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Factors influencing rural migrant households' participation in livelihood activities and income diversification strategies in Southwestern Nigeria

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ABSTRACT
This study focuses on factors influencing rural migrant households' participation in livelihood activities and income diversification strategies in southwest Nigeria. A multistage sampling technique was used for the study. This involved purposive selection of Ekiti, Osun, and Oyo states and twenty percent of the rural Local Government Areas (LGAs) in the respective states. Ten percent of wards in each LGA and 40% of migrant households were randomly selected to arrive at 413 respondents. A structured questionnaire was used to collect relevant data for the study. The collected data were analysed using descriptive statistics, estimation of SID, and multinomial logit regression. The findings showed that 72.75% of household heads were males. 76.75% of the respondents were first-generation migrants, with a mean duration of stay of 29.51 years. The SID revealed that income-generating activities among migrants are moderately (0.53) diversified. The primary factor influencing migrant households' preference for non-farm and off-farm activities over farm activities was the size of their land holdings. The study recommends that government and other stakeholders should adopt strategy to improve access to non-farm and off-farm employment opportunities, particularly in rural areas, by encouraging corporate and private investors to invest in rural areas to solve the problem of unemployment during off-seasons.

Contribution/Originality: The study contributes to existing body of knowledge of livelihood diversification. The study assisted in identifying the role of asset endowment in livelihood diversification strategies and income generation among migrant households in the region. Specifically, it offered a glimpse of what rural migrants consider the most attractive livelihood option.

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1.INTRODUCTION

Agriculture is an important sector for rural dwellers in Nigeria and other developing countries of the world because it is their main source of livelihood. Although Nigeria's rural economy is largely agrarian, only a minority derive their sources of income exclusively from farming. This view is corroborated by Djido and Shiferaw (2018), who pointed out that about eighty percent of rural households in Nigeria diversify their livelihood activities. Despite constraints that appear to limit their social and economic opportunities, these rural people find ways to mitigate the impact of declining income from farm activities (Eneyew & Bekele, 2012; Samuel & Sylvia, 2019).

Migration has been documented as one of the many strategies that rural households and individuals employ to diversify their livelihoods (Awumbila, 2017; World Bank, 2017). The existence of inequalities and livelihood opportunities between rural areas in terms of access to economic resources and development is known to be a major cause of rural-rural or urban-rural migration (Chand, 2012; Ogunniyi, Mavrotas, Olagunju, Fadare, & Rufai, 2018).

Migrants are people who have left their homes or usual place of residence to a new location temporarily or permanently to reap social and economic benefits (Olagunju, Ogunniyi, Oguntegbe, Rahji, & Ogundari, 2019; Young, 2013). Despite conditions that tend to limit their social and economic opportunities, migrants in rural areas find ways to ensure their survival. One of the commonest ways by which they meet their needs is by combining various activities that will ensure their survival within the society or localities they find themselves (Gberu, Amare, Mavrotas, & Ogunniyi, 2018).

Intra-rural migration is typically undertaken by poorer households with low levels of education and other assets, as it requires lower investment. It is one of the commonest coping strategies adopted by poor rural households to stabilize their livelihoods and to adapt to climatic, environmental, social, and economic changes. Farmers often combine this with other livelihood activities like agricultural intensification and local non-farm and off-farm activities (Gberu et al., 2018).

In recent years, the body of literature on development process has emphasized what is generally referred to as rural livelihood and livelihood diversification. A key concept of livelihood is the strong link between asset endowments, activities, and income generation, as well as socio-economic factors affecting the use and return of household assets. According to Ellis (2000), livelihood comprises the assets (human, social, financial, physical, and natural), activities (which include crop production, livestock production, self-employment, farm labour, non-farm labour, off-farm labour) and access to all these, facilitated by social institutions that determine the welfare of an individual or a household. These assets can be stored, transferred, or exchanged during income-generating activities (Walelign, 2016).

There are several ways to define livelihood diversification. A definition of livelihood diversification is the attempt by households or individuals to find new ways to raise income. It is also the process by which individuals and households construct a range of activities and social supports for survival in order to improve their well-being. Thus, a household or an individual with three sources of income is considered more diversified than the one with two income outlets (Eneyew & Bekele, 2012; Samuel & Sylvia, 2019). Most often, the term "rural livelihood diversification" refers to expanding into non-farm and off-farms income, as solely relying on farm activities has not ensured a sustainable livelihood for rural households. Diversification as a rural livelihood strategy involves maintaining over a long time a diversified portfolio of activities and a regular adjustment to contingencies for the purpose of increasing profit, spreading risks, reducing income shocks, or achieving other household goals (Awotide, Awoyemi, Diagne, Kinkingnihoun, & Ojehomone, 2012; Murata & Miyazaki, 2014; Nguyen, Nguyen, Do, Nguyen, & Grote, 2022).

With respect to factors influencing livelihood diversification, the empirical literature offers mixed results. Furthermore, the conceptualization of livelihood diversification as having multiple income streams without considering their respective weights and transfer payments, such as remittances, is overly restrictive. Some studies in Nigeria, which include Babatunde and Matin (2009), Fabusoro, Omotayo, Apantaku, and Okuneye (2010), and Abiodun, Olutumise, and Ojo (2019), have used Simpson's Index of Diversity to report the degree of livelihood diversification without any recourse to other factors that affect choice of livelihood activities before conclusions can be drawn on drivers of livelihood diversification.

