependency ratio, primary occupation, and income were positively associated with diversification, each statistically significant at the 5% level. Support from NGOs and government also showed a positive and significant relationship with diversification at the 1% level. The study highlights the importance of education in equipping farmers with the knowledge to diversify their livelihoods. Additionally, support from the government and organizations can strengthen resilience and foster economic diversification among rural households.

Keywords: Livelihood Diversification, Rural Household, Oyo State, Determinants, Rural Economy, Rural Development, Sustainable Livelihood.

Introduction

To feed the projected 9.7 billion people on the planet by 2050, eradicate extreme poverty, and increase shared prosperity, agricultural development is crucial. When it comes to increasing the incomes of the poor, agricultural growth is two to four times more effective than growth in other sectors. By 2016, 65% of working adults living in poverty were dependent on their agricultural income. Furthermore, agriculture is a major driver of

economic growth, making up over 25% of GDP in some developing nations and 4% of the global GDP in 2018. However, the potential of agriculture is threatened by climate change, which may result in lower crop yields, especially in areas where food insecurity is a problem. An estimated 25% of greenhouse gas emissions worldwide are caused by forestry, agriculture, and changes in land use. By using mitigation techniques, however, agriculture can also contribute to the solution (World Bank, 2020).

By participating in a variety of activities and creating social support systems, rural households diversify their sources of income to improve their standard of living (Ellis, 2000). To attain the best possible balance between expected returns and risk exposure, this diversification entails reallocating resources across various on- and off-farm activities (Dilruba and Roy, 2012). Two essential components of diversification are a move away from reliance on agriculture and a rise in the range of revenue-generating pursuits. These livelihood strategies are heavily influenced by the options that rural communities have. According to Sekumade and Osundare (2014) and Babatunde and Saim (2010), livelihood diversification entails increasing household income sources while lowering environmental risks associated with both farm-related and non-farm activities. These tactics frequently seek to increase revenue to support agricultural initiatives. Ayantoye et al. (2017) describe diversification decisions as coping mechanisms rather than alternatives to primary income sources.

Livelihood diversification, according to Gebru et al. (2018), is the ongoing adaptation and growth of activities to stabilize household income, lessen exposure to livelihood shocks, and mitigate seasonal variations. Non-agricultural businesses and off-farm activities like part-time employment, migration, or growing cash crops and agri-foods are examples of diversification options (Khatun and Roy, 2012). According to Kassie and Aye (2017), farm households take part in non-farm activities to mitigate risks such as drought. Rural livelihoods, which represent the kinds of jobs required to make a living, provide a prism through which to view the prosperity of rural communities. With 90% of rural households farming, agriculture, and the use of natural resources are vital to rural livelihoods in developing nations, especially in Africa (Davis et al., 2010). However, many farming households in SSA have diversified beyond agriculture to maintain their living standards due to the prevalence of subsistence farming, low productivity, and shrinking farm sizes (Babatunde, 2013; Jirstrom et al., 2011).

It is increasingly recognized that rural livelihoods derive from both farm and non-farm activities, with non-farm activities becoming more significant as rural households adopt diverse income strategies (IFAD, 2011). Off-farm income sources, such as wage work in agriculture and other activities beyond the farm, are critical for rural households to meet their needs (Covarrubias et al., 2009). The shift away from sole reliance on agriculture in SSA is driven by the sector's inability to sustain households adequately (Kebede et al., 2014). Other factors influencing livelihood diversification include socioeconomic, institutional, and infrastructural conditions (Kassie et al., 2017; Davis, 2006). Gender also

plays a pivotal role in shaping livelihood decisions, as societal roles and responsibilities often vary between men and women (Oláh et al., 2014).

Problem Statement

Rural households heavily depend on agriculture as their primary source of livelihood, supplemented by other strategies to meet their income needs. However, the income generated through these strategies often fails to adequately support household requirements, pushing families into a cycle of poverty. This is particularly evident in rural areas where livelihood diversification is limited by inadequate infrastructure, poor asset bases, lack of credit facilities, and insufficient awareness and training opportunities (Wanyama et al., 2010; Khatun and Roy, 2012).

In Oyo State, Nigeria, smallholder farm households participate in various livelihood activities, but their access to income sources beyond agriculture is unevenly distributed and influenced by the ownership of livelihood assets. While diversification has the potential to reduce income risks associated with agriculture—a highly unpredictable enterprise (Ibrahim and Umar, 2008)—it often stems from desperation rather than opportunity-driven motivations, especially in the context of migration (Lay and Schuler, 2007). Poor households, for instance, tend to have more diversified income sources but experience minimal financial gains due to the low-income nature of these activities (Schwarze, 2004; Babatunde and Quaim, 2009).

The current state of non/off-farm income generation in Oyo State is further hindered by structural barriers, such as high transaction costs and entry barriers to higher-paying off-farm activities, which disproportionately affect disadvantaged households (Babatunde and Quaim, 2009). Despite the critical role non-farm income plays in augmenting farm income, it remains insufficient to substantially improve rural livelihoods (Adepoju and Obayelu, 2013). Furthermore, the complex and empirically untested factors influencing rural households' participation in non/off-farm activities in Oyo State remain unexplored, creating a significant gap in the understanding of rural livelihood diversification.

Given the pivotal role of agriculture in poverty reduction globally (Burch et al., 2007), there is an urgent need to examine the determinants of livelihood diversification in Oyo State. Identifying these factors will inform policies aimed at enhancing rural households' access to non/off-farm income opportunities, mitigating risks associated with single-income sources, and addressing the infrastructural and institutional challenges hindering effective diversification. This research seeks to contribute to the growing body of knowledge on rural livelihoods by providing insights into the dynamics of income diversification among smallholder households in Oyo State, Nigeria.

Objectives of the Study

- Examine the socioeconomic characteristics of respondents in the study area.
- Identify the diversification strategies adopted by rural households in the region.

- Assess the extent of income diversification among respondents.
- Explore the challenges faced by households in diversifying their income sources.

Significance of the Study

Declining agricultural incomes and the need to mitigate risks associated with market fluctuations and farming activities have prompted income diversification among rural households (Matsumoto et al., 2006). In many cases, the risks of farming, such as crop failures and volatile markets, outweigh the potential benefits, pushing some households toward non-farm and off-farm activities. For others, higher rewards or lower risks outside of agriculture serve as incentives to seek alternative livelihoods.

