Determinants of Livelihood Diversification among Irish Potato Farmers in Bokkos Local Government Area, Plateau State, Nigeria

Selzing, P.M[1]., Binuyo, G[2]., Henry, M.U[3]., Mbah, J.J[4]

[1]Montane Forest Research Station Jos, Plateau State, Nigeria
[2]Department of Agricultural Extension & Management, Federal College of Forestry, Jos Plateau State, Nigeria
[3]Department of Science Laboratory Technology, Federal College of Forestry, Jos, Plateau State, Nigeria
[4]Department of Statistics, Federal College of Forestry, Jos, Plateau State, Nigeria: Celrace@gmail.com

Abstract

This study analyzed factors influencing livelihood diversification among Irish potato farmers in Bokkos Local Government Area, Plateau State, Nigeria. Data were collected from 192 respondents using a structured questionnaire and analyzed through descriptive statistics and Logit regression. Results showed that the average farmer was 40 years old, with 84% being male and 76% married, having an average household size of 8 and a farm size of 2.5 hectares. Most respondents (62%) had only primary education, 93% lacked access to credit, and their average annual farm income was ₦165,601. Farmers diversified into additional food and cash crops (62%), livestock rearing (33%), agricultural produce trading (30%), non-farm businesses (28%), and salaried jobs (6%). However, diversification remained low, with 74% having only two income sources. Key factors influencing diversification included age, education, cooperative membership, access to credit, and farm income. Major constraints were lack of capital (31%), limited non-farm enterprises (20.3%), poor infrastructure (17%), restrictive government policies (14.5%), and gender-related challenges (11%). The study recommends improving access to rural credit through expanded financial institutions and implementing policies to develop rural infrastructure, enabling better livelihood diversification opportunities.

Key Words: Analysis, livelihood, diversification, Irish potato, farmers

Introduction: One of the critical challenges facing the world today is ensuring that millions of impoverished households have access to sufficient food for a healthy and sustainable life. In Africa, addressing food insecurity has been a persistent issue of concern, engaging the attention of leaders, scholars, and stakeholders alike (Sekumade and Osundare, 2014). Despite substantial earnings from oil, Nigeria remains predominantly an agrarian nation. The agricultural sector plays a crucial role in the Nigerian economy and other developing countries, contributing significantly to the Gross Domestic Product (GDP) and employing a large portion of the labor force. Approximately 70% of Nigeria's workforce is engaged in agriculture, making it the nation's most vital sector (Chauvin, Mulangu and Porto, 2012). Nigeria's diverse climate, ranging from the tropical zones along the coast to the arid regions in the north, allows for the cultivation of a wide variety of crops typically grown in tropical and semi-tropical regions (Olayemi, Adegbola, Bamishaiye, and Awagu, 2012). However, the country's agricultural sector is predominantly characterized by small-scale subsistence farming, relying on simple tools and traditional methods. This mode of farming has failed to generate adequate income for farm households (Babatunde, 2013). Presently, Nigerian agriculture is plagued by inefficient production systems, decaying infrastructure, and challenges such as risk, uncertainty, and seasonal fluctuations. The sector is marked by low productivity, minimal input utilization, and limited areas under cultivation (Izuchukwu, 2011). Most farmers operate on smallholdings ranging from 0.5 to 3.0 hectares, utilizing rudimentary farming practices with limited capital investment, resulting in low yields per hectare. These challenges are exacerbated by factors such as unfavorable natural conditions (soil, water, and climate), flawed economic policies, and a struggling economy. Historically, it was assumed that growth in farm output would drive rural development by creating numerous non-farm income opportunities through linkage effects. However, this assumption is increasingly untenable. For many poor rural households,

farming alone is insufficient for survival, and the productivity gains from new technologies have begun to plateau. Consequently, smallholder farmers in Nigeria remain impoverished, with these challenges threatening their welfare and economic security. In response, many farmers have diversified into non-farm activities to supplement their income. This shift has compelled rural households to adopt livelihood diversification strategies as a means of coping with the vulnerabilities inherent in agricultural production systems.