Some reports, including that of FAO (2018), have revealed that migrants in rural areas are sometimes restricted due to a range of factors, including climate change, resource limitations, material uncertainties, and land tenure systems prevalent in their various locations. Therefore, it is necessary to examine the factors that influence migrant households' choice of livelihood activities and the income shares from those activities. The emphasis here is on the role of households' asset endowments, namely, human, social, natural, physical, and financial capital. The total household income is the aggregate measure of all the outcomes of all activities (farm, non-farm, off-farm) the household is engaged in. There is also the need to ascertain the key drivers of livelihood diversification.

2. METHODOLOGY

2.1. Scope of the Study

The study was carried out in Nigeria's southwestern geopolitical zone, which spreads between latitudes 6°21' and 8°37' N and longitudes $2^{0}31'$E and $2^{0}31'$. It has a land area of 114,271 square kilometers, representing 12% of the country's land mass. The 2006 national population census estimated the zone's population at 21,974,678. This zone is made up of four different sub-ecologies, namely, derived savannah, moist and dry lowland, mangrove forests, and swamps. It comprises 6 states, namely; Ekiti, Lagos, Ogun, Ondo, Osun, and Oyo. Large portion of Osun, Oyo, and Ekiti are covered with derived savannah, while Lagos, Ondo, and Ogun states have a sizeable portion of their lands covered with tropical rainforests with swamps along the coastline zone. The region is characterized by a tropical climate, usually with distinct rainy and dry seasons and a main growing season lasting about 9 months. The average

annual rainfall with peaks in July and September is 1480 mm. During the dry season, the monthly temperature ranges from 18°C to 24°C and 30°C to 35°C during the rainy season.

The main source of income for the people living in this zone is rain-fed agriculture, which is characterized by arable cropping with cassava, maize, and yam as the main crops. Commonly grown are tree crops such as cocoa, cashew, oil palm, and kolanut. The zone is also well-known for business and trade in addition to farming, which is the main economic activity in rural villages. There are many micro, small, and medium-sized businesses in the area that are involved in production, manufacture, and agro-allied enterprises. Culturally, the South West zone is home to a diverse array of ethnic nationalities, with the Yorubas being the majority and having the most dominant language.

The study placed emphasis on migrant households in the selected rural areas. For this study, respondents must have been residing in their new location for at least one year and have migrated from one local government area to the other. Another layer of migrants that were considered are foreigners who move in from different parts of Africa.

2.2. Sample Size and Sampling Procedure

The study used a multistage sampling technique to select the respondents for the study. Ekiti, Osun, and Oyo states were purposively selected from the six states of the southwest of Nigeria due to their low level of urbanization. Twenty percent of the rural LGAs were randomly selected in the respective states. Ten percent of wards in each LGA were randomly selected. Prior to the survey, leaders of selected descendant associations in chosen wards facilitated the availability of member lists, which formed the sampling frame for migrant households, from which 40% of households were randomly selected to arrive at 413 respondents.

2.3. Data Collection

Structured questionnaire was used to collect data on respondents' generational status, duration of stay, household assets, livelihood activities, and other important variables relevant to the study.

2.4. Method of Data Analysis

Data were analysed using descriptive statistics (frequency counts, percentages, mean and standard deviation), estimation of Simpson's Index of Diversity (SID), and multinomial logit regression model.

2.5. Measurement of Overall Income Diversity

Simpsons Index of Diversity encompasses both the count of income sources and the significance or uniformity of these sources, as articulated by Minot, Epprecht, and Trung (2006). It is calculated using the following formula:

$$d = 1 - \sum Pi^2 \quad (1)$$

Where d = Simpsqn's index of diversification.
n = number of livelihood activities.
Pi = proportion of income generated from each activity.
i = number of income sources indexed by i.

This metric of income diversification (d) quantifies the variety of income sources numerically and ranges between zero and one. A value closer to one indicates greater diversity in household income, with a diversification index of one signifying extreme diversification. The index is formulated by evaluating each income source, weighted by its proportionate contribution to the total income.
The empirical model for (d) is articulated as follows:

$$d = 1 - \sum_{i=1}^{3} \left(\frac{fincom}{thi}\right) + \left(\frac{Nfincom}{thi}\right) + \left(\frac{Offincom}{thi}\right) \quad (2)$$

Where:
Fincom = Farm income.
Nfincom = Non-farm income.
Offincom = Off- farm income.
Thi = Total household income.

This approach, aimed at assessing income diversification, is more inclusive as it considers transfer payments to individual households. The index has been employed in studies by Ahmed, Bhandari, Gordoncillo, and Quicoy (2018), Djido and Shiferaw (2018), and Abiodun et al. (2019).

2.6. Econometric Specifications

2.6.1. The Multinomial Logit Model

The classification of households based on their income mix strategies served as the foundation for formulating and estimating the multinomial logit model, which assesses the probability of belonging to one of the activity income groups. Farm, non-farm, and off-farm were the designated categories for farm activities. The objective is to understand how each explanatory variable influences the likelihood of a household head engaging in non-farm activities compared to farm activities, which serves as the base case. The model assigns each individual to one of the categories with a specific probability. Households in the study area can choose from three different income activity options.

Researchers have used a similar methodology to examine the characteristics of households associated with various activities. Examples include studies by Adepoju and Oyewole (2014), Maja and Oluwatayo (2018), and Abiodun et al. (2019).