Households often diversify their income sources to improve their overall well-being, addressing needs such as housing, healthcare, food security, and clothing. The growing relevance of non-agricultural activities to the welfare of rural households can no longer be ignored. Understanding the role and significance of non-farm and off-farm activities is crucial for developing effective agricultural and rural development policies.

Policymakers require a comprehensive grasp of how these activities influence household income and resilience in rural areas. With persistent low levels of rural household welfare in Nigeria despite numerous policy reforms, it is essential to gain deeper insights into this issue. Solutions must prioritize the needs of the poor and support rural households in diversifying their income sources to sustain their living standards and enhance their quality of life. ii. Encourage beneficial farming practices, such as crop rotation and cultivation techniques, that enhance other farming strategies (Gradl et al., 2012). iii. To safeguard the environment and the health of those who use agrochemicals, encourage their prudent use (Bennett et al., 2006; Hofs et al., 2006; Gradl et al., 2012). iv. Give farmer's market data (DAFF, 2012;

Literature Review

Conceptual Framework

There is still some disagreement regarding the precise meaning of livelihood diversification, even though it is now widely acknowledged to be common (Ellis, 2000), particularly about tactics and laws intended to fight poverty. The main conclusions of diversification research are outlined in this section, from which links to the function of companies that grant access to natural resources are subsequently drawn. Research on rural income portfolios generally accepts the once-shocking fact that, on average, non-farm activities and transfers from cities or overseas—remittances and pension payments being the main types of such transfers—account for about 50% of rural household incomes in low-income countries. The average percentage is slightly lower in Latin America, at about 40% (Reardon et al., 2001).

At the household level, there is undoubtedly a lot of variation around these mean numbers, but not as much as one might anticipate when comparing sample evidence across various nations in a given region. Numerous studies have found a strong positive correlation between the percentage of household income derived from non-farm sources and the total

household income per capita (Barrett et al., 2001; Ellis & Freeman, 2004). The type of income source diversification varies significantly between households with higher incomes and those with lower incomes, even though it is common across income classes. While the poor usually diversify through casual wage work, particularly on other farms, the wealthy usually do so through non-farm business endeavors (trade, transportation, retail, bricklaying, etc.). Although wealthy people's diversification decreases their reliance on agriculture, it tends to leave the poor more dependent.

Africa's average rural non-farm income share of 42% of total rural incomes is higher than that of Asia and Latin America (Reardon et al., 2000). The bulk of the evidence points to non-farm rural activity in Africa being primarily informal rather than formal, and it is fairly evenly distributed across manufacturing, services, and commerce. Furthermore, it has a direct or indirect connection to small towns or local agriculture. Additionally, nonfarm wage labor continues to be more significant than self-employment in the nonfarm sector, despite households earning significantly more from rural nonfarm activity than from farm wage labor (Haggblade et al., 2007). Depending on the situation, diversification of livelihoods is also sought for several reasons, including the need to spread risk or sustain incomes, the desire to invest and accumulate, the need to adapt to survive in worsening conditions, or a combination of these. Furthermore, the nature of livelihood diversification is significantly influenced by the context in which it takes place, specifically the unequal distribution of benefits and access to diversification activities. The poorest rural communities, however, most likely have the fewest chances to diversify in a way that will result in accumulation for investment purposes. Babatunde and Quaim (2009) state that the majority of Nigerian rural households have fairly diverse income sources, as evidenced by their income diversification patterns.

Typically, only half of household income comes from farming; the other half comes from a variety of non-farm sources. However, there are clear differences in income levels. While farming remains the main source of income for the poorest households, off-farm employment—especially self-employed work—is the main source for relatively wealthier households. Ellis (2000) also used regression models to show that a variety of factors, such as education, assets, endowments, credit availability, and favorable infrastructure conditions, affect the level of household diversification. These factors raise the chances of starting a business and finding employment in the more profitable non-farm industry.

To put it another way, households with limited resources in remote areas find it challenging to diversify their sources of income. Using double log regression, Ibekwe et al. (2010) discovered that a distress diversification hypothesis is supported by the negative correlation between nonfarm income and farm output per hectare of land in South Eastern Nigeria. In addition to other household-specific characteristics such as occupation, education, number of spouses, family size, land holdings, and farm output, they examined a household's demographics to determine its involvement in nonfarm activities. The findings indicate that the size of the land holding, the number of years of education of the

workers, the value of agricultural output per hectare, the occupation, and other factors are the primary determinants of nonfarm income at the household level in South Eastern Nigeria.

Limited Land

To combat rural poverty in Africa through agricultural production, agricultural land is required (Barrett et al., 2001). However, most of the time, there is a shortage of land, it is unsuitable for agricultural production, and farmers' property rights are insecure (Ortmann and King, 2007). The South African government has put in place a redistributive land reform program to rectify the disparities in land distribution brought about by the apartheid era (Anseeuwand Mathebula, 2008; Jayne et al., 2010). Studies on livelihood choices and income diversification, including those by Mutenje et al. (2010), Babulo et al. (2008), Khatun and Roy (2012), and Fabusoro et al. (2010), have focused on the scarcity of suitable land for agricultural production.

Household Composition

The livelihood options and income diversification approaches chosen by rural households are significantly influenced by their composition. Family labor is the primary source of work in the labor-intensive subsistence farming production system (DAFF, 2013) (Grad et al., 2012). Feynes and Meyer (2003), cited by Altman et al. (2009), state that women, children, and the elderly make up the majority of the population of the former homelands. Although they are available, these household members are sometimes unable to participate completely in agricultural tasks. For instance, the senior members of the household might not be able to contribute to subsistence agriculture output because they are past their prime physical and economic years. Dlova et al. (2004) state that a household's livelihood activities are significantly influenced by the age of the head of the household. Unlike their younger counterparts, older heads of household may base their decisions on maturity and experience. The concept that the age of the household's head affects the household's receptivity to particular livelihood strategies and income diversification patterns is supported by this study. Marital and domestic duties, including childrearing and housework, may restrict women's ability to work and make decisions in the home (Dlova et al., 2004). To predict income diversification and better understand household composition, studies such as those conducted by Khatun and Roy (2012) have used metrics such as the dependence ratio. Additionally, a similar ratio was used by Mutenje et al. (2010) to forecast livelihood strategy choices.