Livelihood diversification refers to the process by which rural households build a varied portfolio of activities and social support systems to enhance their survival and improve their living standards (Gebru, Hyacinth and Ogbonnia, 2018). It involves the continuous adjustment and maintenance of a broad range of activities and occupations aimed at reducing income fluctuations, mitigating the adverse effects of seasonality, and providing additional employment or income (Loison, 2015). For rural households, diversification encompasses both on-farm and off-farm activities undertaken to supplement income derived from primary agricultural ventures. This may include producing agricultural and non-agricultural goods and services, engaging in wage labor, self-employment in small businesses, or adopting other strategies to manage risk effectively. Diversification has become a critical focus of research and policy discussions as farming incomes are increasingly strained by factors such as population growth (Khatun and Roy, 2016). In the context of various risks, diversification serves as a key risk management strategy, enabling households to adapt proactively to potential shocks or cope with the effects of actual shocks. This strategy reflects a trade-off between high-risk activities with potentially high returns and lower-risk alternatives aimed at ensuring stable income and consistent consumption (Kassie and Aye, 2017). For instance, rural households often engage in non-farm activities as a response to challenges like drought, seeking to spread risk and secure additional income (Gebru and Beyene, 2012). Livelihood diversification manifests in two primary forms: a shift away from agricultural activities and an increasing blend of various income-

Determinants of Livelihood Diversification among Irish Potato Farmers in Bokkos Local Government Area, Plateau State, Nigeria

1

generating activities. These choices are largely shaped by the livelihood opportunities available within rural communities. Ayantoye, Amao and Fanifosi (2017) describe diversification decisions as coping strategies rather than mere alternative income sources. Income from non-agricultural activities can complement dwindling agricultural earnings, significantly enhancing the livelihoods of rural households (Ijaiya, Ijaiya, Bello and Ajayi, 2011). The key drivers of diversification include the need to increase income when resources for primary activities are insufficient, reduce income risks in the absence of functional insurance markets, leverage complementarities between activities, and secure cash income in environments with credit constraints (Dilruba and Roy, 2012). Non-farm activities, in particular, play a vital role in reducing poverty by providing households with a safety net against the risks associated with farming and minimizing dependence on natural resources.

Diversification can occur as either a deliberate household strategy or an involuntary response to crises. According to Loison (2015), individuals and households diversify their assets, incomes, and activities in response to two main drivers: push and pull factors. Push factors are adverse conditions that compel farm households to seek additional livelihood options, either on or off the farm (Loison, 2015). These factors are predominant in high-risk, low-potential agricultural environments that face challenges such as drought, flooding, and environmental degradation (Albore, 2018). Survival-driven diversification, often linked to push factors, involves poorer rural households engaging in low-return non-farm activities out of necessity. These households diversify their income sources to reduce vulnerability, cope with shocks, and prevent deeper poverty. Common push factors include agricultural stagnation, seasonal and climatic uncertainties, labor market inequalities, credit market limitations, demographic pressures, and fragmented landholdings (Albore, 2018). Additionally, poor infrastructure and high transaction costs exacerbate market access problems, further driving diversification. Pull factors, on the other hand, are positive influences that encourage farm households to pursue additional livelihood activities to improve their living standards (Loison, 2015). Known as opportunity-driven diversification, this occurs when wealthier households engage in high-return non-farm activities with the goal of asset accumulation and increased income. Such households are often better positioned to take advantage of favorable labor markets, technological advancements, new market opportunities, proximity to urban centers, and improved infrastructure (Albore, 2018). Pull factors are often driven by increased demand for non-farm goods and services, as well as opportunities in thriving sectors such as agriculture, mining, and tourism. These opportunities are typically accessible to households with significant asset endowments, including land, livestock, and buildings. In Africa, studies reveal that most rural households rely on agricultural activities such as crop, livestock, or fish production as their primary livelihood but also engage in other income-generating activities to supplement their income. Few rural producers derive all their income from a single source or invest all their resources in one activity (Barrett, Reardon and Webb, 2001). For instance, Haggblade, Hazell and Reardon (2006) found that rural residents in developing countries earn 35–50% of their income from non-farm sources. Similarly, research in Ethiopia shows that non-farm income contributes 40–45% of average household income (Bezabih, 2010). While the contribution of non-farm income is significant, it varies across regions and communities due to differing contextual factors. In some cases, livelihood diversification creates an economic scope effect, allowing households to allocate resources across various activities and achieve higher returns per unit invested (Gebru et al., 2018).