Following Kennedy (1986), the multinomial logit model is expressed as:

$$P_{ij} = \frac{\exp(X_i y_j)}{1 + \sum^{3} \exp(X_i y_j)} \quad (3)$$

$$P_{ij} = \frac{\exp(X'_i y_j)}{1 + \sum_{j-1}^{2} \exp(X'_i y_j)} \quad (j=1, 2) \quad (4)$$

$$P_{i0} = \frac{1}{1 + \sum_{i-1}^{2} \exp(X'_i y_j)} \quad (5)$$

Where P*ij* = The probability linked to the income activity choices of a household "i" is denoted by "j," where j=0 if the household exclusively engages in farm activities, j=1 if the household participates in non-farm activities, and j=2 if the household partakes in off-farm activities.
X_i = represents the explanatory variables that remain constant across these alternatives.

3. RESULTS AND DISCUSSION

3.1. Socio-Economic Characteristics of Rural Migrant Households

The socio-economic characteristics of the respondents (Table 1) show that the majority (72.25%) are male, whereas 27.25% were female. This indicates a higher occurrence of male-headed households in rural settings. Consequently, this gender imbalance is likely to affect the respondents' choices regarding diversifying their livelihoods. Men often perceive themselves as more active and motivated to improve the wellbeing of their household members, which may lead them to pursue additional income-generating activities. The average age of household heads, which is 49.97 years, indicates that the age range of migrant household heads falls within the productive years. This aligns with previous research conducted by Fabusoro et al. (2010) and Oyesola and Ademola (2011), who reported that rural labor forces in the southwestern region of Nigeria generally range from 20 to 55 years old. Consequently, the household heads in this study are more likely to seek additional avenues for income generation.

The majority (85.25%) of the respondents are married, while about 84.5% had access to formal education, with the average year of formal education estimated at 7.81 years. The literature widely acknowledges a positive relationship between access to education and involvement in income-generating activities. Babatunde and Matin (2009) emphasized that education significantly and positively influences the diversification into non-farm income. The level of literacy within rural farm households is vital for improving productivity, enhancing production efficiency, and ultimately increasing income, leading to a more diverse range of income sources for improved well-being. As household heads are typically responsible for decision-making within the household, their educational background greatly influences their choice of livelihood strategies.

The result further indicates that majority of respondents (73.50%) had a household size of 4 to 8 individuals, with an average household size of 8. This suggests a relatively large family size within migrant households. These results align with the research conducted by Fabusoro et al. (2010), which also found that relatively large household sizes are prevalent in rural areas. Consequently, in the study area, a larger household size implies that there is a higher likelihood of diversified income sources if all members contribute to the overall welfare of the household.

The results also showed that majority (91.25%) of household heads were physically fit, 76.75% of them were first-generation migrants, and 85% of the respondents have spent at least 15 years as migrants in their respective locations, with the mean duration of stay estimated to be 29.51 years. According to Hendriks, Martinj, Julie, and Espinova (2018), length of stay in a location is an important determinant of migrants' welfare. They are of the opinion that migration is often considered a long-term investment into one's future and that standard of living is expected to gradually improve over time after the initial challenges, such as cultural differences and environmental-related issues, are overcome. Demireva (2019) also found out that most migrants experience more positive and significant impact of migration over time than negative ones. Some results have also emerged from literature that length of stay of migrants is positively related to acquisition of assets and social integration (Borodak & Tichit, 2013; Mara & Landesmann, 2013).

The results further reveal that about 95.5% had access to electricity from the national grid for less than 36 hours in a week, and about 78.75% had at least one livestock unit. Power is a crucial element of rural infrastructure that plays a significant role in expanding non-farm opportunities in rural areas. It contributes to the establishment of rural enterprises, reduces operational costs, minimizes labor requirements for time-consuming tasks, and enables individuals to allocate more hours towards selected rural non-farm activities. Access to electricity and its reliability directly impact the income-generating activities of rural migrant households and encourage them to diversify their livelihood strategies.

Livestock provide income and employment for producers (Herrero et al., 2013). The respondents had various categories of livestock, such as goats, sheep, cows, rabbits, and chickens, that are at various stages of development. The Tropical Livestock Unit (TLU) conversion index was used, depending on the type of livestock. About 73% of the respondents were members of one or more social organizations. The level of participation in social organizations and

decision-making of such organisations largely affects access to networks, credit information of cooperatives, and other forms of social assets that enhance the economic strengths of rural dwellers for livelihood diversification.

Regarding the size of land holdings of respondents, 86.5% had at least 2ha with a mean of 11.29 ha. About 92.25% of respondents covered at least 15 km from their locations to urban center, with a mean distance of 18.37 km. The household disposable asset of the majority (51%) was in the range of ₦ 1,000,000 to ₦ 2,000,000, while only 43% had access to credit. Disposable assets are those that can be used to pay off debt in a hurry and reduce the impact of income shocks. Having disposable assets also gives households freedom to get quick access to cash when there is a need to dabble into new business ventures. Having disposable assets is crucial for meeting current needs and creating long-term plan. By implication, the more the household's disposable assets, the more likely they are to be able to diversify their income sources.

