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Original Research Article

Socioeconomic Factors Influencing Non-Farm Income Diversification in Rural Nigeria: A Case Study of Yobe State

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Abstract: This study examines the determinants of income diversification into non-farming sources among rural farmers, focusing on the influence of demographic and socio-economic factors such as age, gender, marital status, educational level, annual income, farming experience, farm size, and ownership status. Using primary data collected from rural households across six local government areas, the data was analysed using descriptive analysis and chi-square (χ^2) analysis. χ^2 analysis was applied to assess the strength of association between these demographic factors and various sources of non-farming income, including wage employment, self-employment, remittances, and income from livestock. Results indicated significant associations between each demographic factor and income diversification sources, with education, marital status, and income level showing the highest levels of influence. The findings revealed that small-scale farmers diversify their income to mitigate risks associated with agriculture and to achieve economic stability, with the most common sources being wage employment outside agriculture (38.5%) and self-employment (37.8%). This study highlights the role of education in expanding non-farm income opportunities while also illustrating the impact of gender, marital status, and land ownership on diversification sources. Based on these results, the study recommends enhanced access to education and vocational training, improved financial services, and policies that secure land tenure to support sustainable income diversification in rural areas. These insights contribute to a deeper understanding of rural livelihood strategies, offering policy guidance to promote economic resilience and poverty reduction through non-farm income diversification.

Keywords: Non-farming income; income diversification; chi-square; climate change; drought; desertification effects

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1. Introduction

Income diversification among rural farmers involves adopting income-generating activities outside traditional agricultural practices, such as engaging in small businesses, wage employment, or the informal economy. These non-farm sources of income are increasingly significant as rural households respond to various pressures, including climate change, market fluctuations, and diminishing land productivity. Diversifying income sources can offer a buffer against risks associated with agriculture, providing households with additional financial stability and resilience (Ellis, 2000). According to Ellis (1998), income diversification may occur as a deliberate rural farmers' strategy response to a crisis. It can be used as a safety net for the rural poor or a means of accumulation for the rich.

Farming, as the primary source of income for rural small-scale farmers, has not successfully ensured sufficient means of living for most Nigerian farming households (Diao *et al.,* 2010). The effects of climate change and the farmers-herdsmen conflict over agricultural land further aggravate the situation. Therefore, rural farmers struggle with food security and other livelihood-related issues. Diversification is necessary for any developmental strategy and livelihood sustainability (Minot *et al.,* 2006). For instance, by diversifying income sources, rural farmers may avoid the financial risks associated with a sole dependence on crop yields or livestock, especially in regions experiencing significant environmental or economic challenges. This can improve rural households' food security and overall quality of life (Barrett *et al.,* 2001). A study by Babatunde and Qaim (2010) revealed that income diversification significantly contributed to rural small-scale farmers' household income and rapidly increased economic growth and livelihood sustainability. According to Haggblade *et al.* (2010) and Reardon (1997), income from non-farm sources accounted for 35-50% of sub-Saharan African countries. Several developing countries' governments encourage more output diversification because of the critical role income diversification may play in stabilising incomes and reducing rural poverty (Petit & Barghouti, 1992).

1.1 Problem Statement

Agriculture has traditionally been the primary livelihood source of small-scale farmers in many developing countries such as Nigeria. However, reliance on agricultural income alone has become increasingly unsustainable due to climate change, market volatility, and limited land resources. Consequently, there is a growing shift towards non-farm income diversification, encompassing activities outside traditional agriculture, such as small-scale trade, manufacturing, and services. This shift is crucial for enhancing small-scale farmers' resilience and economic stability and promoting overall rural development.

Despite its importance, non-farm income diversification varies significantly across demographic groups. Factors such as age, gender, education level, household size, and land ownership influence both the ability and motivation to engage in non-farm activities. Yet, these demographic influences on non-farm income diversification are not fully understood, limiting policies' effectiveness in supporting rural households in achieving income stability through diversification. The need for a deeper understanding of how demographic factors affect non-farm income diversification is pressing. Exploring these relationships can help policymakers and development organisations better target interventions to support specific demographic groups, encouraging wider participation in non-farm income-generating activities.

Therefore, this research explores the relationship between income diversification sources in non-farm, providing insights for policymakers to create a more inclusive and resilient rural economy. Addressing these constraints is essential for individual farmers and rural development, as non-farm sectors can drive economic growth and reduce poverty. Identifying the determinants factors of non-farm income diversification sources in the study area is important. Therefore, the objectives of this study are 1) to identify the existing income diversification sources pursued by small-scale farmers; and 2) to examine the relationship between demographic factors and the non-agricultural income diversification sources.