Problem Statement

Livelihood diversification has become an essential strategy for rural households in Nigeria to mitigate economic risks, ensure food security, and enhance resilience in the face of increasing challenges such as climate variability, limited access to resources, and fluctuating agricultural income. In Plateau State, Irish potato farming is a significant economic activity, particularly in Bokkos Local Government Area. However, many farmers remain vulnerable to income instability due to overdependence on potato cultivation, which is subject to seasonal constraints, price volatility, and production risks such as pests, diseases, and poor infrastructure. Despite the critical role that diversification plays in improving household livelihoods, the extent to which Irish potato farmers in Bokkos engage in alternative income-generating activities remains limited. Factors such as socioeconomic characteristics, access to resources, institutional support, and infrastructural development are likely to influence their ability to diversify. However, there is a dearth of empirical studies examining these determinants within the context of Irish potato farming in Bokkos LGA. Furthermore, farmers face numerous constraints, including limited access to credit, inadequate infrastructure, and restrictive policies, which hinder their capacity to pursue diversification opportunities. Understanding the factors influencing livelihood diversification and the barriers faced by farmers is crucial for formulating effective policies and interventions. This study seeks to bridge the knowledge gap by analyzing the determinants of livelihood diversification among Irish potato farmers in Bokkos LGA, thereby providing insights to promote sustainable rural livelihoods and economic development in the area.
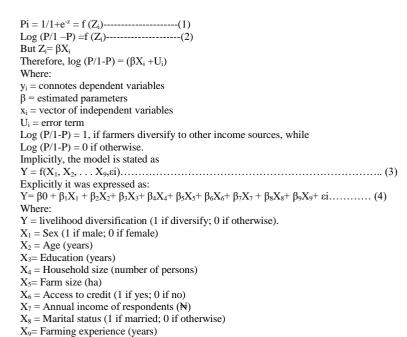
Test of Hypothesis
H_O: There is no significant relationship between farmers' socio-economic characteristics and livelihood diversification

Materials and Methods: Study Area: Bokkos Local Government is a local government area in Plateau State, Nigeria. It is located in the central part of the state and has its headquarters in the town of Bokkos. The local government area was created in 1991 from the former Jos East Local Government Area. It is located between latitude 8^0- 9^0 N equator and longitude 8^0-9^0E of the Green witch meridian with high annual rainfall of about 2000mm and the estimated land area covered of 29,372km2. The rainfall often last from March to November. The annual temperature is about $15O$ -$20O^C$, which is favourable for agricultural production. Bokkos is about 45 km away from the State Capital sharing boundaries with Barkin Ladi LGA to the North, Mangu LGA to the North- East and to the West with Wamba LGA of Nasarawa State (NPC,2006). Bokkos Local Government area comprise of different ethnics group with the population of about 150, 000 people and the major occupation of the indigenes is farming and petty trading (NPC, 2006). The Local Government Area has five (5) districts namely Bokkos, Daffos,Toff, Kamwal and Richa. The area is known for its agricultural activities, including the production of crops such as potatoes, yams, maize, and rice.

Sampling Method: A multi-stage sampling technique was employed to select potato farmers for the study. The first stage involved the purposive selection of three districts in the Local Government Area where irish potatoes is highly produced. They include; Bokkos Daffo and Richa. In the second stage, two communities were randomly selected from each of the three chosen districts, resulting in a total of six communities for the study. Finally, using a sample frame obtained from the Plateau State Agricultural Development Programme (PADP), thirty two (32) respondents were randomly selected from each of the six communities, totaling one hundred and ninety two (192) farmers chosen as the sample size for the study. Primary data was collected for the study through structured questionnaires via household interviews. Data collected were analyzed using both descriptive and inferential statistics.

Model specification : The factors influencing livelihood diversification were analyzed using Logistic regression. The logistic (logit) probability function is represented as:

Determinants of Livelihood Diversification among Irish Potato Farmers in Bokkos Local Government Area, Plateau State, Nigeria

$$P_i = 1/1 + e^{-z} = f(Z_i) \text{--------------------}(1)$$
$$\text{Log}(P/1-P) = f(Z_i) \text{--------------------}(2)$$
But $Z_i = \beta X_i$

Therefore, $\log(P/1-P) = (\beta X_i + U_i)$

Where:

y_i = connotes dependent variables

β = estimated parameters

x_i = vector of independent variables

U_i = error term

$\text{Log}(P/1-P) = 1$, if farmers diversify to other income sources, while

$\text{Log}(P/1-P) = 0$ if otherwise.

Implicitly, the model is stated as

$$Y = f(X_1, X_2, \ldots X_9, \varepsilon i)\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots. (3)$$

Explicitly it was expressed as:

$$Y = \beta 0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + \varepsilon i\ldots\ldots\ldots (4)$$

Where:

Y = livelihood diversification (1 if diversify; 0 if otherwise).

X_1 = Sex (1 if male; 0 if female)

X_2 = Age (years)

X_3 = Education (years)

X_4 = Household size (number of persons)

X_5 = Farm size (ha)

X_6 = Access to credit (1 if yes; 0 if no)

X_7 = Annual income of respondents (₦)

X_8 = Marital status (1 if married; 0 if otherwise)

X_9 = Farming experience (years)