Access to credit by households or individuals residing in rural areas is important because it helps to break the vicious circle of low capital, low productivity, and low levels of savings that usually characterize rural economies. Access to credit plays a crucial role in rural households as it aids in mitigating the negative effects of income fluctuations and enables the diversification of livelihood activities (Abraham, 2018). The rural economy can grow only if it has an adequate flow of finance. Provision of credit facilities has been discovered to enable rural dwellers to buy farm inputs and expand their businesses. Access to credit helps alleviate financial constraints and enhances the ability of households to initiate off-farm and non-farm enterprises (Oyinbo & Olaleye, 2016).

Table 1. Socio-economic characteristics of rural migrant households.

Variables	Frequency	Percentage
Female	109	27.25
Male	291	72.75
<30 years	6	1.50
30-40 years	80	20.00
41-50 years	134	33.50
51-60 years	102	25.50
Above 60 years	78	19.50
Mean	49.97	
Standard deviation	10.25	
Married	341	85.25
Widow/Widower	37	9.25
Divorced/Separated	22	5.50
0 year	62	15.50
1-6 years	157	39.25
7-12 years	129	32.25
Above 12 years	52	13.00
Mean	7.81	
Standard deviation	4.86	
<4 persons	29	7.25
4-8 persons	294	73.50
9-12 persons	59	14.75
Above 12 persons	18	4.50
Mean	8	
Standard deviation	2.69	
Healthy	365	91.25
Permanently ill	35	8.75
First generation	307	76.75
Second generation	93	23.25
<15 years	60	15.00
15-25 years	140	35.00
26-35 years	67	16.75
Above 35 years	133	33.25
Mean	29.51	
Standard deviation	14.71	
0	111	27.75
<15 hours	23	5.75
15-25 hours	132	33.00
26-35 hours	116	29.00
Above 35 hours	18	4.50
< 1	85	21.25
1 – 2.5	156	39.00
2.6 – 3.5	43	10.75
Above 3.5	116	29.00
Mean	12.95	
Standard deviation	27.77	
0	106	26.50
1	130	32.50
2	111	27.75

Variables	Frequency	Percentage
3	52	13.00
4	1	0.25
<2ha	54	13.50
2ha- 4 ha	164	41.00
4.4ha -6 ha	102	25.50
Above 6 ha	80	20.00
Mean	11.29	
Standard deviation	6.38	6.38
< 5km	31	7.75
5-15km	129	32.25
16-25km	153	38.25
Above 25km	87	21.75
Mean	18.37	
Standard deviation	8.73	
<1,000,000 Naira	58	14.50
1,000,000-2,000,000 Naira	204	51.00
2,000,001-3,000,000 Naira	83	20.75
Above 3,000,000 Naira	55	13.75
Mean	2.186,513	
Standard deviation	2,122.428	
No	220	55.00
Yes	180	45.00

Source: Field survey, 2023.

3.2. Major Sources of Income of Household Heads in the Study Area

Results in Table 2 show that more than half (53%) of the respondents engaged in farming as their major occupation, 27.75% chose non-farm as their major source of livelihood, and 19.25% of the migrant households were involved in off-farm activities as their primary means of livelihood. Non-farm activities provide employment for the landless. Off-farm activities are agriculturally related but occur beyond the farm. Examples of off-farm services include extension services, processing, packaging, storage, and transportation. Diversification of income sources into farm and non-farm enhances food security, increases agricultural production by alleviating capital constraints, and also helps to better cope with environmental shocks.

Table 2. Distribution of respondents based on major source of income of household heads.

Major source of income	Frequency.	Percent
Farm	212	53.00
Non-farm	111	27.75
Off-farm	77	19.25
Total	400	100

Source: Field survey, 2023.

3.3. Number of Income Outlets of the Respondents

Rural areas have unique socio-economic dynamics, meaning that most rural dwellers make their living from their relationship with land-based industry. This section presents livelihood diversity in the study area based on the number of income sources. Table 3 shows that 21.25% of the respondents had only one source of income, while 24% relied on two income sources. Also, 20.75% of the respondents had three sources of income, 15.75% had four sources, 8.75% had five income outlets, and 6.75% had 6 income outlets, while 2.50% of them had 7 sources of income. On cumulative basis, 46.25% of the migrants had 1 to 2 income sources, while 66.00% had between 1 and 3 income outlets.

Table 3. Distribution of households according to number of income outlets.

Income source outlets	Freq.	Percent
1	85	21.25
2	96	24.00
3	83	20.75
4	63	15.75
5	35	8.75
6	27	6.75
7	11	2.75
Total	400	100

Source: Field survey, 2023.

3.4. Primary Occupation of Household Heads

Table 4 presents the primary occupations of household heads. The table shows that 44.25% of the respondents chose farming as their primary occupation. Those who chose teaching, commercial transportation, commercial motorcycle riding, and retailing formed 13.00%, 11.00%, 6.00%, and 6.00% of the rural migrants, respectively. Others include blacksmithing, carpentry, hair plaiting, palm wine tapping, paid employment, tailoring, and vulcanizing.

Table 4. Distribution of household heads according to primary occupation.

Primary occupation of households	Freq.	Percent
Blacksmithing	16	4.00
Carpentry	9	2.25
Farming	177	44.25
Hair plaiting	18	4.50
Motorcycle operator	24	6.00
Palm wine tapping	14	3.50
Paid employment	4	1.00
Retailing	24	6.00
Tailoring	16	4.00
Teaching	52	13.00
Transporter	44	11.00
Vulcanizing	2	0.50
Total	400	100.00

Source: Field survey, 2023.