Infrastructure

The absence of adequate roads, electricity, sanitation, health care, water infrastructure, and productive assets limits smallholder agricultural production in rural communities (Barrett, 2008; Gradl et al, 2012; Sikwela, 2013). By enabling year-round agricultural production, producing high-value crops, expanding the variety of cultivated products, and

reducing smallholders' reliance on rain-fed agriculture, technological advancements, and infrastructure improvements may enhance livelihoods and agricultural output (Gradl et al., 2012). Access to and effective use of water resources are critical to the expansion of smallholder productivity. To do this, irrigation infrastructure is required (Boomsma et al., 2013). Using equipment that, for example, can enable the cultivation of larger areas of land in addition to carrying out other tasks like transportation and harvesting can increase the intensity of production (Gradl et al., 2012). Babulo et al. (2008), Rahman (2013), Stifel (2010), and Alemu (2012) examined the significance of infrastructure and its impact on livelihood strategy decisions. Additionally, it has been discovered that infrastructure affects income diversification (Fabusoro et al., 2010). Many studies have examined how infrastructure improvements like roads, irrigation systems, and piped water contribute to income diversification (Babatunde and Qaim, 2009; Fabusoro et al., 2010; Khatun and Roy, 2012).

Financial Resources

According to Sikwela (2013), smallholder farmers do not have the financial means to increase their output. When sufficient financial resources are available, the degree of intensification and resource management needed to generate a positive return on investment can be accomplished (Hofs et al., 2006). In sub-Saharan Africa, smallholders frequently lack access to inputs like improved seeds, fertilizers, and animal breeds (Boomsma et al., 2013; Gradl et al., 2012). It has been demonstrated that efficient fertilizer use increases agricultural productivity and output, particularly when paired with better seed and soil management practices (Gradl et al., 2012). Due to limited access to credit and other financial resources, these agricultural inputs are not prioritized and only comprise a small portion of smallholder farms (Aliber and Hart, 2009).

For smallholder farmers to produce a marketable surplus of crops and livestock, they must have access to credit (Barrett, 2008). Because they do not have the documentation that demonstrates they are the legitimate owners of the land they have access to—a standard requirement for obtaining agricultural loans from financial institutions—the majority of smallholder farmers have limited access to credit (Gradl et al., 2012). Farmers in rural areas with limited resources can benefit from having access to credit and savings (Gradl et al., 2012). Babulo et al. (2008) looked at how crucial financial resources—like credit availability—are in influencing livelihood decisions. A key element in this context is cited by Babatunde and Qaim (2009), Khatun and Roy (2012), and Demissie and Legesse (2013).

Theoretical Framework

The stability of farming as a source of income is threatened by pests, diseases, and unpredictable bad weather (Gradl et al., 2012). Diversifying their sources of income and livelihood activities can help rural households reduce the risk associated with agricultural

production. According to Boomsma et al. (2013), this diversification varies by country and region. The subsections that follow discuss these.

Livelihood Choices

Numerous factors, including the endowment of resources, assets (primarily the availability or lack of land and livestock), and the educational attainment of household members, influence each household's decision to pursue a diversified livelihood. Furthermore, factors that influence livelihood choices at the household level include the household's makeup, perception of risk, and available opportunities (Boomsma et al., 2013). Farmers' assets and resource endowment play a major role in determining their capacity to produce agricultural products and engage in the market (Baiphethi and Jacobs, 2009). Due to their disparate resource and asset endowments, smallholder rural households react to risks in different ways.

Their socioeconomic traits and the range of available livelihood options determine how diverse they are;

Income Diversification

Development economics literature has established that individuals and households do not depend on a single source of income for their livelihoods, but invest their resources in one asset rural, or use their resources to sustain their livelihoods from one source (Barrett et al., 2001). Reasons for income diversification include increasing earnings to sustain livelihoods when the main activity fails to sufficiently provide household needs (Minot et al., 2006) income diversification patterns vary across regions. However, scant attention has been given to the empirical investigation of income diversification among rural households in Africa and generally during the past decade.

Herfindahl Index

Measuring the size of firms in the industry and an indicator of the amount of competition those firms is termed the Herfindahl index. It is known as the sum of the squares of the market shares of the firms within the industry. It is usually limited to the largest 50 firms, where the market shares are expressed as fractions. The resultant is equivalent to the average market share, weighted by market share; the result will range between 0 and 1, stepping up from a large number of tiny firms to a single monopolistic producer. A rise in the Herfindahl index always denotes an increase in market power and a reduction in competition. Larger firms obtained more weight; this is the major benefit of the Herfindahl index in relationship to such measures as the concentration ratio. Squaring the market share of each firm participating in a market is the most commonly accepted measure of market concentration, and then adding up the resulting numbers.

The HHI is expressed as: HHI = S1 2 + S2 2 + S3 2 + ... + Sn 2 ... Where Sn is the market share of the ITH firm. Where Si is the market share of the firm, i is the market and N is the number of firms. Thus, in a market with two firms having a 50% market share each, the Herfindahl

index equals 0.502+0.502 = 1/2. The Herfindahl Index (H) ranges from 1/N to 1, where N is the number of firms in the market. If percentages are used as whole numbers, as in 75 instead of 0.75, the index can range up to 1002, or 10,000. An H below 0.01 (or 100) indicates a highly competitive index, and the value of H that falls below 0.15 (or 1,500) indicates an un-concentrated index. The value of H which lies between 0.15 and 0.25 (or 1,500 to 2,500) shows moderate concentration, while H above 0.25 (above 2,500) indicates high concentration. There is also a normalized Herfindahl index. Whereas the Herfindahl index ranges from 1/N to 1, the normalized Herfindahl index ranges from 0 to 1. It is computed as: For N > 1 and H* = (H-1/N)/1-1/N for N>1 and H* = 1 for N = 1.

Empirical Literature

According to Boomsma et al. (2013) and Altman et al. (2009), rural households that depend only on one form of livelihood activity, such as subsistence farming, are more likely to be in deep poverty than those that depend on multiple sources. Even though farming is essential for rural households, non-farming opportunities can offer a variety of livelihood options (Baiphethi and Jacobs, 2009). Remittances, social grants, and off-farm labor all generate more income than farming when compared to non-farming sources (Aliber and Hart, 2009). Rural households rely less on agricultural production and more on non-farm revenue-generating activities due to low farming incomes and agricultural productivity (Baiphethi and Jacobs, 2009). As a result, rural households are now engaging in agricultural production as an additional means of subsistence, or even for recreation (Altman et al., 2009).