εi = Error term

Results and Discussions: Socio-economic Characteristics of Farmers: The socio-economic characteristics of the farm households are summarized in Table 1. The age distribution of respondents shows that 42% of the household heads were aged 31–40 years, with an average age of 40 years. This indicates that most of the farm households are in their economically active years, enabling them to engage actively in agriculture and other livelihood activities. These findings align with Ayantoye et al. (2017), who reported a mean age of 41.15 years among rural households in Kwara State, Nigeria. Regarding gender, 84% of the farmers were male, while 16% were female, indicating male dominance in household leadership in the study area. This aligns with the patriarchal structure of rural Nigeria, where men are primarily responsible for family welfare. Omotayo (2016) similarly found male-headed households dominating farm communities in Ekiti State. Gender influences livelihood diversification options due to cultural roles, mobility restrictions, and unequal access to assets. Marital status revealed that 76% of respondents were married, while 24% were single. Marital status plays a crucial role in livelihood diversification, as married individuals are more likely to diversify income sources to meet family responsibilities. This aligns with Abiodun, Adewale and Ojo (2019) who found 82.5% of rural households in Ondo State to be married, often leading to diversified income portfolios. The household size analysis revealed that 57% of respondents had 6–10 members, with an average household size of eight. Larger households may have the advantage of more labor for income-generating activities, supporting Ahmed's (2012) observation that larger families enhance labor availability for agricultural activities.

In terms of education, 62% of respondents had primary education, 20% secondary education, 3% tertiary education, while 15% had no formal education. This suggests that most respondents had some level of literacy, which positively influences resource use, adoption of innovations, and income diversification. Abiodun et al. (2019) similarly found that most rural households in their study had at least primary education.

The farming experience of respondents averaged nine years, with 63% having 6–10 years of experience. This suggests that most farmers in the area have sufficient knowledge to manage their farms effectively, including decision-making on input use and resource allocation. The average farm size was 2.5 hectares, indicating that most respondents were small-scale farmers. Limited landholding often drives farmers to diversify into off-farm activities such as wage labor and petty trading.

Farming was the primary occupation for 75% of respondents, with 25% engaged in non-farm activities. Crop production dominated, but 83% of farmers also engaged in livestock production, including poultry, goats, sheep, swine, and rabbits. Livestock was typically raised on a small scale to supplement income and provide meat during festive periods.

Access to credit was limited, with 93% of respondents reporting no access to credit for financing production activities. Adequate funding is crucial for supporting both crop farming and livelihood diversification. The average annual farm income was ₦165,601, which, though fair, primarily supports survival rather than lifting farmers out of poverty.

Land tenure analysis showed that 68% of respondents acquired farmland through inheritance, while 32% rented land. The predominance of inherited land can lead to fragmentation, reducing available farmland for agricultural practices due to division among siblings.

Table 1: Distribution of Respondents Based on their Socio-economic Characteristics (n=192)

Variable	Frequency	Percentage	Mean
Age (years)			
21- 30	33	17.0	
31- 40	80	42.0	
41 – 50	43	22.0	
50 above	36	19.0	40.0
Sex			
Male	162	84.0	
Female	30	16.0	

Determinants of Livelihood Diversification among Irish Potato Farmers in Bokkos Local Government Area, Plateau State, Nigeria

Variable	Frequency	Percentage	Mean
Marital status			
Single	46	24.0	
Married	146	76.0	
Educational level			
Primary	120	62.0	
Secondary	38	20.0	
Tertiary	5	3.0	
Non formal education	29	15.0	
Household size (number)			
1-5	54	28.0	
6-10	110	57.0	
11-15	21	11.0	
16-20	7	4.0	8.0
Size of farm land (hectares)			
1.0-2.0	104	54.0	
3.0-4.0	75	39.0	
Above 4.0	13	7.0	2.5
Years of farming			
1-5	21	11.0	
6-10	120	63.0	
11-15	33	17.0	
>15	18	9.0	9.2
Major occupation			
Farming	144	75.0	
Trading	28	14.0	
Artisans	11	6.0	
Civil service	9	5.0	
Type of Farming Enterprise			
Crop farming only	28	14.0	
Livestock farming only	5	3.0	
Mixed farming (crop & livestock)	159	83.0	
Access to credit			
Yes	13	7.0	
No	179	93.0	
Land tenure			
Rent	59	32.0	
Inheritance	131	68.0	
Annual farm income (Naira)			
50,000- 100,000	1	0.52	
101,000-150,000	68	35.42	
151,000-200000	91	47.40	
Above 200.000	32	16.67	165601
Member of farm association			
Yes	52	27.08	
No	140	72.92	

Source: Field survey, 2024

Table 2. Distribution of Respondents by Livelihood Activities engage in apart from Irish potato Farming.