3.5. Livelihood Diversification among the Rural Migrant Households

The results presented in Table 5 show that among household heads who engaged in farming as their major source of income, 47.64% had SID values that ranged from 0.41-0.60, and 30.19% had SIDs that were above 0.60. Those with SIDs of 0.20-0.40 accounted for 21.23%, while the remaining 0.94% had SID estimates that were less than 0.20. For household heads that chose non-farm as their main livelihood activity, 45.95% had SID estimates that ranged from 0.41-0.60, 40.54% had SID estimates well above 0.60, while those who had SIDs of 0.20-0.40 formed 12.61%, and the remaining 0.90% had less than 0.20. With respect to household heads that took off-farm as their main source of livelihood, 44.16% and 44.16% had SID values that range from 0.41-0.60 and above 0.60, respectively. The remaining 11.69% had SID estimates between 0.20-0.40. It will be observed that the household heads with SID estimates that range from 0.41-0.60 were prevalent across the three income sources. Furthermore, the results revealed that the off-farm activities have the highest SID. This is similar to the findings of Anang and Yeboah (2019), who asserted that the income from off-farm work complements income from farm activities and helps to expand other economic activities.

Overall, the results revealed that less than one percent (0.75%) of the rural migrant household heads had SID of less than 0.20. While seventeen percent (17%) of the migrant households had SID ranging between 0.20 and 0.40, 47.5% (0.41-0.60) and 35.75% had above 0.60. The average livelihood diversification index was 0.53; this is an indication that livelihood activities of the respondents are moderately diversified. The findings are similar to those of Oni and Fashogbon (2013), who asserted that households in rural areas, including those of migrants, are risk-neutral with SID of 0.53. The moderate level of livelihood diversification in this study could be attributed to major challenges that are peculiar to rural migrants. These may include constraints such as low levels of assets, inadequate rural infrastructural facilities, erratic power supply, and inadequate credit facilities, among others, which militate against a suitable environment for venturing into many livelihood activities.

Table 5. Distribution of the migrants based on Simpson's income diversity index.

Simpsons income diversity index	Farm	Non-farm	Off-farm	Total	Mean
<0.20	2 (0.94)	1 (0.90)	0 (0.00)	3 (0.75)	0.53
0.20-0.40	45 (21.23)	14 (12.61)	9 (11.69)	68 (17.00)	
0.41-0.60	101 (47.64)	51 (45.95)	34 (44.16)	186 (46.50)	
Above 0.60	64 (30.19)	45 (40.54)	34 (44.16)	143 (35.75)	
Total	212 (100.00)	111 (100.00)	77 (100.00)	400 (100.00)	

Note: Figures in brackets are in percentages (%).

3.6. Determinants of Household Choice of Livelihood Activities

Table 6 presents the results of the multinomial logit model, which examines the determinants of migrant households' choice of livelihood activities. The model includes three outcome variables: farm activities, non-farm activities, and off-farm activities, with farm activities serving as the reference group. The total assessed a total of 10 explanatory variables, identifying four statistically significant in the non-farm activity equation and two as significant in the off-farm activity equation. The overall model was determined to be statistically significant, with a Wald chi-square ratio of 42.27 and a p-value of 0.0025. The model has a log likelihood of -378.11236.

3.7. Non-Farm Activities Relative to Farm Activities

The age of household heads was found to have a positive impact at a significance level of 5%. This suggests that a one-unit increase in age increases the likelihood of choosing non-farm activities over farming activities by 0.0357 units, assuming all other variables remain constant. This finding aligns with the research by Nmeregini and Udoka (2021)

indicating that older household heads are more likely to participate in non-farm activities, potentially due to health challenges associated with old age. Household size negatively influenced the choice of livelihood activity at a significance level of 10%. This implies that a one-unit increase in household size decreases the likelihood of choosing non-farm activities as a livelihood option relative to farming activities by 0.1271 units, assuming other variables remain constant. This result is consistent with the findings of Babatunde and Matin (2009) and Adepoju Abimbola and Obayelu Oluwakemi (2013) but contradicts the findings of Ahmed and Melesse (2018). The large household size often leads to a focus on farm-related activities as a way to increase income and meet the family's food needs.

Furthermore, the multinomial regression estimates demonstrate that farm size is highly significant at a significance level of 1% and has a negative influence. When all other variables remain constant, a one-unit increase in farm size reduces the likelihood of choosing non-farm activities as a livelihood choice by 0.0585 units. This finding aligns with the research by Abiodun et al. (2019), suggesting that households with larger farm sizes tend to specialize in farming as their primary income source. Vocational training has a positive and significant influence on livelihood activity choice at a significance level of 1%. This means that the log odds of migrants who have undergone vocational training relative to those who have not undergone training are 0.7447 units higher in choosing non-farm activities over farming activities, assuming all other variables remain constant. This implies that migrants with specialized skills have more time dedicated to their vocations and are less likely to engage in farming activities.