Numerous researchers have examined methods for enhancing rural households' quality of life. Babulo et al. (2008), Diniz et al. (2013), Mutenje et al. (2010), and Siddique et al. (2009) examined the numerous livelihood choices made by households. There isn't much current study that is unique to South Africa, even if the amount of international literature on this subject has increased over the last ten years. The main sources of income for rural households were determined by Babatunde and Qaim (2010) to be farming (land and crops), non-agricultural jobs, off-farm labor, self-employment, and remittances. Ellis (2000) pointed out that household members move to make money as a livelihood strategy. Social welfare programs may also assist homes in South Africa.

This section explains the empirical techniques used to analyze lifestyle choices and pinpoint the factors that affect them. The multinomial logistic regression model, which works best with categorical dependent variables, is one popular technique. Studies that have used this method to look at livelihood strategies include Alemu (2012), Babulo et al. (2008), Mutenje et al. (2010), and Stifel (2010). As mentioned by Dossa et al. (2011), other analytical methods for researching lifestyle choices include factor analysis (FA), principal component analysis (PCA), discriminant analysis (DA), multidimensional scaling (MDS), and cluster analysis (CA). These multivariate methods are frequently employed for data classification; PCA is especially good at lowering the dimensionality of the data (Jolliffe, 2002). Techniques like DA, FA, and MDS (Dossa) are strongly connected to PCA.

To discover typologies of interest, PCA and CA are frequently used together in the literature, as evidenced by works such as Diniz et al. (2013), Dossa et al. (2011), and Bidogeza et al. (2009). The multivariate analytic approach is useful for defining typologies, according to Bidogeza et al. (2009). The variables employed depend on the goals of the study (Nainggolan et al., 2013). For instance, Fish et al. (2003) investigated the reasoning behind farmer actions, while Bidogeza et al. (2009) and Nainggolan et al. (2013) concentrated on farm household and farmer typologies, respectively. The usefulness of this approach in classifying livelihood strategies into typologies was shown by Diniz et al. (2013). However, no single technique can objectively identify the ideal number of clusters (Bidogeza et al., 2009). K-means and hierarchical clustering are the most popular clustering techniques, however choosing the right one requires significant thought (Gelbard et al., 2007). For datasets with more than 250 samples, Kaur and Kaur (2013) discovered that K-means clustering outperformed hierarchical clustering. Furthermore, PCA-derived components can be used as inputs for K-means clustering, as noted by Ding and He (2004). In studies like Bidogeza et al. (2009), Dossa et al. (2011), and Nainggolan et al. (2013), K-means and hierarchical clustering techniques were combined. K-means was used for classification, and hierarchical clustering was used to determine the number of clusters. Mutenje et al. (2010) observed that time spent on activities, land allocation, and income distribution were significant variables of livelihood strategies in their multinomial logistic regression analysis of Zimbabwe's livelihood diversity. The K-means clustering was used to group these methods. The age and marital status of the household head, financial assets, livestock ownership, dependency ratios, shocks like HIV/AIDS, and livestock losses were all significant factors influencing livelihood choices (Babulo et al., 2008). For instance, Ethiopian families were grouped by Babulo et al. (2008) based on their level of wealth and reliance on forests, citing factors including plot size, household size, gender of the household head, education, and access to infrastructure.

Stifel (2010) categorized livelihood strategies in rural Madagascar into three groups: wage-based, non-wage, and mixed activities. A multinomial logistic model was used to analyze the determinants. Household size, education, land ownership, proximity to urban centers, household head age, and microfinance availability were all significant factors. Alemu (2012) divided livelihood strategies in South Africa into eight groups and used stochastic dominance tests and multinomial logistic regression to analyze the socioeconomic determinants. Age, education, labor endowment, and community infrastructure were all important factors that affected the capacity to engage in high-paying activities. Rahman (2013) used Probit regression models to investigate the factors that influence participation in off-farm activities in Bangladesh. Participation in business, labor, and service activities was influenced by factors like age, education, farm size, dependency ratio, and infrastructure development.

Studies on livelihood strategies did not always use econometric modeling. In Thorndale, South Africa, for example, Dovie et al. (2005) used PCA, correlation analysis, T-tests, and chi-square tests to perform a financial assessment of livelihoods. Using association tests,

Siddique et al. (2009) evaluated Pakistani rural women's involvement in agricultural income-generating activities. To categorize livelihood strategies in the Brazilian Amazon, Diniz et al. (2013) used cluster analysis in conjunction with chi-square tests and ANOVA.
Income diversification research often uses indices like Simpson, Herfindahl, Ogive, and Entropy. For example, Fabusoro et al. (2010) applied the Simpson diversity index, while Babatunde and Qaim (2009) measured diversification through income sources and non-farming income percentages. Econometric models such as Tobit, Probit, and multiple regression have been employed to analyze factors influencing diversification. Olale and Henson (2012) used bivariate Probit regression to study income diversification among Kenyan fishing communities, while Khatun and Roy (2012) applied multiple regression analysis in West Bengal. Fabusoro et al. (2010) employed hierarchical regression models to analyze diversification factors in Nigeria. Kieschnick and McCullough (2003) discussed the strengths of fractional response modeling, emphasizing the benefits of logit-transformed regression for interval-bound response variables. Ultimately, the choice of variables and methods is dictated by the research objectives, with modifications applied as necessary for specific investigations.

Methodology

Study Area

The study was conducted in Ogo-Oluwa Local Government, Ogbomoso, Oyo State; at latitude 8.13524, longitude 4.24006, 8° 8' 17" North, 4° 14' 24" East. According to the 2006 census, its area was 369 km², and its population was 65,184. Farming is the primary source of income for the people who live in the towns that comprise the Ogo-Oluwa local government. Additionally, the primary products of their farming operations are palm oil, cocoa, and yam.