Secondary occupation	*Frequency	Percentage	Rank
Cultivation of other food and cash crops	119	62.0	1st
Livestock keeping	63	33.0	2nd
Trading of agricultural produce	57	30.0	3rd
Non-farm activities/ businesses	53	28.0	4th
Civil service/ private salary jobs	11	6.0	5th

Multiple choice responses

Table 3 Distribution of respondents based on Extent of livelihood diversification

Extent	Frequency	Percentage
Not diversified	-	-
1-2 (Moderately)	142	74.0
3-4 (Highly)	50	26.0
Total	**192**	**100**

Source: Field survey, 2024

Table 4 Distribution of Respondents based on reasons for diversification

Reason	Frequency	Percentage
To augment poor earnings from agriculture	139	72.0
Small farm size	10	5.0
Availability of non-farm opportunities	6	3.0
Seasonal nature of agricultural production	13	7.0

Determinants of Livelihood Diversification among Irish Potato Farmers in Bokkos Local Government Area, Plateau State, Nigeria

Risk and uncertainties in agriculture	24	13.0

Multiple choice responses: Livelihood Activities engage in by the Respondents apart from Irish potato Farming.

Table 2 presents the various livelihood strategies adopted by Irish potato farmers. The findings reveal that these farmers engage in both farm and non-farm livelihood activities. Specifically, their activities include cultivating other food and cash crops (62%), livestock keeping (33%), trading of agricultural produce (30%), non-farm businesses (28%), and civil service or private-sector jobs (6%). Among these, cultivating additional food and cash crops was the most common strategy, followed by livestock keeping, as many farmers rear animals to diversify their income sources. Trading agricultural produce was another significant activity, with many farmers buying harvested crops at farm gates and selling them in urban markets for profit. Non-farm businesses, which require relatively low capital, also attracted some farmers. This finding aligns with Rukwe, Oladimeji and Tsukutoda (2019) who reported that rural households in Taraba State engaged in similar low-capital off-farm activities, such as trading, selling foodstuff, casual labor, and brewing local liquor, as part of their livelihood strategies amidst conflicts. The results suggest that respondents are primarily agrarian rural dwellers who rely heavily on their farming activities for survival and to meet daily needs. Despite engaging in diverse livelihood strategies, the study indicates that diversification efforts are still underdeveloped, with a strong dependence on agriculture as the primary means of sustenance. This finding reinforces the notion that agriculture remains the foundation of livelihoods in Nigerian rural communities.

The extent of Livelihood Diversification

This section evaluates the extent of livelihood diversification among Irish potato farmers in the study area, focusing on the number of income-generating activities farmers engage in apart from potato farming. The results, presented in Table 3, reveal that 74% of the respondents moderately diversified into two additional income sources, while 26% diversified into more than two sources. The findings indicate that most farming households achieved a moderate level of diversification. In this study, diversification refers to engaging in additional livelihood activities beyond the primary potato farming. The results further highlight that the majority of farming households do not rely solely on a single source of income. This approach serves as a strategy to enhance income security and mitigate poverty. The rationale behind this strategy is that if one enterprise experiences a decline in production or sales, the farmers can fall back on other ventures to sustain their livelihoods. These findings align with the studies of Okere and Shittu (2013) and Idowu, Ambali and Onasanya (2014) who also reported that most farming households adopt moderate diversification to enhance income stability.

Reasons for Livelihood Diversification: As shown in Table 4, respondents cited multiple reasons for engaging in additional livelihood activities. The primary reason reported by 72% of the farm household heads was to supplement the low income generated from agriculture, followed by 13% who cited risks and uncertainties associated with farming. These findings indicate that the dominant motivation for diversification among most respondents in the study area was the need to improve their income due to inadequate earnings from agricultural activities.

Factors Influencing Farmers Livelihood Diversification:

The Logit model was employed to identify factors influencing livelihood diversification among farmers in the study area. The model's estimated coefficients, along with standard errors and t-

values, are presented in Table 5. The log-likelihood value (-76.08) indicates that the model, inclusive of a constant and explanatory variables, fits the data well. This suggests that all variables in the model collectively play a significant role in shaping farmers' decisions to diversify into other income-generating activities. The results reveal that five of the eight predictors—age, educational status, cooperative membership, access to credit, and annual farm income—were statistically significant. Specifically, age and cooperative membership positively influenced diversification at a 5% significance level, while educational status, access to credit, and annual farm income negatively influenced it at 5%, 5%, and 1% significance levels, respectively.

Age: The positive and significant relationship between age and livelihood diversification implies that older farmers are more likely to engage in additional agricultural and non-agricultural activities. This could be attributed to the accumulated experience and skills that older individuals possess, which enhance their ability to diversify income streams. Moreover, older farmers with larger families may have surplus labor available for non-farm activities. This finding aligns with studies by Dilruba and Roy (2012), Gecho (2016), and Irohibe and Agwu (2014). However, it contrasts with research by Aababbo and Sawore (2016), Abimbola and Oluwakemi (2013), and Adepoju and Oyewole (2014), who reported a negative relationship between age and diversification. **Educational Status:** Education was significant at the 5% level but negatively related to diversification. This indicates that farmers with secondary or higher education are less likely to diversify their income sources, potentially due to their preference for focusing on specialized farming practices and adopting advanced technologies to boost productivity. This finding contradicts studies by Afodu, Afolami, Akinboye, Ndubuisi-Ogbonna, Ayo-Bello, Shobo and Ogunnowo (2019), Fufa (2015), and Adepoju and Oyewole (2014), which found a positive relationship between education and diversification.

