VOL. 13 NO. 8,
AUGUST, 2026
E-ISSN 3026-8893
P-ISSN 3027-1061

African Scholar Publications & Research International
www.africanscholarpub.com

Journal of Education Research and Library Practice (JERLP)

Analysis of Influence of Livelihood on Food Security among Rural Farming Households in Katagum Local Government Area, Bauchi State, Nigeria

***Dr. Muhammad Ali Ahmad; & **Sagir Azarema**

*Department of Agric Education, School of Secondary Education (Vocational). mohammedaliburra7@gmail.com **Department of Agric Education, School of Secondary Education (Vocational). sazarema98@gmail.com

DOI: https://doi.org/10.70382/ajerlp.v13i8.0118

Abstract

This study examined the influence of livelihood activities on food security among rural farming households in Katagum Local Government Area, Bauchi State, Nigeria. Data were collected from 279 farming households selected from 12 communities using a structured electronic questionnaire. Descriptive statistics and binary logit regression were used for data analysis. Food security was assessed using the Food Consumption Score, Household Dietary Diversity Score, Reduced Coping Strategy Index and Household Hunger Scale. The results showed that food-crop production was the dominant livelihood activity (98.60%), while 72.80% of households engaged in trading of non-agricultural produce. Overall, 81.00% of households were food insecure. Non-farm activities, combined livelihood activities, education, farm size and access to extension services significantly influenced household food security. High cost of agricultural inputs, adverse climatic conditions and poor infrastructure were the major livelihood constraints. The study recommends livelihood diversification, improved extension services and interventions to reduce the cost of agricultural inputs and strengthen rural livelihoods.

Keywords: livelihood activities, food security, livelihood diversification, rural households, Katagum, Bauchi State.

Introduction

Food and livelihood insecurity remain important development challenges in developing countries. Agriculture constitutes a major source of livelihood for rural households, particularly in sub-Saharan Africa, where farming provides food, income and employment. However, dependence on agriculture alone can expose households to production, market and climatic shocks. Livelihood diversification has therefore become an important strategy for reducing

vulnerability and improving household welfare (Clement, 2014; Ellis, 2001).

Livelihood refers broadly to the capabilities, assets and activities through which people secure their means of living. A sustainable livelihood is one that can cope with and recover from stresses and shocks while maintaining or enhancing its assets and capabilities (Serrat, 2017). Rural households may combine crop production, livestock rearing, trading, processing, wage employment and other activities to meet their livelihood needs. Such diversification can provide alternative sources of income when agricultural production is inadequate (Adepoju & Obayelu, 2013).

Food security exists when people have physical and economic access to sufficient, safe and nutritious food needed for an active and healthy life. Household food security is therefore influenced not only by food availability but also by household income, purchasing power and access to livelihood resources (Otaha, 2013). Food insecurity may be particularly severe among rural households whose livelihoods depend on small-scale agriculture and are vulnerable to climatic and economic shocks.

Evidence from Nigeria and other developing countries indicates that livelihood diversification can contribute to improved household food security. Clement (2014) found a positive relationship between livelihood diversification and household food security among farming households in northern Ghana. Similarly, Bealu (2019) reported that education, land size, income and access to extension services were important factors associated with livelihood diversification and food security. In Kenya, Emily et al. (2019) found that increasing household income from farm and off-farm activities had a positive influence on food security.

Studies conducted in Nigeria have also established links between livelihood activities and food security. Bayero et al. (2019) reported a significant relationship between livelihood diversification and food insecurity among rural farming households in north-eastern Nigeria. Ganiyu and Abiodun (2016) similarly found that livelihood activities were associated with household food-security outcomes in Oyo State. Adepoju and Obayelu (2013) reported that household size, income and education influenced livelihood strategies among rural households.

Despite these findings, limited empirical evidence is available on the influence of livelihood activities on food security among rural farming households in Katagum Local Government Area of Bauchi State. This study therefore examined the livelihood activities of rural farming households and determined their influence on household food security.

Objective of the Study

The main objective of the study was to examine the influence of livelihood activities on food security among rural farming households in Katagum Local Government Area of Bauchi State.