3.8. Off-farm Activity Relative to Farm Activity

Participation in off-farm activities refers to engaging in paying jobs related to farming outside of one's own farm. Researchers have found that these activities significantly contribute to livelihood security. Off-farm income, derived from activities such as crop processing, hunting, gathering, and palm tapping, supplements on-farm income and promotes economic expansion among rural communities. The estimates from multinomial regression (Table 6) demonstrate that farm size has a significant impact on the choice of off-farm activity as a livelihood. This significance is observed at a 1% level and is negative. This suggests that the availability of land for farming purposes influences the decision to engage in off-farm activities. Specifically, a one-unit increase in farm size leads to a 0.0682 reduction in the log odds of choosing off-farm activity as a source of livelihood, holding other variables constant. These findings align with previous studies by Ahmed and Melesse (2018) and Abiodun et al. (2019). Furthermore, the coefficient for the value of disposable assets significantly influences the choice of activity at a 1% significance level and is negative. This suggests that a one-unit increase in the value of assets leads to a 3.852e-07 unit decrease in the log odds of choosing off-farm activity, while maintaining the same level of other variables. The results indicate that migrant household heads with higher levels of disposable income are less inclined to engage in off-farm activities. This finding contradicts the expectations set forth by Babatunde and Matin (2009), which anticipated a positive relationship. The discrepancy may be due to the poor compensation associated with self-employment in the non-farm activities in rural areas.

Table 6. Multinomial logit regression estimates of determinants of household choice of livelihood activities.

Variables	Non-farm			Off-farm		
	Coefficient	Z	P> |z|	Coefficient	Z	P> |z|
Sex	-0.3346 (0.2658)	-1.26	0.208	-0.0793 (0.3235)	-0.25	0.806
Age	0.0357** (0.0163)	2.19	0.028	0.0094 (0.0177)	0.53	0.596
Household size	-0.1271* (0.0675)	-1.88	0.060	-0.0273 (0.0681)	-0.40	0.688
Education years	-0.0017 (0.0260)	-0.07	0.947	-0.0211 (0.0301)	-0.70	0.483
Farm size	-0.0585*** (0.0217)	-2.69	0.007	-0.0682*** (0.0235)	-2.90	0.004
Value of assets	-0.000000109 (0.0000000807)	-1.36	0.175	-0.000000385*** (0.000000137)	-2.81	0.005
Dependency ratio	0.1869 (0.2567)	0.73	0.466	0.0877 (0.2822)	0.31	0.756
Migrant generation	-0.3229 (0.2903)	-1.11	0.266	-0.2021 (0.3276)	-0.62	0.537
Vocational training	0.7447*** (0.2775)	2.68	0.007	0.0802 (0.2968)	0.27	0.787
Credit access	0.1139 (0.2469)	0.46	0.644	0.2131 (0.2779)	0.77	0.443
Constant	-0.9524 (0.8335)	-1.14	0.253	0.3455 (1.0425)	0.33	0.740
Observation = 400 Wald chi^2 (20) = 42.27 Prob> chi^2 = 0.0025 Log likelihood = -378.11236 Standard error in parenthesis						

Note: ***, ** and * represent level of significance at 1%, 5% and 10% respectively.

3.9. Marginal Effect of Determinants of Household Choice of Livelihood Activities

Table 7 presents the Marginal Effect (ME) of the explanatory variables. With an increase in age, there is a decrease in the probability of choosing farm activity as the main livelihood activity by 0.0055 unit (P= 0.068). However, the same variable increases the probability of choosing a non-farm activity by 0.0062 unit (P= 0.026), assuming all other variables remain constant. An increase in household size by one unit decreases the probability of choosing a non-farm activity by 0.0224 unit (P=0.060), holding other variables constant. The marginal effect of farm size on the choice of livelihood activity shows that an increase in the farm size by one unit increases the probability of choosing farm activity by 0.0140 unit (P= 0.000). In contrast, increasing the same variable by one unit will reduce the probability of choosing non-farm activity (P= 0.064) and off-farm activity (P= 0.038) by 0.0071 and 0.0068 units, respectively, assuming other variables remain constant.

Increasing the value of assets by one unit increases the probability of choosing farm activity (P=0.004) by 5.02e-08 units, while reducing the probability of choosing off-farm activity (P=0.010) by -5.12e-08 unit, holding other variables constant. Acquiring vocational training lowers the probability of choosing farm activity (P= 0.037) by 0.1060 units, while having vocational training increases the probability of choosing non-farm activity (P= 0.005) by 0.1360 units, assuming other variables remain constant.

Table 7. Marginal effect of determinants of household choice of livelihood activities.

Variables	dy/dx	Std. error	Z	P>|z|
Sex				
Farm	0.0516	0.0527	0.98	0.327
Non-farm	-0.0587	0.0472	-1.24	0.214
Off-farm	0.0070	0.0455	0.15	0.877
Age				
Farm	-0.0055*	0.0030	-1.83	0.068
Non-farm	0.0062**	0.0027	2.23	0.026
Off-farm	-0.0006	0.0024	-0.25	0.801
Household size				
Farm	0.0193	0.0120	1.60	0.109
Non-farm	-0.0224*	0.0119	-1.88	0.06
Off-farm	0.0030	0.0096	0.32	0.749
Education years				
Farm	0.0021	0.0050	0.43	0.667
Non-farm	0.0008	0.0046	0.19	0.853
Off-farm	0.0030	0.0042	-0.72	0.472
Farm size				
Farm	0.0140***	0.0038	3.66	0.000
Non-farm	-0.0071*	0.0039	-1.85	0.064
Off-farm	-0.0068**	0.0033	-2.07	0.038
Value of disposable assets				
Farm	0.0000000502***	0.0000000173	2.9	0.004
Non-farm	0.00000000103	0.0000000156	0.07	0.947
Off-farm	-0.0000000512**	0.0000000199	-2.57	0.010
Dependency ratio				
Farm	-0.0328	0.0487	-0.68	0.500
Non-farm	0.0303	0.0459	0.66	0.509
Off-farm	0.0025	0.0399	0.06	0.949
Migrant generation				
Farm	0.0615	0.0560	1.10	0.272
Non-farm	0.0495	0.0511	-0.97	0.332
Off-farm	0.0119	0.0457	-0.26	0.795
Vocational training				
Farm	-0.1060**	0.0509	-2.08	0.037
Non-farm	0.1360***	0.0483	2.82	0.005
Off-farm	-0.0299	0.0412	-0.73	0.467
Credit access				
Farm	-0.0348	0.0477	-0.73	0.466
Non-farm	0.0095	0.0439	0.22	0.828
Off-farm	0.0253	0.0389	0.65	0.516