Cooperative Membership: Cooperative membership had a positive and significant impact at the 5% level, suggesting that being part of a cooperative enhances the likelihood of diversification. This is likely due to the benefits of shared knowledge, exposure to new opportunities, and increased social capital that cooperative membership offers **Annual Farm Income:** A negative relationship between farm income and diversification was observed, significant at the 1% level. This implies that higher farm incomes reduce the likelihood of farmers diversifying into other livelihood activities, possibly because those earning more from farming prefer to focus on their primary agricultural enterprise. This finding aligns with Adekunle and Shittu (2014), who reported similar results in their study in Ogun State, Nigeria. **Access to Credit:** Contrary to expectations, access to credit was negatively associated with diversification, significant at the 5% level. This suggests that farmers with access to credit are less inclined to engage in alternative income-generating activities. This finding is inconsistent with prior research, such as Afodu et al. (2019), which posited that access to credit increases the capital available for off-farm investments.

Table 5 Factors influencing livelihood diversification among Irish potato Farmers

Variable	Coefficient		Std Error		Z		P value
Constant	16.8951	6.6256			2.55	0.011	
Age		.095857	.05625			1.70	0.088**
Education level	-.1469	.0652		-2.25	0.024**		
Household size	-.00009	.00006			-1.34	0.179	
F/ experience	-.3138	.2302		-1.36	0.173		
Member of orgztn	1.2086	.5732		2.11	0.035**		

Determinants of Livelihood Diversification among Irish Potato Farmers in Bokkos Local Government Area, Plateau State, Nigeria

Contact with ext	.4421	.4351	1.02	0.310	
Annual farm income	-3.6919	1.4152		-2.61	0.009***
Access to credit	-1.0334	.4474	-2.31	0.021**	
No. of observations	= 192				
LR Chi2 (8)	= 30.17				
Log likelihood	= -76.0870				
Pseudo R^2	= 0.1654.				

Note: **, Significant at 5%, ***, Significant at 1%

Constraints to Livelihood Diversification
The distribution of constraints encountered by respondents is presented in Table 6. The primary challenges identified were lack of capital (31%), absence of non-farm livelihood enterprises (25%), infrastructural deficiencies (21%), restrictive government policies on natural resource use (14.5%), and gender-related issues (11%).

Lack of capital emerged as the most significant barrier to livelihood diversification. Many farmers expressed the desire to invest in alternative livelihood ventures but faced severe financial constraints. As a result, households tend to opt for non-farm activities requiring minimal capital investment. The absence of organized non-farm livelihood enterprises ranked as the second major constraint. Respondents highlighted the lack of structured organizations capable of motivating, training, or providing technical and financial support for non-agricultural livelihoods. This gap discourages farming households from pursuing other income-generating opportunities outside agriculture.

Infrastructural deficiencies, such as poor road networks and unreliable electricity, also hinder diversification. These issues inflate the costs of establishing and operating alternative livelihoods. For instance, poor road conditions increase transportation expenses, limiting access to markets where better profits could be achieved. Government policies and cultural norms restricting the use of natural resources like land, forests, and water bodies were another significant constraint. These regulations, often rooted in cultural values, prevent farmers from considering activities related to natural resources as viable livelihood options.

Lastly, gender-related issues restrict women's access to critical resources and opportunities in rural areas, limiting their participation in livelihood diversification. Such cultural norms disproportionately affect women, further reducing the overall potential for diversified income strategies. These constraints collectively explain the moderate level of livelihood diversification observed in the study area, as they pose significant barriers to the efforts of farming households to expand their income sources effectively.

Table 6 Distribution of respondents based on constraints to Livelihood Diversification

Constraint	*Frequency		Percentage
Lack of non-farm livelihood enterprises	48	25.0	
Lack of adequate capital	59		31.0
Govt. policies on use of some natural resources	28	14.5	
Infrastructural problems	41		21.0
Gender issues	21		11
Others	12		6.2

Multiple responses

Test of Hypothesis: Decision: The results of the logit regression analysis revealed that certain socio-economic factors of the respondents, including age, educational status, and annual farm income, were statistically significant. As a result, we reject the null hypothesis, which stated that there is no significant relationship between farmers' socio-economic characteristics and livelihood diversification.