2.0 Literature Review

Developing countries' small-scale farmers, such as Nigeria, delve into income diversification due to pull or push factors. Pull factors entice farmers to diversify proactively, connect to commercial agriculture, and seek better economic opportunities to improve livelihoods and enhance resilience (Chamberlin & Jayne, 2012). These factors differ from

push factors that serve as survival-driven motivations for several developing countries' rural income strategies.

Push factors often associated with economic or environmental hardship further drive rural farmers to seek alternative sources of income as a survival strategy. For example, climate variability and land degradation significantly push farmers toward non-agricultural income-generating activities to cope with declining agricultural productivity (Scoones, 1998). Particularly, in regions prone to droughts, floods, or soil degradation, the reliance of small-scale farmers on sole agricultural activities becomes increasingly risky, leading rural farmers to pursue non-farm income diversification sources to buffer against income loss (Bryceson, 2002). Studies by Barrett *et al.* (2001) confirmed that push factors like adverse climatic conditions and low agricultural productivity compel rural farmers and communities to diversify their income in search of economic security and reduce vulnerability to environmental shocks.

Agricultural productivity in many developing countries is highly sensitive to environmental conditions. Bryan *et al.* (2009) highlighted that rural farmers often turn to non-farm income activities in regions where agriculture is frequently impacted by droughts or erratic rainfall. This trend is observed globally but is especially pronounced in areas with high climate sensitivity, such as Sub-Saharan Africa and South Asia, where agricultural losses due to climate events such as changes in temperature, rainfall patterns, or growing seasons significantly reduce agricultural output (Morton, 2007). Adverse climatic conditions such as droughts, desertification, extreme temperature fluctuations, and other climate-related disturbances are increasingly recognised as decisive push factors that drive rural farmers to diversify their sources of income beyond agriculture. This diversification, which often leads to non-agricultural activities, plays a crucial role in enhancing small-scale farmers' household income, reducing dependency on farming, and mitigating the risks associated with agricultural uncertainty.

The unpredictability of rainfall and the increase in extreme weather events associated with climate change make agricultural activities increasingly uncertain, pushing rural households to seek alternative income sources to cope with the shocks (Barrett *et al.,* 2001). This alternative source is a management strategy to mitigate the economic instability caused by climate variability and enhance rural farmers' household resilience (Ellis, 2000).

That attracted rural farmers towards non-agricultural income sources, like risk and seasonality, which are the common reasons for rural farming households diversifying their

activities away from agriculture to deal with agricultural risks and smooth income and consumption (Ellis, 2005; Barrett *et al.,* 2001).

Low agricultural productivity in many rural areas, particularly in developing regions, is often limited by small farm sizes, poor soil quality, and lack of access to essential resources like water, fertilisers, and improved seeds (Jayne *et al.,* 2003; Diao *et al.,* 2010). This productivity gap places economic pressure on rural households that rely primarily on agriculture, driving them to diversify their income sources to survive. According to Ellis (2000), when agricultural output is insufficient to cover basic household needs or meet rising economic aspirations, farmers are compelled to turn to non-farm activities to supplement their income. This diversification is not merely an economic choice but is often necessary to mitigate the risks of low agricultural yields.

Bryceson (2002) observed that in many African countries, declining agricultural productivity due to land degradation and climate change has led to a gradual shift in rural livelihood strategies, with households increasingly relying on non-farm income. This trend, commonly called "de-agrarianisation," illustrates how low agricultural productivity can push rural farmers and families away from farming, encouraging them to seek employment in non-farming sectors such as small business ventures, trade, and wage labour.

Low returns from agricultural activities are a significant factor in the diversification of income sources. Research shows that households facing low agricultural productivity often engage in non-farm income-generating activities to compensate for limited farm earnings and reduce the economic risks associated with volatile agricultural markets (Haggblade *et al.,* 2010). For example, Reardon *et al.* (2001) found that rural households in Latin America increasingly rely on non-farm income due to low and unstable returns from traditional agricultural practices, which are affected by both environmental factors and lack of access to productivity-enhancing technologies.