Note: ***, ** and * represent level of significance at 1%, 5% and 10% respectively.

4. CONCLUSION AND RECOMMENDATIONS

The study area is characterized by predominantly active, first-generation male migrants with limited education. While migrant households exhibit high levels of capital availability, the quality of various capital sources is notably

poor. Respondents participated in three primary income-generating activities, namely: farming, non-farm, and off-farm activities. Although farming is the primary occupation for most households, the majority have reasonably diversified income sources, recognizing that sole reliance on farming may not sustain their desired livelihoods. The livelihood diversification index suggests a moderate level of rural livelihood diversification. There is a high degree of heterogeneity in terms of asset ownership and income-generating activities at household level among the respondents. The level of diversification estimated using SID revealed that income generating activities among migrants are moderately diversified. The major factors that determine migrant household choice of non-farm activities and off-farm over farm activity was size of landholdings. Based on the findings of the study, government and other stakeholders should adopt a comprehensive strategy to improve access to non-farm and off-farm employment opportunities, particularly in rural areas. To address the issue of unemployment during off-seasons, we can encourage corporate bodies and private investors to invest in rural areas. Additionally, government and other policymakers should focus on creating a conducive environment by establishing microfinancial institutions to tackle the problem of access to various livelihood assets, offering training to rural inhabitants, and developing rural infrastructure, including improved roads, electricity, and market facilities. These measures would enable rural households to sustain their livelihoods throughout the year.

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REFERENCES

Abiodun, T. C., Olutumise, A. I., & Ojo, S. O. (2019). Evaluation of choices of livelihood strategy and livelihood diversity of rural households in Ondo State, Nigeria. *Journal of Social Sciences and Humanities*, *5*(1), 17-24.

Abraham, T. W. (2018). Estimating the effect of financial access on poor farmers in Rural Northern Nigeria *Financial Innovation*, *4*(1), 112-122. https://doi.org/10.1186/s40854-018-0112-2

Adepoju Abimbola, O., & Obayelu Oluwakemi, A. (2013). Livelihood diversification and welfare of rural households in Ondo State, Nigeria. *Journal of Development and Agricultural*, *5*(12), 482-489. https://doi.org/10.5897/jdae2013.0497

Adepoju, A. O., & Oyewole, O. O. (2014). Rural livelihood diversification and income inequality in local government area Akinyele, Ibadan, Oyo state, Nigeria. *Journal of Agricultural Sciences, Belgrade*, *59*(2), 175-186.

Ahmed, M. H., & Melesse, K. A. (2018). Impact of off-farm activities on technical efficiency: Evidence from maize producers of Eastern Ethiopia. *Agricultural and Food Economics*, *6*(1), 1-15. https://doi.org/10.1186/s40100-018-0098-0

Ahmed, M. T., Bhandari, H., Gordoncillo, P. O., & Quicoy, C. B. (2018). Factors affecting extent of rural livelihood diversification in selected areas of Bangladesh. *SAARC Journal of Agriculture*, *43*(1), 99-110. https://doi.org/10.3329/sja.v16i1.37419

Anang, B. T., & Yeboah, R. W. (2019). Determinants of off-farm income among smallholder rice farmers in Northern Ghana: Application of a double-hurdle model. *Advances in Agriculture*, *2019*(1), 7246176. https://doi.org/10.1155/2019/7246176

Awotide, B. A., Awoyemi, T. T., Diagne, A., Kinkingnihoun, F.-M., & Ojehomone, V. (2012). Effect of income diversification on poverty reduction and income inequality in rural Nigeria: Evidence from rice farming households. *OIDA International Journal of Sustainable Development*, *5*(10), 65-78.

Awumbila, M. (2017). *Drivers of migration and urbanization in Africa: Key trends and issues background paper prepared forum expert groups meeting on sustainable cities, human mobility and international migration*. New York: UN.

Babatunde, R. O., & Matin, O. (2009). Patterns of income diversification in rural Nigeria: Determinants and impacts. *Quarterly Journal of International Agriculture*, *48*(4), 305-320.

Borodak, D., & Tichit, A. (2013). Connections between return migration and transnationalism. *International Migration*, *52*(60), 1-12.

Chand, M. (2012). Diasporas, migration, and trade: The Indian diaspora in North America. *Journal of Enterprising Communities: People and Places in the Global Economy*, *6*(4), 383-396. https://doi.org/10.1108/17506201211272805

Demireva, N. (2019). Receiving country investments and acquisitions: How migrants negotiate the adaptation to their destination. *Social Inclusion*, *7*(4), 18-27. https://doi.org/10.17645/si.v7i4.2352

Djido, A. I., & Shiferaw, B. A. (2018). Patterns of labor productivity and income diversification–Empirical evidence from Uganda and Nigeria. *World Development*, *105*, 416-427. https://doi.org/10.1016/j.worlddev.2017.12.026

Ellis, F. (2000). *Rural livelihood and diversification in developing countries*. Oxford: Oxford University Press.