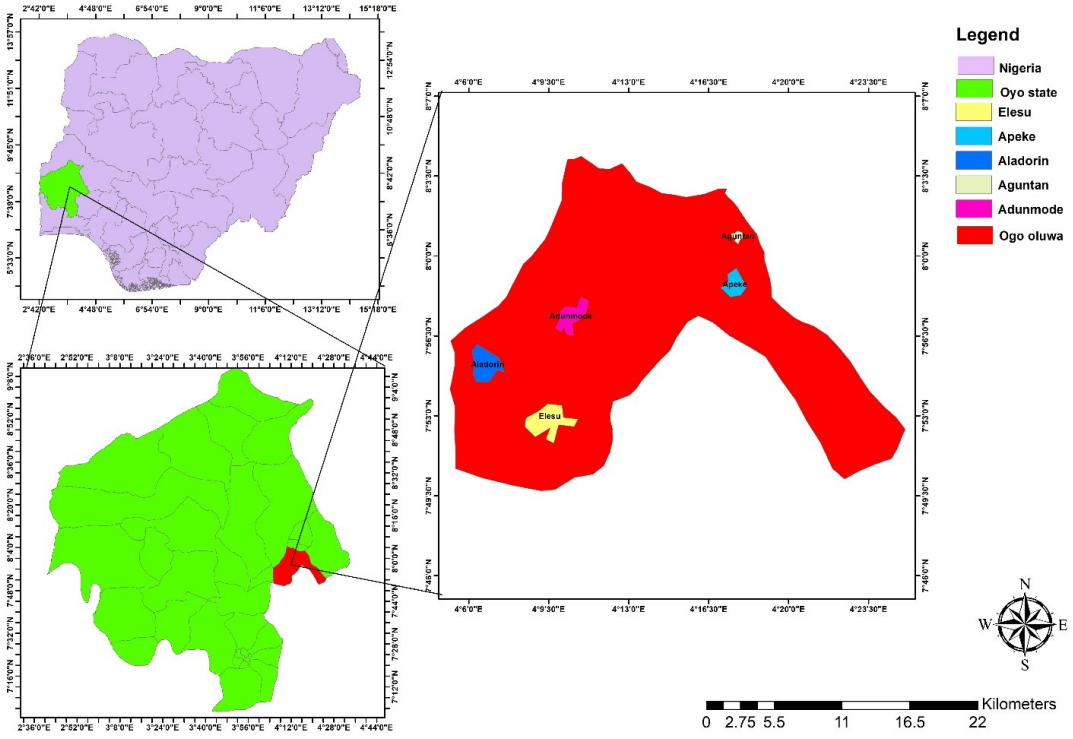

Fig 1: Map of Oyo State showing Ogo-Oluwa Local Government Area, Ogbomoso

Population of the Study

The headquarter is in Aja-Awa town, this study focuses on the rural households within Ogo-Oluwa Local Government Area (LGA) of Oyo State, Nigeria.

Sampling Techniques and Sample Size

A multistage sampling approach was adopted. In the first stage, five wards within the LGA were selected based on the proportion of rural households present in each ward. In the second stage, ten villages were randomly chosen from these wards. Finally, in the third stage, twelve rural households were randomly selected from each village, resulting in a total sample size of 120 respondents.

Data Collection Method

The study relied on primary data to achieve its objectives. A carefully designed questionnaire was utilized to collect data directly from the respondents. Information gathered included key personal and household characteristics such as age, gender, household size, education level, farm income, sources of credit, number of children in the household, primary occupation, amount of credit accessed, cultivated land area, and challenges faced by households. These challenges encompass limited assets, restricted credit access, poor infrastructure, outdated technology, geographic constraints, market demand issues, and inadequate production equipment.

Method of Data Analysis.

The objective of this study was to identify the factors influencing the livelihood diversification among rural households in Oyo State, Nigeria. A multistage sampling method was used to select 120 respondents from the region, with primary data collected through structured questionnaires. Descriptive statistics were employed to analyze the socioeconomic characteristics, while inferential statistics (regression analysis) were utilized to assess the extent of livelihood diversification. A tobit regression model was employed to ascertain the determinants of livelihood diversification among the respondents in the study area. In this context, the dependent variable Yi takes on a value of either 0 or 1, where 0 represents the absence of the event and 1 signifies its occurrence (Gujarati, 2003; Obisesan, 2013). The binary nature of the outcome variable makes it ideal for analysis using logistic regression. The study used descriptive statistics and a logistic regression model to analyze the relevant data.

Suppose X1, X2,..., Xn X_1, X_2, X_n are the explanatory variables influencing the probability of the outcome. The logistic regression model defines the conditional probability of the event (i.e., when Y=1Y = 1) based on these influencing variables.

$$P(Y) = 1/ [1+ \exp-(\alpha-\sum\beta iXi)$$

We then linearize the Right Hand Side (RHS) a logit transformation was done by taking the logarithm of both sides, which is given by:

$$\text{Logit } P(Y) = \alpha + \sum\beta iXi \quad (2)$$

Where Yi = 1 if success (i.e. respondent's livelihood diversification).

Xi = Independent Variables

B = Logistic Coefficient for Independent Variable

A = Constant term

The independent variables were specified as the factors influencing livelihood diversification among rural house

X1 =Age, X2 = Sex, X3 = household size, X4 = education, X5 = economically active member, X6 = school children living in an household, X7 = Income, X8 = Primary Occupation, X9 = the amount of credit accessed, X10 = lack of infrastructure, X11 = poor technology, X12 = geographical location, X13 = marketing (demand), X14 = production.

Results and Discussion

Table 1: Socio-economic characteristics of the respondents. Frequency distribution of the respondents based on socio-economic characteristics.