The decision to diversify is also influenced by the opportunity cost of labour in low-productivity settings. In regions where agriculture yields minimal returns, the time and labour allocated to farming may have higher returns if invested in non-agricultural activities (Lanjouw *et al.,* 2001). For instance, rural farmers may engage in seasonal or part-time non-farm employment to generate a stable income, especially during off-peak farming seasons, thereby balancing agricultural commitments with other forms of income generation (Reardon *et al.,* 2007). This flexible approach to labour allocation allows households to optimise their economic potential in the face of persistent agricultural constraints.

3. Materials and Methods

3.1 Study Area

This study was conducted across six selected Local Government Areas (LGAs) within Yobe State of Nigeria. These LGAs represent rural communities where non-agricultural income diversification is emerging as a vital livelihood strategy. According to the National Bureau of Statistics (2022), Yobe State has one of the highest poverty rates in Nigeria, with over 70% of the population living below the poverty line. Yobe state is in the Northeast of Nigeria with an estimated land area of about 46,609 km^2 between the latitude 12^0 00' north and the longitude 11^0 30' east, sharing an international border with the Niger Republic and a state border with Borno, Gombe, Bauchi, and Jigawa States (NBS, 2011). The state has sixteen (16) local government areas, with an approximate population of 2,321,339 in 2006.

3.2 Sampling Technique and Sample Size

A multi-stage sampling technique was used to select respondents across the six LGAs. Initially, one community was selected from each LGA based on their willingness to participate; six communities from six LGAs were sampled. After that, 64 respondents were randomly selected from each LGA ward, making it a total of 384 respondents from the whole zone. This sample size allows for robust data analysis and generalisation of results across the study region.

Table 1. Sample Size of the Respondents.

Zone	Local Government Areas in the Zone	Wards by LGAs	Sample Size Collected
Yobe South	Machina	Lamisu	64
	Nguru	Afunori	64
	Karasuwa	Bukarti	64
	Yusufari	Sunomari	64
	Yunusari	Ngrabo	64
	Geidam	Kalgeri	64
Total			**384**

Data were collected through trained enumerators using a structured questionnaire administered in face-to-face interviews. The questionnaire covers various aspects of income diversification, including demographic information (e.g., age, gender, education level), economic factors (e.g., household income sources, land ownership), and social factors (e.g., household size, dependency ratio).

Data collected were analysed using Statistical Package for the Social Sciences (SPSS) version 26. Descriptive Statistics (mean, frequency, percentages) were used to summarise the demographic and farm profiles or socio-economic characteristics of the respondents. A Chi-Square (χ^2) test was employed to examine relationships between demographic factors (e.g., education level, household size) with the different identified non-agricultural income diversification sources. This test helps determine if there are statistically significant associations between key variables and respondents' income diversification sources.

4. Results and Discussion

Table 2 summarises the respondents' socioeconomic demographic factors in the study area. As shown in the table, most respondents fall within the age range of 41–60 (49.7%). This age distribution indicates that rural small-scale farmers engaged in non-agricultural income diversification tend to be middle-aged, with fewer younger and older adults represented. The gender distribution among respondents revealed a pronounced male predominance, with 94.3% of participants being male and only 5.7% female.

Table 2. Demographic Characteristics of the Respondents

Variables	Frequency	Percentage (%)
Age (Years)		
21–40	174	45.3
41–60	191	**49.7**
>60	19	4.9
Gender		
Male	362	**94.3**
Female	22	5.7
Marital Status		
Single	24	6.3
Married	354	**92.2**
Widowed	6	1.6
Educational Level		
Never been to School	19	4.9
Islamic School (Tsangaya)	179	**46.6**
Primary School	55	14.3
Secondary School	41	10.7
Certificate	18	4.7

Variables	Frequency	Percentage (%)
Diploma	41	10.7
Bachelor's degree	25	6.5
Master's degree	6	1.6
Household Size (Persons)		
1–5	106	27.6
6–15	252	**65.6**
16–25	23	6.0
26–35	3	0.8
Annual Income in Naira		
Less than or Equal to 50,000	12	3.1
51,000–150,000	60	15.6
151,000–250,000	75	19.5
251,000–350,000	60	15.6
351,000–450,000	32	8.3
451,000–550,000	52	13.5
Greater than or Equal to 551,000	93	**24.2**
Total	**384**	**100%**

The results indicate that 92.2% of the respondents are married, 6.3% are single, and 1.6% are widowed. The predominance of married respondents suggests that rural farmers' marital obligations play a significant role in income diversification decisions. The educational distribution of respondents shows that nearly half (46.6%) attended Islamic schools (Tsangaya or Islamiyya). This displays the potential opportunities associated with non-agricultural income diversification in the study. The result also revealed that 65.6% of respondents had a family size of 6-15 persons; these findings indicate that there may be a strong association between family size and the likelihood of engaging in non-agricultural income activities. The table further shows that 24.2% of the respondents earn an annual income of N551,000 or more, marking the highest income group. These income levels suggest that a substantial portion of rural farmers supplement their agricultural income with other non-agricultural income sources to stabilise and increase household welfare.