Conclusion and Recommendation: The study examined livelihood diversification among Irish potato farmers in Bokkos Local Government Area, Plateau State, Nigeria. Findings revealed that the primary livelihood strategies adopted by the farmers included cultivating other food and cash crops (62.0%), livestock keeping (33.0%), trading agricultural produce (30.0%), engaging in non-farm businesses (28.0%), and working in civil service or private salary jobs (6.0%). The level of livelihood diversification was moderate, as most respondents had only two additional income sources beyond potato farming.

Key factors influencing farmers' decisions to diversify included age, cooperative membership, educational attainment, access to credit, and annual farm income. However, several constraints hindered livelihood diversification, including lack of capital, absence of non-farm livelihood enterprises, infrastructural challenges, restrictive government policies on natural resource use, and gender-related barriers. The study recommended that government and non-governmental organizations prioritize rural livelihood enhancement by providing information on credit facilities, marketing opportunities, and available non-farm enterprises. Additionally, policymakers should develop and implement rural infrastructure policies tailored to local needs to foster sustainable rural community development.

References

Aababbo, Y., & Sawore, A. (2016). Assessing Determinant Factors of Income Diversification among Rural Farm Households in Ethiopia: The Case of Leemo and Anileemo Districts, Hadiya Zone, South Nation Nationalities People Region. *International Journal of Science and Research (IJSR)* 5(12):100-110 DOI: 10.21275/ART20163308

Abimbola, A. O., & Oluwakemi, O. A. (2013). Livelihood Diversification and Welfare of Rural Households in Ondo State, Nigeria. *Journal of Development and Agricultural Economics.* Vol.5(12), pp.482-489.

Abiodun,T .C., Adewale, I. O., & 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.* Vol. 5, No. 1, 2019, pp. 17-24

Adekunle, C. P., & Shittu, A. M. (2014). Patterns and Determinants of Livelihood Diversification among Farm Households in Odeda Local Government Area, Ogun State, Nigeria. *Journal of Agricultural Science and Environment.* 14:27-35

Adepoju, A.O., & Oyewole, O.O. (2014). Rural Livelihood Diversification and Income Inequality in Akinyele Local Government Area, Ibadan, Oyo State, *Nigeria. Journal of Agricultural Sciences,* 59(2): 175-186.

Afodu, O. J., Afolami, C. A., Akinboye, O. E., Ndubuisi-Ogbonna, L. C., Ayo-Bello, T. A., Shobo, B. A. &

Determinants of Livelihood Diversification among Irish Potato Farmers in Bokkos Local Government Area, Plateau State, Nigeria

Ogunnowo, D.M. (2019). Livelihood Diversification and it's Determinants on Rice Farming Households in Ogun State, Nigeria. *African Journal of Agricultural Research.* Vol. 14(35), pp. 2104-2111, December, 2019. DOI: 10.5897/AJAR2019.14205

Ahmed, F. F. (2012) Income Diversification Determinants among Farming Household in Konduga, Borno state, Nigeria. *Journal of Academic Research International* 2(2) 555-561

Akaakohol M. A., & Aye, G. C. (2014). Diversification and Farm Household Welfare in Makurdi, Benue State, Nigeria. *Development Studies Research. An Open Access Journal,* 1:1, 168-175, DOI: 10.1080/21665095.2014.919232

Albore, A. (2018). Review on Determinants Of Sustainable Rural Livelihood Diversification Of Small Holder Farmers in Ethiopia. *Int. J. Adv. Res. 6(2), 251-259International Journal of Advance Research (IJAR)*

Ayantoye, K.I., Amao, J. O., & Fanifosi, G. E.(2017). Determinants of Livelihood Diversification among Rural Households in Kwara State, Nigeria. *International Journal of Advanced Agricultural Research*, 5, 82-88.

Babatunde, H.J.(2013). Non-farm Inequality and Land in Rural Egypt. *Economic Development and Cultural Change,* 50(2), 339-363.

Barrett, C.B., Reardon, T., & Webb,P. (2001). Non-farm Income Diversification and Household Livelihood Strategies in Rural Africa: Concepts, Dynamics, and Policy Implication. *Food Policy*. 26(4): 315-331.

Bezabih, M.(2010). Participation in off-farm employment, rainfall patterns, and rate of time preferences: the case of Ethiopia. 2010.

Chauvin, N. D., Mulangu, F.,and & Porto. G. (2012). Food Production and Consumption Trends in Sub-Saharan Africa: Prospects for the Transformation of the Agricultural Sector." UNDP Regional Bureau for Africa, WP 2012–011.