Indices	Frequency	Percentage	Mean±SD
Age			
<=30	18	15.00	47.29±13.28
31-40	23	19.17	
41-50	31	25.83	
51-60	30	25.00	
Above 60	18	15.00	
Total	**120**	**100.00**	
Sex			
Female	39	32.50	
Male	81	67.50	
Total	**120**	**100.00**	
Marital status			
Separated	4	3.33	
Single	15	12.50	
Married	101	84.17	
Total	**120**	**100**.00	
Household size			
<=5	54	45.00	5.89±2.14
6-10	64	53.33	
Above 10	2	1.67	
Total	**120**	**100.00**	
Education status			
No formal education	11	9.17	
Primary education	42	35.00	
Secondary education	46	38.33	
Tertiary education	21	17.50	
Total	**120**	**100.00**	
Religion			
Christianity	77	64.17	
Islam	36	30.00	
Traditional	7	5.83	
Total	**120**	**100.00**	
Primary Occupation			
Trading	16	13.33	
Artisan	15	12.50	
Farming	70	58.33	
Civil/public servant	19	15.83	
Total	**120**	**100.00**	
Year of farm experience			
<=5	2	1.67	24.52±12.55

6-10	17	14.17	
11-15	26	21.67	
15-20	12	10.00	
Above 20	63	52.50	
Total	**120**	**100.00**	
Farm income			
<=50k	2	1.67	558750±351028.7
101k-200k	15	12.50	
201k-300k	25	20.83	
301k-400k	8	6.67	
Above 400k	70	58.33	
Total	**120**	**100.00**	
Income from Other Sources			
Non-farm income	102	85.00	
Remittance	4	3.33	
Gift	4	3.33	
Pension	4	3.33	
NGO's support	6	5.00	
Total	**120**	**100.00**	
Member of any Social Group.			
No	60	50.00	
Yes	60	50.00	
Total	**120**	**100.00**	
Support from Social Group			
No	62	51.67	
Yes	58	48.33	
Total	**120**	**100.00**	
Support from Government and NGOs			
No	41	34.17	
Yes	79	65.83	
Total	**120**	**100.00**	
Type of Support			
None	41	34.17	
Money	5	4.17	
Skill acquisition	21	17.50	
Training	19	15.83	
Constituency project	34	28.33	
Total	**120**	**100.00**	
Source of Credit			
Personal	81	67.50	
Family & Friends	9	7.50	
Cooperative Society	21	17.50	
Bank	9	7.50	

Total	**120**	**100.00**

Source: Field Survey, 2022

From Table 1, The age distribution of respondents is summarized. The data reveals that 25.83% of respondents were aged 41–50, 19.17% fell within the 31–40 age group, 15% were 30 years old or younger, 25% were aged 51–60, and 15% were over 60 years of age. The average age of respondents was approximately 47 years, suggesting that most participants were in their productive working years. It can be implied that most of the respondents are still in their active age. This result is contrary to the findings of Ayanda and Ogunsekan (2012) in their study on Farmers' perception of repayment of loans from the Bank of Agriculture, Ogun State, Nigeria, where the mean age of the respondents was 39.36 years. This, however, aligns with Adepoju et al. (2013), who reported a mean age of 47.50 years. Table 1 results are also in contrary to the findings of Ahmed (2012) in her work titled, 'Income diversification determinants among farming households in Konduga, Borno State, Nigeria', where 66.4% of their respondents are married. Most (45.00%) of the respondents had a household size of 1–5, 53.33% had between 6 and 10 members, and 1.67% of the respondents had a household size greater than 10. The mean of the household size of the respondents was 5, which indicated that rural households are moderate (Oyekale et al., 2006). The findings revealed that 81% of the households were male-headed, with over half (55.3%) of the respondents being in their prime economic years. The average age of respondents was 47 years. Most respondents were male (67.50%) and married (84.17%). A majority of the respondents (53.33%) lived in households with six to ten people, indicating relatively large family sizes. Christianity was the dominant religion (64.17%), and most respondents (38.33%) had completed at least high school. Farming was the primary occupation for 58.33% of the respondents, and over half (52.50%) had more than 20 years of farming experience.

The gender distribution shows that 67.50% of respondents were male, while 32.50% were female. This finding suggests a male-dominated rural household structure, consistent with Akinbode's (2013) description of typical rural African communities, where men often take on the role of breadwinners and household heads.

Regarding marital status, 84.17% of respondents were married, 12.50% were single, and 3.33% were separated. This dominance of married individuals reflects a societal norm in the study area, with marriage often considered a cornerstone of stability and responsibility. Married respondents are likely more committed to resource management and livelihood activities, as highlighted by Oludipe (2009), who emphasized the role of marriage in enhancing access to livelihood assets, especially for women.

Household sizes varied, with 45.00% of respondents living in households with five or fewer members, 53.33% in households of six to ten, and 1.67% in households with more than ten members. The average household size was six. This finding supports Fabusoro et al. (2010), who noted the prevalence of large households in rural Nigeria. Larger households could

contribute to diversified income sources, provided that all members actively participate in income-generating activities (Mattew & Adosepe, 2007).

Educational attainment showed that 9.17% of respondents had no formal education, 35.00% had completed primary school, and 38.33% had secondary education. This indicates that most participants had some level of formal education, which could be beneficial for pursuing diversified income sources. Higher educational levels often enable individuals to explore alternative income opportunities or manage their own ventures effectively.

Religious affiliations among respondents were as follows: 30.00% identified as Muslims, 57.3% as traditional believers, and 64.17% as Christians. Christians made up the majority. Religious beliefs can influence income diversification decisions, as certain faiths may encourage or discourage specific livelihood activities. This finding aligns with Fabusoro et al. (2010), who emphasized the role of religious organizations in shaping livelihood strategies in developing nations.

The study found that 58.33% of respondents were farmers, 13.33% were traders, 12.50% were artisans, and 15.83% were civil or public servants. This indicates that farming remains the primary occupation in rural areas, even though agriculture alone is often insufficient to meet household needs (Ellis, 2000; Mustapha, 2009; Oluwatayo, 2009; Fabusoro et al., 2010). Policies aimed at enhancing agricultural productivity and farmer incomes could significantly improve the quality of life for rural households.

In terms of farming experience, 21.67% of respondents had been farming for 11–15 years, 10% for 15–20 years, and 52.50% for over 20 years, while 14.17% had six to 10 years of experience, and only 1.67% had less than five years. The average farming experience was approximately 25 years. Experienced farmers may be more inclined to diversify their livelihoods, given their deeper understanding of agricultural challenges and opportunities.

Farm income distribution showed that 12.50% of respondents earned between ₦101,000 and ₦200,000, while 1.67% earned less than ₦50,000. About 20.83% earned ₦200,000–₦300,000, 6.67% earned ₦300,000–₦400,000, and 58.33% earned over ₦400,000 annually, with an average income of ₦558,750. This suggests that farming provided a substantial income for many households, consistent with findings from Babatunde (2009) and Oluwatayo (2009).

Around 85% of respondents reported having additional income sources beyond farming, including remittances (3.33%), gifts (3.33%), pensions (3.33%), and support from NGOs (5.00%). This indicates the importance of non-farming income streams in rural households.