For the respondent's farm profile, the result revealed that 37.8% of respondents have been involved in farming for 11-20 years, representing the largest experience group as shown in Table 3. This group is at a critical juncture where they accumulate experience to understand the risks of farming as a sole income source due to fluctuating yields and climate change volatility. About 62.5% of respondents cultivate farmland on a farm size between 1

and 5 hectares. This typically yields lower agricultural output and income, leading many households to seek additional income sources outside farming to stabilise and improve their livelihoods. The result further indicated that 28.6% of the respondents own farmland through inheritance, suggesting that a significant portion of rural households rely on familial land transfers to secure their primary agricultural assets.

Table 3. Respondents Farm Profiles

Variables	Frequency (n)	Percentage (%)
Farming Experience (Years)		
1–10	84	21.9
11–20	145	**37.8**
21–30	96	25.0
31–40	48	12.5
41–50	10	2.6
>51	1	0.3
Farm Size (Hectares)		
1–5	240	**62.5**
6 –10	106	27.6
11–15	28	7.3
16–20	9	2.3
>21	1	0.3
Farmland Ownership		
Self-Owned	69	18.0
Inheritance	110	**28.6**
Family	48	12.5
Rent	44	11.5
Partnership	6	1.6
Government Reserved Area	107	27.9
Total	**384**	**100%**

Table 4 shows that the respondents engage in various income-generating activities, with wage employment outside agriculture (38.5%) and income from self-employment or own businesses (37.8%) representing the two most common sources. Other income sources include agricultural labour on others' farms (2.3%), remittances (0.8%), pensions and government salaries (4.4%), leasing of land and resources (1.0%), income from livestock (8.3%), and fish mongering and processing (1.3%). These diversified income sources reflect

the need and opportunities for rural small-scale farmers to expand beyond agriculture to build more resilient livelihoods.

Table 4. Identification of Current Income Diversification Sources

Income Diversification Sources	Frequency (n)	Percentage (%)
Wage employment outside of Agriculture	148	**38.5**
Wage from the Agricultural labour supply on other people's farms	9	2.3
Income from self-employment or an owned business	145	**37.8**
Remittances received from family members and relatives	3	.8
Pension/share dividend /government salary	17	4.4
Revenue from leasing out land and other resources	4	1.0
Income from livestock	32	**8.3**
Income from fish mongering and processing	5	1.3
Total	**384**	**100%**

The results from the χ^2 analysis are displayed in Table 5, which provides insights into the relationships between key demographic factors and non-farm income diversification among the respondents. This analysis is essential in identifying which demographic characteristics are significantly associated with the choice or success of non-farm income sources, thereby illuminating broader patterns in rural economics.

Table 5. Summary of the χ^2 Analysis

Variables	χ^2 Value	p-value
Age	39.96	0.001**
Gender	29.97	0.000**
Marital Status	52.90	0.000**
Educational Level	115.40	0.000**
Household Size	31.80	0.132
Annual Income	67.14	0.035*
Farming Experience	62.81	0.012*
Farm Size	13.40	0.099
Farm Ownership	85.81	0.001**

Note: **Significant at 1% level of significance, *Significant at 5% level of significance

The observed χ^2 values indicate the degree of association, where higher values generally signify stronger relationships between each demographic factor and various sources of non-farm income diversification. Regarding the respondents' age, the χ^2 test indicated a significant association between age and the sources of non-farm income diversification at $p < 0.01$ significance level. This is because middle-aged individuals may be more inclined to pursue stable income sources outside of farming to supplement their farm income and sustain their households. This finding is consistent with the results of Oluwatusin and Sekumade (2016), who state that young and middle-aged rural farmers prefer having more than one source of income than the older ones. Gender, with a χ^2 value of 29.97, shows a meaningful association with non-farm income diversification at $p < 0.01$. This may be related to most rural settings, where men and women have different access to resources, opportunities, and income sources. Men may dominate in wage employment outside agriculture and ownership-based businesses. At the same time, women often engage in home-based activities such as small-scale retail, handicrafts, or processing and selling food products.