Dilruba, K., & Roy, B.C. (2012). Rural Livelihood Diversification in West Bengal: Determinants and Constraints. *Agricultural Economics Research Review,* Vol. 25(No.1) January-June 2012 pp 115-124

Fufa, M. (2015). Factors Responsible for Income Diversification among Rural Households in Agafa District, Bale Zone, Oromia National Regional State, Ethiopia. Unpublished M.Sc thesis, Department of Rural Development and Agricultural Extension, School of Graduate Studies, Haramaya University, Haramaya, Ethiopia.

Gebru, G W., Hyacinth, E. I., & Ogbonnia, PE.(2018). Determinants of Livelihood Diversification Strategies in Eastern Tigray Region of Ethiopia. *Agriculture & Food Security. (2018) 7:62* https://doi.org/10.1186/s40066-018-0214-0

Gebru, GW., & Beyene, F. (2012). Rural Household Livelihood Strategies in Droughtprone Areas: A Case of Gulomekeda District, Eastern Zone of Tigray National Regional State, Ethiopia. *J Dev Agric Econ.* 4(6):158–68.

Gecho, Y. (2016). Rural Farm Households' Income Diversification: The Case of Wolaita Zone, Southern

Ethiopia. *International Journal of Sustainable Development Research,* 2 (2): 6-17.

Haggblade, S., Hazell, B., and& Reardan, T. (2006) .The Rural Non- Farm Economy: Pathway out of Poverty or pathway in? Transforming The Rural Non-farm Economy. Baltimore, John Hopkins University Press.

Idowu, A. O., Ambali, O.I., & Onasanya, A. S. (2014). Living Condition, Livelihood and Crop Diversification among Rural Farm Households in Remo Division of Ogun State Nigeria. *Asian Journal of Agricultural Extension,Economics and Sociology.*3(6): 619-629.

Ijaiya, G. T., Ijaiya, M. A., Bello, R. A., & Ajayi, M. A. (2011). Economic Growth and Poverty Reduction in Nigeria. *International Journal of Business and Social Sciences,* 2(15),147-154.

Irohibe, I. J., and& Agwu, A.E. (2014). Assessment of Food Security Situation among Farming Households in Rural Areas of Kano State, Nigeria. *Journal of Central European Agricu*lture, 15(1): 94-107.

Izuchukwu, O. (2011). Analysis of the Contribution of Agricultural Sector on the Nigerian Economic Development. *World Review of Business Research*, 1(1): 191– 200.

Kassie, G.W., & Aye, G. (2017). The Nexus between Livelihood Diversification and Farmland Management Strategies in Rural Ethiopia. *Cogent Econ Finance.* 5(1):1275087.

Khatun, D., & Roy, B.C. (2016). Rural Livelihood Diversification in West Bengal: Nature and Extent. *Agric Econ Res Rev.* 29(2):183–90.

Loison, S. A. (2015). Rural Livelihood Diversification in Sub-Saharan Africa: A Literature Review. *Journal of Development Studies*, 51 (9), 1125 –1138.

Losch, B., Freguin-Gresh, S., & White, E. T. (2012).Structural Transformation and Rural Change Revisited: *Challenges for late developing countries in a globalizing world.* Agence Française de Developpement and the World Bank: Washington, DC: World Bank Publications

National Population Commission (2006). Nigeria Census Statistical Bulletin in Report. Vol. 6, ISBN: 978-35734-8-9.

Okere, C.P., & Shittu, A.M. (2013). Patterns and Determinants of Livelihood Diversification among Farm Households in Odeda Local Government Area, Ogun State, *Nigeria. Journal of Economics,* 1(1): 1-12.

Olayemi, F. F., Adegbola, J.A., Bamishaiye, E.I., and& Awagu, E.F. (2012). Assessment of Post Harvest Losses of Some Selected Crops in Eight Local Government Areas of Rivers State, Nigeria." *Asian Journal of Rural Development* 2 (1): 13–23.

Omotayo, A.O. (2016). Economic Synergy between Rural Off-farm Income and Households' Poverty in Ekiti State, Nigeria. *Journal of Human Ecology*, 56(1,2), pp. 99-106.

Rukwe, D.T., Oladimeji, E.D., & Tsukutoda, I.I. (2019). Rural Farmers Households Livelihoods Security Options amidst Conflicts in Taraba State, Nigeria South Asian Research Journal of Agriculture and Fisheries. Volume-1 Issue-3. Oct-Nov -2019

Sekumade, A.B., and& Osundare, F.O.(2014). Determinant and effects of livelihood diversification on farm households in Ekiti State, Nigeria. *Journal of Economics and Sustainable Development,* 5(5), 1-2.

Determinants of Livelihood Diversification among Irish Potato Farmers in Bokkos Local Government Area, Plateau State, Nigeria

.

Determinants of Livelihood Diversification among Irish Potato Farmers in Bokkos Local Government Area, Plateau State, Nigeria