Half of the respondents (50.00%) were members of social groups, which could facilitate income diversification by providing access to resources, markets, and information. Among group members, 48.33% reported receiving support from these associations, suggesting the need for expanded programs to aid diversification efforts.

About 65.83% of respondents received support from both government and non-governmental organizations, primarily in the form of financial aid (4.17%), skills acquisition (17.50%), training (15.83%), and constituency projects (28.33%). However, 34.17% reported

receiving no assistance, highlighting the need for improved outreach and support programs.

In terms of credit sources, 7.50% of respondents relied on banks, 7.50% on friends and family, 17.50% on cooperative societies, and 67.50% on personal savings. This underscores the heavy reliance on personal resources for financing livelihood activities, suggesting limited access to formal credit systems.

Livelihood Diversification Strategies Adopted

The livelihood diversification strategies adopted shows the various income-generating activities in the study area. Considering the results presented in table 2, it can be implied that non-farming activities generate the highest income share in the study area. This finding contradicted the findings of Idowu et al. (2011) who reported that income share derived from labour-oriented non-farm income diversification activities by the poor rural farm households was significantly higher (The distribution of respondents by livelihood diversification strategies is outlined in the table below, highlighting the frequency and percentage of individuals employing various methods. Among the strategies, crop farming emerged as the most prevalent, with 45 respondents (37.50%) opting for this approach. Livestock farming was the second most common choice, selected by 33 respondents (27.50%). This indicates that agricultural activities dominate as the primary means of income diversification in the study area. Other strategies were also employed, though less frequently, including activities such as hairstyling, pedicure and manicure services, fashion design, night watch services, street cleaning, food vending, blacksmithing/welding, carpentry/furniture making, trading, shoemaking, driving, civil service work, laboring, clergy roles, photography, and vulcanizing.

The insights provided by this table have significant research implications, as they shed light on the most widely adopted livelihood diversification strategies in the rural context of the study region. This information could be invaluable for policymakers and development practitioners in designing targeted interventions to promote rural livelihood diversification. For instance, if crop farming is the dominant strategy, policies aimed at enhancing access to credit and agricultural inputs for crop farming are likely to be particularly effective in fostering livelihood diversification in the area.

Distribution of the respondents according to livelihood diversification strategies adopted

Diversification Strategies Adopted	Frequency	Percentage
Crop farming	45	37.50
Livestock farming	33	27.50
Hairstylist	6	5.00
Fashion Stylish	6	5.00
Night Guard	9	7.50
Sales Representative	2	1.67
Food Vendor	11	9.17
Blacksmith/Welding	2	1.67
Mechanic	2	1.67
Bricklaying	4	3.33
Crafting	1	0.83
Carpentry/Furniture	2	1.67
Trading	20	16.67
Driving	8	6.67
Civil Service	4	3.33
Labourer	16	13.33
Member of the clergy	12	10.00
Photographer	13	10.83
Vulcanizing	15	12.50
Total	**120**	**100**

Source: Field Survey, 2022

Constraints

Respondents' constraints to livelihood diversification

Several challenges hinder the diversification of rural households' livelihoods in the study area. According to Table 18, a significant 98.00% of respondents identified the rising costs of production as a primary obstacle. Additionally, other constraints included geographic location (97.00%), a weak asset base (92.00%), market demand (92.00%), lack of credit facilities (86.00%), and inadequate transportation networks (68.00%). These findings align with information gathered through interviews and focus groups, where participants highlighted the scarcity of adequate livelihood assets as a key reason preventing income diversification.

This situation suggests that many respondents are unable to pursue income-generating activities that rely on sufficient infrastructure, assets, or access to markets and credit. The failure to implement effective government policies and programs for rural development may be contributing to the lack of essential assets and infrastructure in rural areas. These challenges are consistent with similar research conducted in Nigeria's Ogun and Kaduna states by Fabusoro et al. (2010) and Nasa et al. (2010), who also found that barriers such as

inadequate assets, infrastructure, and support systems significantly hindered rural households' ability to diversify their livelihoods.

Distribution of the respondents based on constraints to livelihood diversification (N = 120)

S/n	Constraints	Severe constraint	Mild constraint	Not a constraint
1	Poor Asset Base	92(76.67%)	21(17.50%)	7(5.83%)
2	Lack of credit facilities	86(71.67%)	31(25.83%)	3(2.50%)
3	Lack of infrastructure	66(55.00%)	53(44.17%)	1(0.837%)
4	Poor technology	48(40.00%	68(56.67%)	4(3.33%)
5	Geographical location	97(80.83%)	17(14.17%)	6(5.00%)
6	Lack of rural electrification	55(45.83%)	62(51.67%)	3(2.50%)
7	Transportation network	68(56.67%)	47(39.67%)	5(4.17%)
8	Marketing (demand)	92(76.67%)	21(17.50%)	7(5.83%)
9	Production equipment	43(35.83%)	73(60.83%)	4(3.33%)
10	Hike in cost of production	98(81.67%)	18(15.00%)	4(3.33%)
11	Government support of SMEs	10(8.33%)	32(26.67%)	78(65.00%)

Source: Field Survey, 2022

Distribution of the respondents based on the level of Livelihood Diversification Status

The table below shows the respondents' level of livelihood diversification in the study area. 15.83% of the respondents are highly diversified, 38.33% are moderately diversified, and 45.83% are not diversified, according to the data. This implies that more than half of the respondents had multiple sources of income.

Frequency distribution of the respondents based on Livelihood Diversification Status

Diversification status	Frequency	Percentage
Highly diversified	19	15.83
Moderately diversify	46	38.33
Not diversify	55	45.83
Total	120	100.00

Factors affecting livelihood diversification of the respondents

The table below presents the results of a Tobit regression analysis conducted to identify the factors influencing livelihood diversification among rural households in the study area. The Tobit regression model is suitable for situations where the dependent variable is censored or bounded at a specific range. In this case, the dependent variable, livelihood diversification, is likely constrained, making the Tobit model appropriate. The coefficients provide insights into the strength and direction of the relationship between each independent variable and the dependent variable, adjusting for the influence of other

variables. The standard error reflects the accuracy of the coefficient estimates, while the t-value assesses the statistical significance of each coefficient.

The results show that gender had a statistically significant negative relationship with livelihood diversification at the 10% level. This suggests that as the proportion of males increases in a household, the likelihood of livelihood diversification decreases.