1. identify the livelihood activities undertaken by rural farming households;
2. determine the food-security status of the households;
3. examine the influence of livelihood activities on household food security; and
4. identify the major constraints associated with livelihood activities.

Study Area

The study was conducted in Katagum Local Government Area of Bauchi State, Nigeria. The Local Government Area covers approximately 1,436 km² and is located in the northern part of Bauchi State. It is bordered by Dambam Local Government Area and Potiskum in Yobe State to the east, Jama'are to the west, Itas/Gadau to the north and Misau to the south. The study was conducted in 2023. The projected population reported in the original study was 523,200 (NPC, 2022).

Sampling Procedure and Data Collection

A multistage sampling procedure was used. Six wards were randomly selected from the eleven wards in the Local Government Area. Two communities were subsequently selected from each of the six wards, giving twelve communities. A sampling frame of 1,560 registered farmers obtained from the Bauchi State Agricultural Development Programme was used. Using Yamane's (1967) procedure at a 5% margin of error, 286 households were selected. However, 279 questionnaires were correctly completed and used for analysis.

Primary data were collected through an electronic questionnaire administered using an interview schedule with the assistance of two enumerators. Information was obtained on socio-economic characteristics, livelihood activities, food security and livelihood constraints.

Measurement of Food Security

Four indicators were used to assess household food security: Food Consumption Score (FCS), Household Dietary Diversity Score (HDDS), Reduced Coping Strategy Index (rCSI) and Household Hunger Scale (HHS).

The HDDS measured household consumption from 12 food groups during the previous 24 hours, following the approach used by Atish et al. (2017) and Emily et al. (2019). The rCSI was used to assess the frequency with which households adopted less-severe coping strategies. The HHS assessed experiences of household food deprivation during the previous 30 days, while the FCS measured the frequency of consumption of different food groups during the seven days preceding the survey.

A composite Food Security Score was calculated using the benchmarked FCS, HDDS, rCSI and HHS scores.

Data Analysis

Descriptive statistics, including frequencies, percentages and means, were used to summarize the livelihood activities, food-security status and constraints. A binary logit regression model was used to examine the influence of livelihood activities and selected household characteristics on food security.

The dependent variable was coded as 1 for food-secure households and 0 for food-insecure households. The explanatory variables included education, farm size, household size, access to credit, livelihood strategy and access to extension services.

Socio-economic Characteristics of Respondents

The results showed that 93.50% of household heads were male, while 6.50% were female. The largest proportion (50.18%) were between 41 and 50 years, with a mean age of approximately 40 years. About 50.18% had some level of formal education, while 49.82% had no formal education.

Most households (72.76%) had between six and ten members, with a mean household size of seven persons. About 83.15% reported monthly household income of not more than ₦100,000. Farm holdings were generally small, with 77.77% cultivating between 0.5 and 2.0 hectares.

Access to institutional support was low. Only 14.00% of respondents had contact with extension agents, while 13.60% had access to credit facilities.

The predominance of middle-aged farmers is consistent with Pur et al. (2016), who reported that farmers within the productive age range are more likely to participate in livelihood activities. The importance of education is also consistent with Godwin and Aondonenge (2016), who reported that education can improve access to modern farming technologies and employment opportunities.

Livelihood Activities of Rural Farming Households

Agriculture remained the major livelihood base of the households. Food-crop production was reported by 98.60% of respondents, while 77.40% engaged in sheep and goat rearing. Cash-crop production accounted for 29.40%, poultry farming 16.80%, cattle rearing 16.10% and fish farming 2.90%.

Among off-farm activities, 20.40% of respondents reported sales of farm products, 10.00% engaged in processing of agricultural produce and 4.30% sold farm inputs.

Non-farm activities were also important. Trading of non-agricultural produce was reported by 72.80% of respondents, while 19.70% reported formal employment. Other non-farm activities included tailoring, carpentry, bricklaying, weaving, blacksmithing, motorcycle riding and mechanics. Multiple responses were allowed.