Eneyew, A., & Bekele, W. (2012). Determinants of livelihood strategies in Wolaita, Southern Ethiopia. *Agricultural Research and Reviews*, *1*(5), 153-161.

Fabusoro, E., Omotayo, A., Apantaku, S., & Okuneye, P. (2010). Forms and determinants of rural livelihoods diversification in Ogun State, Nigeria. *Journal of Sustainable Agriculture*, *34*(4), 417-438. https://doi.org/10.1080/10440041003680296

FAO. (2018). *Rural migration in developing countries*. Retrieved from http://www.fao.org/3/BU261en/bu261en.pdf

Gberu, H., Amare, M., Mavrotas, G., & Ogunniyi, A. (2018). *Role of land access in youth migration and youth employment decisions: Evidence from rural Nigeria (No. 58)*. Washington DC: International Food Policy Research Institute.

Hendriks, M., Martinj, B., Julie, R., & Espinova, N. (2018). Do international migrants increase their happiness and that of their families by migrating? In world happiness report 2018 edited by John Helliwell, Richard Layard and Jeffrey Sachs. In (pp. 44-66). New York: UN Sustainable Development Solutions Network.

Herrero, M., Grace, D., Njuki, J., Johnson, N., Enahoro, D., Silvestri, S., & Rufino, M. C. (2013). The roles of livestock in developing countries. *Animal*, *7*(s1), 3-18.

Kennedy, J. (1986). *Dynamic programming application to agriculture and natural resources elsevier applied.* Essex, London: Science Publishers.

Maja, T., & Oluwatayo, I. (2018). *Livelihood diversification and poverty among rural households in the capricorn district, Limpopo, South Africa.* Paper presented at the Annual Conference, of Agricultural Economics Association of South Africa (AEASA).. September 25-27, Cape Town, South Africa 284752.

Mara, I., & Landesmann, M. (2013). *The steadiness of migration plans and expected length of stay: Based on a recent survey of Romanian migrants in Italy norface research programme on migration.* College London: Department of Economics, Univ.

Minot, N., Epprecht, M. T., & Trung, Q. L. (2006). *Income diversification and poverty in the Northern upland of Vietnam research Report No. 145.* Washington, D. C: International Food Research Institute.

Murata, A., & Miyazaki, S. (2014). *Empirical study of the impact of infrastructural building in Filipino farms: The role of space, infrastructure and human capital and the impact of the financial crisis.* Retrieved from JICA Research Institute Working Paper No. 67:

Nguyen, T.-T., Nguyen, T. T., Do, M. H., Nguyen, D. L., & Grote, U. (2022). Shocks, agricultural productivity, and natural resource extraction in rural Southeast Asia. *World Development, 159*, 106043. https://doi.org/10.1016/j.worlddev.2022.106043

Nmeregini, D. C., & Udoka, B. U. (2021). Socio-economic determinants of participation in non-farm income generating activities among households in Abia State, Nigeria. *Nigeria Agricultural Journal, 52*(3), 381-387.

Ogunniyi, I. A., Mavrotas, G., Olagunju, K., Fadare, O., & Rufai, M. A. (2018). *The paradigm of governance quality, migration and its implication on food and nutritional security in Sub-Saharan Africa Africa what does dynamic generalized method of moments estimation reveal?* . Paper presented at the At 2018 Conference of International Association of Agricultural Economists, Vancouver, BC, Canada, July 28-August 2.

Olagunju, K. O., Ogunniyi, I. A., Oguntegbe, F. K., Rahji, A. I., & Ogundari, K. (2019). Welfare impacts of globalization in developing countries: Examining the mediating role of human capital. *Economies, 7*(84), 230-241. https://doi.org/10.3390/economies7030084

Oni, O. A., & Fashogbon, A. E. (2013). Food poverty and livelihoods issues in rural Nigeria. *African Journal of Agricultural and Resource Economics, 8*(2), 108-135.

Oyesola, O. B., & Ademola, A. O. (2011). Livelihood in university of Ibadan social laboratory in Ileogbo community of Osun State, Nigeria. *Journal of Human Ecology, 34*(2), 91-100.

Oyinbo, O., & Olaleye, K. T. (2016). Farm households livelihood diversification and poverty alleviation in Giwa local government area of Kaduna State, Nigeria. *Consilience*(15), 219-232.

Samuel, O. O., & Sylvia, T. S. (2019). Analysis of rural livelihood diversification strategies among maize farmers in North West province of South Africa. *International Journal of Entrepreneurship, 23*(2), 1-11.

Walelign, S. Z. (2016). *Quantification of rural livelihood dynamics: Environmental,resourcesb use, asset accumulation, poverty and livelihood strategies.* A PhD Thesis submitted to the Faculty of Science, University of Copenhagen and Faculty of Sciences and Ecology, Georg-August University of Gottingen.

World Bank. (2017). *Migration and remittances: Recent developments and outlook special topic: Global compact on migration, migration and development brief No. 27.* Germany/ Sweden: World Bank Group.

Young, A. (2013). Inequality, the urban-rural gap, and migration. *The Quarterly Journal of Economics, 128*(4), 1727-1785.