For marital status, the χ^2 value (52.9) suggests a strong association with income diversification practices. Married individuals, especially those with dependents, often seek diversified income sources to ensure financial stability and support household needs. Concerning the educational level, it has the highest χ^2 value (115.4), underscoring its significant association with non-agricultural income diversification at $p < 0.01$ significance level. Education generally broadens individuals' skill sets, making rural farmers more competitive for non-farm employment and enhancing their entrepreneurial capacity. This result is consistent with the results from other studies on diversification behaviour in Africa (Barrett, Reardon, and Webb 2001; Lanjouw *et al.* 2001; Abdulai CroleRees 2001), where education was found to be a key determinant of the diversification of income-generating activities.

The result of the annual income (67.14) indicates that income levels are significantly associated with non-farm diversification sources at a $p < 0.05$ level of significance. Higher-income small-scale farmers may have the resources to invest in non-agricultural ventures, such as retail businesses or property leases, creating a feedback loop where diversified income generates further capital for investment. This study confirmed the prior survey of Sallawu *et al.* (2016), who found that annual income can be a source of investment in non-farming activities. Farming experience, with a χ^2 result of 62.81, is also significantly related to non-agricultural income diversification. Experienced farmers may leverage their agricultural knowledge to enter complementary sectors, such as agricultural processing or

livestock trading, which utilise their skills while expanding their income sources. The relatively lower χ^2 value for farm size (13.40) indicates no significant association with non-farm income diversification. Farmer with larger farmlands might be less inclined to diversify income due to their considerable investment and reliance on farming. These findings disagree with the result of Yizengaw *et al.* (2015) that only smallholders with smaller farm sizes tend to diversify into other non-farm income sources. The χ^2 value for farm ownership (85.81) highlights a strong association with non-agricultural income diversification at $p < 0.01$. Owning land provides security, enabling farmers to take risks in non-farm income ventures or lessen the need for non-agricultural income diversification

5. Conclusion and Recommendations

The analysis of non-agricultural income diversification among rural farmers demonstrates that demographic factors such as age, gender, marital status, educational level, average annual income, farming experience, farm size, and land ownership significantly influence the choice and success of diversified income sources. These findings underscore that rural small-scale farmers pursue diverse income sources to enhance financial resilience, mitigate agricultural risks, and improve overall livelihoods. Wage employment outside agriculture, self-employment, and income from livestock were identified as predominant sources of diversification, highlighting a gradual shift away from sole reliance on farming. The demographic associations with these choices reveal complex socio-economic dynamics within rural communities, reflecting individuals' opportunities and constraints in seeking additional income sources.

Education emerged as a potent factor, enabling farmers to access higher-paying, more sustainable income streams. Other factors, such as marital status and gender, also indicate social dimensions influencing diversification. Overall, the data affirmed that non-agricultural income sources are vital to rural households' strategies for economic stability, contributing to poverty alleviation and resilience in the face of agricultural uncertainties.

For the recommendations of this study, it is as follows:

1. **Enhance Education and Skill Development**: Given the strong association between educational level and non-farm income diversification, efforts should improve rural areas' access to education and vocational training. Such initiatives would enable individuals, especially youth and women, to participate in diverse non-farm income activities, improving household financial security.

2. **Promote Gender-Inclusive Opportunities**: The significant impact of gender on income diversification suggests a need for policies that provide equitable opportunities for both men and women. Programs should support women in accessing skill-building, financing, and business opportunities, enabling them to engage in diversified, profitable activities that enhance household income.
3. **Strengthen Land Tenure Security**: With farm ownership significantly influencing income diversification, policies that secure land tenure and support land leasing can encourage farmers to engage confidently in diversified ventures. Secure land tenure can serve as collateral for credit and provide a foundation for sustainable income diversification activities.
4. **Encourage Community-Based Enterprises**: Given that age experience can play a role in income diversification, community-based initiatives such as cooperatives and collective enterprises may be beneficial. Such structures can facilitate resource-sharing, skill exchange, and access to larger markets, particularly for small-scale entrepreneurs in rural areas.

These recommendations address structural and social barriers to non-agricultural income diversification, supporting rural households in achieving sustainable economic growth and resilience against agricultural vulnerabilities. By implementing targeted interventions that recognise the complex demographic influences on income diversification, policymakers can help foster diversified, stable rural economies that contribute to the broader goals of poverty reduction and sustainable development.

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