The dominance of food-crop production agrees with Isma'il (2014), Ganiyu and Abiodun (2016), Raphael et al. (2017) and Bealu (2019), who identified agriculture as a major livelihood source among rural households. At the same time, the substantial participation in non-farm activities demonstrates the importance of livelihood diversification in rural communities.

Table 1. Major Livelihood Activities of Rural Farming Households

Livelihood activity	Frequency	Percentage
Food-crop production	275	98.60
Sheep and goat rearing	216	77.40
Trading of non-agricultural produce	203	72.80
Cash-crop production	82	29.40
Sales of farm products	57	20.40
Formal employment	55	19.70
Poultry farming	47	16.80
Cattle rearing	45	16.10
Vegetable production	30	10.80
Processing of agricultural produce	28	10.00

Source: Field Survey, 2023. Multiple responses were allowed.

Food Security Status

The Food Consumption Score showed that 63.08% of households had borderline food consumption, 20.07% had acceptable consumption and 16.85% had poor food consumption.

For household dietary diversity, 49.46% had high dietary diversity, 45.88% had medium dietary diversity and 4.66% had low dietary diversity. The rCSI indicated that 63.80% had high coping strategies, while 19.20% had low coping strategies and 17.20% had moderate coping strategies.

The Household Hunger Scale classified all 279 households (100%) within the moderate hunger category.

The composite Food Security Score showed that only 19.00% of households were food secure, while 81.00% were food insecure. The high level of food insecurity is consistent with Emily et al. (2019), who also reported considerable food insecurity among rural households. The finding further supports Saheed and Isa (2017), who identified food insecurity as a multidimensional problem associated with economic and social conditions in Nigeria.

Table 2. Food Security Indicators and Household Food Security Status

Indicator	Category	Frequency	Percentage
FCS	Poor	47	16.85
FCS	Borderline	176	63.08
FCS	Acceptable	56	20.07
HDDS	Low	13	4.66
HDDS	Medium	128	45.88
HDDS	High	138	49.46
rCSI	Low	53	19.20
rCSI	Moderate	46	17.20
rCSI	High	178	63.80
HHS	Moderate hunger	279	100.00
Composite status	Food secure	53	19.00
Composite status	Food insecure	226	81.00

Source: Field Survey, 2023.

Influence of Livelihood Activities on Food Security

The binary logit regression model showed that education, farm size, household size, livelihood strategy and access to extension services were important predictors of household food security, while access to credit was not statistically significant in the model.

Education had an odds ratio of 1.22 and was significant at the 1% level. This indicates that households headed by individuals with higher educational attainment were more likely to be food secure. This finding agrees with Ifeoma and Agwu (2014) and Bealu (2019), who identified education as an important determinant of household food security.

Farm size had an odds ratio of 1.51 and was significant at the 5% level. This suggests that households cultivating larger areas were more likely to be food secure, consistent with Godwin and Aondonenge (2016), who reported a positive relationship between farm size and household food security.

Household size had an odds ratio of 0.85 and was significant at the 10% level. The negative relationship suggests that increasing household size reduces the likelihood of food security when productive resources do not increase proportionately. This finding is consistent with Adepoju and Obayelu (2013).

Livelihood strategy was particularly important. Households engaged in non-farm activities had an odds ratio of 15.66 and were significantly more likely to be food secure than the reference group. This finding supports Andaleeb and Sumit (2019), who reported that non-farm income can improve household food expenditure and dietary diversity.

Households combining on-farm, off-farm and non-farm activities had an odds ratio of 2.55 and were significantly more likely to be food secure. This agrees with Dereje and Abeje (2018), who found that diversified livelihood strategies provide households with different food-entitlement options.

Access to extension services had an odds ratio of 5.61 and was significant at the 5% level. Thus, households with access to extension services were substantially more likely to be food secure. This finding agrees with Bealu (2019), who identified extension access as an important factor associated with livelihood diversification and food security.