Years of education exhibited a significant positive correlation with livelihood diversification at the 1% level. This implies that households with higher education levels are more inclined to diversify their income sources. This could be attributed to increased awareness of opportunities, greater adaptability to new challenges, and enhanced skills and knowledge. Investing in education appears to be a key driver in increasing household income and financial stability.

The dependency ratio was positively associated with livelihood diversification at the 5% significance level, indicating that households with more dependents are more likely to seek additional sources of income. This result may reflect the financial necessity of supporting a larger household, driving the need to diversify income streams.

Income levels were also positively and significantly correlated with livelihood diversification at the 5% level. This suggests that wealthier households are more likely to engage in a variety of income-generating activities, as they may seek to augment their income further.

Primary occupation had a positive coefficient and was statistically significant at the 5% level, suggesting that the type of primary occupation influences the likelihood of income diversification. Households whose primary occupation is linked to diverse income-generating activities are more likely to diversify.

Support from non-governmental organizations (NGOs) and government agencies showed a strong positive correlation with livelihood diversification, statistically significant at the 1% level. Households that receive support in the form of financial assistance, training, or information are more likely to diversify their livelihoods. This indicates that such support provides households with greater access to resources, opportunities, and encouragement, which facilitates their engagement in multiple income-generating activities. This finding underscores the importance of targeted support from external organizations and government initiatives in promoting economic resilience and diversification in rural areas.

Distribution of Factors affecting livelihood diversification of the respondents

Livelihood diversification indices	Co-efficient	Standard Error	t
Age	0.0005998	0.0007308	0.82
Sex	-0.0218613*	0.008408	2.60
Marital status	0.0098046	0.0065806	1.49
Number of year spent in school	0.0896704***	0.0175306	5.12
Dependency ratio	0.0205314 **	0.0099977	2.05
In-income	0.639418 **	0.2743671	2.33
Years farm of experience	-0.0004585	0.0007764	-0.59
Primary occupation	0.1699828**	0.0772556	2.20
Member of social group	-0.0200405	0.0228702	-0.88
Support from social group	0.0275276	0.0218969	1.26
Support from the government and Non-governmental organization	5.31174 ***	1.791348	2.97
Constant	-9.360433***	0.9872875	-9.48

*** denotes significance at 1%; ** denotes significance at 5%; * denotes significance at 10%

Source: Field survey,

Summary, Conclusion, and Recommendation

Summary of the Findings

This study aimed to identify the factors influencing the diversification of income sources among rural households in Ogo-Oluwa Local Government Area, Oyo State, Nigeria. A multistage sampling method was used to select 120 respondents from the region, with primary data collected through structured questionnaires. Descriptive statistics were employed to analyze the socioeconomic characteristics, while inferential statistics (regression analysis) were utilized to assess the extent of livelihood diversification.

The findings revealed that 81% of the households were male-headed, with over half (55.3%) of the respondents being in their prime economic years. The average age of respondents was 47.29 ± 11.9 years. Nearly half (45%) of respondents had households consisting of one to five members, while the majority of households (84.17%) were headed by married individuals. The most common age range among respondents was 41–50 years (25.83%). Most respondents were male (67.50%) and married (84.17%). A majority of the respondents (53.33%) lived in households with six to ten people, indicating relatively large family sizes. Christianity was the dominant religion (64.17%), and most respondents (38.33%) had completed at least high school. Farming was the primary occupation for 58.33% of the respondents, and over half (52.50%) had more than 20 years of farming experience.

The study further revealed that the average annual farm income for respondents was N558,750. It also highlighted that income sources were diversified, with farming, livestock rearing, and other non-farming activities such as hair styling, food vending, blacksmithing, trading, and various services. Specifically, crop farming was the most common livelihood activity (37.50%), followed by livestock farming (27.50%).

Regarding income sources, 85% of respondents earned a significant portion of their income from non-farm activities, while 50% were members of social groups, and 48.33% received support from these groups. The study identified several constraints that hindered livelihood diversification in the area, including a lack of credit facilities (71.67%), poor infrastructure (55.00%), inadequate technology (40.00%), geographical location (80.83%), and limited access to transportation networks (56.67%). Additionally, the high cost of production (81.67%) and limited government support for SMEs (65.00%) were significant barriers.
The respondents' degree of livelihood diversification was categorized as highly diversified (15.83%), moderately diversified (38.33%), and not diversified (45.83%).

Conclusions

The study found that the majority of respondents were married men in their prime productive years with formal education. The average age of respondents (47.29 years) and household size (six members) indicate a level of experience and support conducive to livelihood diversification. Farming remained the dominant livelihood activity, although many households participated in both agricultural and non-agricultural activities throughout the year. The study identified key socioeconomic factors, including income from both farm and non-farm sources, which influence livelihood diversification. However, despite some diversification, farming remained the predominant occupation for the majority of households.
The main barriers to livelihood diversification in the area included a lack of rural infrastructure, limited access to credit, insufficient marketing facilities, and inadequate technology. The degree of livelihood diversification was primarily influenced by the respondents' abilities, assets, and the activities they engaged in. Ability contributed the most to diversification, followed by assets, while activities had the least impact. The findings suggest that livelihood diversification in Ogo-Oluwa Local Government Area remains relatively low.

Recommendations

To foster livelihood diversification, interventions should focus on addressing the most pressing challenges faced by rural households, such as improving access to assets, reducing production costs, and upgrading infrastructure, including roads and utilities.
The study suggests a positive relationship between education and livelihood diversification. Therefore, policies encouraging education among rural households should be implemented to promote awareness of income diversification opportunities.
Furthermore, the study indicates that households with higher incomes are more likely to diversify their income sources. Policies aimed at financially supporting low-income households could help promote greater diversification.
Encouraging social organization and support networks is crucial for livelihood diversification, as the study showed that participation in social groups and receiving support

from these organizations significantly improved diversification. Policies should therefore aim to strengthen social organizations and facilitate resource-sharing in rural areas.

Additionally, the proportion of working-age individuals to dependents was found to impact diversification. Households with a higher dependency ratio may be more motivated to seek alternative income sources. Policies should focus on providing resources and support to such households to foster diversification.

Finally, government and non-governmental organization (NGO) support for rural households should be encouraged, as the study indicated that receiving assistance from these organizations plays a significant role in boosting livelihood diversification.

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