Table 3. Binary Logit Regression of Factors Influencing Household Food Security

Variable	Odds Ratio	Z-value	Significance
Education status	1.224	5.54	***
Farm size	1.511	2.32	**
Household size	0.850	-1.77	*
Access to credit	1.666	0.69	NS
Non-farm activities	15.665	1.93	*
On-farm + off-farm + non-farm	2.548	1.98	**
Extension contact	5.606	2.42	**

*Model: N = 279; LR $\chi^2 = 11.80$; $p < 0.001$; Pearson $\chi^2 = 193.65$; $p = 0.2306$; Mean VIF = 1.55. *** Significant at 1%; ** significant at 5%; * significant at 10%; NS = not significant.*

Constraints Associated with Livelihood Activities

High cost of agricultural inputs was the most frequently reported constraint, affecting 95.70% of respondents. This was followed by adverse climatic conditions (88.20%), poor infrastructure (80.60%), inadequate skills (78.10%) and inadequate information (74.20%).

Other reported constraints included low educational level (56.60%), inadequate enlightenment and training programmes (38.70%) and poor access to credit facilities (31.20%). The findings support Gordon and Craig (2001), Onwuemele (2015), Namabanda (2019), Okoro et al. (2020) and Michael et al. (2021), who identified inadequate resources, infrastructure, skills, information, finance and adverse climatic conditions as important constraints to rural livelihood activities.

Discussion

The findings demonstrate that rural households in Katagum Local Government Area continue to depend heavily on agriculture, particularly food-crop production. However, the high participation in non-farm activities suggests that households recognize the need to supplement agricultural livelihoods with alternative income sources.

The finding that 81.00% of households were food insecure is particularly important. Although almost half of the households had high dietary diversity, the composite food-security measure indicates substantial vulnerability. The high proportion of households reporting coping strategies also suggests that many households were adjusting their consumption or livelihood behaviour in response to inadequate food access.

The positive relationship between education and food security suggests that human capital can improve household capacity to utilize livelihood opportunities. Education may facilitate access to information, improved technologies and alternative employment opportunities.

Farm size was also positively associated with food security. Larger farms provide greater opportunities for food production and income generation. In contrast, household size had a negative relationship with food security, possibly because available food and income must be shared among more household members.

The strongest livelihood-related result was the positive association between non-farm activities and food security. This is consistent with the argument that non-farm income can provide households with purchasing power when agricultural production is inadequate. Andaleeb and Sumit (2019) similarly found that non-farm income can improve household food expenditure and dietary diversity.

The significant effect of combining on-farm, off-farm and non-farm activities further supports livelihood diversification as a mechanism for reducing vulnerability. Dereje and Abeje (2018) reported that households with diversified livelihood strategies have multiple food-entitlement options, while Bayero et al. (2019) established a significant relationship between livelihood diversification and food insecurity among farming households in north-eastern Nigeria.

The strong positive association between extension contact and food security is also important. Extension services can provide farmers with information and knowledge that may improve production and livelihood decisions. However, only 14.00% of respondents had access to extension services, indicating a substantial institutional gap in the study area.

Finally, the prominence of high input costs and adverse climatic conditions indicates that rural livelihood improvement cannot depend on diversification alone. Agricultural production must also be supported through affordable inputs, climate-resilient practices, infrastructure and access to relevant information.

Conclusion

The study established that agriculture, particularly food-crop production, remains the major livelihood activity among rural farming households in Katagum Local Government Area. Nevertheless, non-farm activities, especially trading, constitute an important complementary livelihood source.

Food insecurity was widespread, with 81.00% of households classified as food insecure. Education, farm size, livelihood strategy and extension contact significantly influenced household food security, while household size had a negative influence.

The findings demonstrate that livelihood diversification, particularly participation in non-farm activities and a combination of on-farm, off-farm and non-farm activities, can contribute to improved household food-security outcomes.

Recommendations

1. Government and development organizations should promote viable non-farm and off-farm livelihood activities to enable rural households to diversify their income sources.
2. Agricultural extension services should be strengthened and expanded to improve farmers' access to information, technologies and improved production practices.
3. Measures should be introduced to reduce the cost of agricultural inputs and improve farmers' access to affordable productive resources.
4. Climate-resilient agricultural practices should be promoted to reduce the effects of adverse climatic conditions on rural livelihoods.
5. Rural infrastructure, particularly roads, markets and other basic facilities, should be improved to facilitate agricultural production and non-farm economic activities.
6. Farmers should be encouraged to form or strengthen cooperatives to improve their collective access to inputs, information and livelihood opportunities.

References

Adepoju, A., & Obayelu, O. (2013). Livelihood diversification and welfare of rural households in Ondo State, Nigeria. Journal of Development and Agricultural Economics, 5(12), 482–489.

Andaleeb, R., & Sumit, M. (2019). Does non-farm income affect food security? Evidence from India. The Journal of Development Studies, 56(6), 1190–1209.

Atish, R., et al. (2017). Household dietary diversity and food security assessment.

Bayero, S. G., Joseph, K. O., & Odjuvwuederhie, E. I. (2019). Livelihood diversification strategies and food insecurity status of rural farming households in north-eastern Nigeria. Economics of Agriculture, 66(1), 281–295.

Bealu, T. (2019). Analysis of livelihood diversification practice to promote rural households food security: A case of Hawassa Zuria District, Ethiopia. Journal of Development and Agricultural Economics, 11(1), 1–8.

Clement, M. (2014). The impact of livelihood diversification on food security amongst farm households in Northern Ghana: A case study of Bole District. Unpublished MSc thesis, University of the Western Cape.

Dereje, T., & Abeje, B. (2018). Rural livelihood strategies and household food security of farmers in Oromia region, Ethiopia. Rural Sustainability Research Journal, 40(30).

Ellis, F. (2001). Rural livelihoods, diversity and poverty reduction policies. Overseas Development Group, University of East Anglia.

Emily, M., Patrick, B., & Yohannah, J. (2019). Livelihood and food security among rural households in the north-western region of Kenya. Frontiers in Sustainable Food Systems, 7, 1–12.

Ganiyu, M. O., & Abiodun, O. O. (2016). Effects of livelihood activities on household food security in Ogbomoso South Local Government Area of Oyo State, Nigeria. Journal of Human Ecology, 56(1–2), 107–113.

Godwin, A. A., & Aondonenge, S. (2016). Analysis of factors affecting food security in rural and urban farming households of Benue State, Nigeria. International Journal of Food and Agricultural Economics, 1(Special Issue), 55–68.

Ifeoma, J., & Agwu, E. A. (2014). Assessment of food security situation among farming households in rural areas of Kano State, Nigeria. Journal of Central European Agriculture, 15(1), 94–107.

Michael, A., Tashikalma, A. K., Kolawale, A. A., & Akintunde, M. O. (2021). Rural livelihood improvement: An assessment of household strategies and activities in Adamawa State, Nigeria. Journal of Rural and Community Development, 16(1), 1–22.

Namabanda, E. M. (2019). Livelihood challenges in a rural growth point: The case of Ondobe, Namibia. Master's dissertation, University of Free State.

NPC. (2022). Population projection for Katagum Local Government Area, Bauchi State, Nigeria.

Okoro, D. P., Mmamel, Z. U., Okolo, V. O., & Obikeze, C. O. (2020). Women petty trading and household livelihood in rural communities of South-Eastern Nigeria. International Journal of Managerial Studies and Research, 8(2), 1–12.

Onwuemele, A. (2015). Escalating poverty in Nigeria: Appraising institutional frameworks for poverty reduction in Nigeria. International Journal of Economic Development Research and Investment, 6(1), 1–21.

Otaha, I. J. (2013). Food insecurity in Nigeria: Way forward. An International Multidisciplinary Journal, 7(4), 26–35.

Pur, J. T., et al. (2016). Farmers' participation and livelihood activities.

Raphael, N. E., Chigozirim, N. O., & Daniel, C. N. (2017). Effect of livelihood diversification on food security status of rural farm households in Abia State, Nigeria. Scientific Papers Series Management, Economic Engineering in Agriculture and Rural Development, 17(1), 159–166.

Saheed, M., & Isa, E. (2017). The challenges of food security in Nigeria. Open Access Library Journal, 4, e4185.

Serrat, O. (2017). Sustainable livelihood approach. Asian Development Bank, 21–26.

Yamane, T. (1967). Statistics: An introductory analysis (2nd ed.). Harper and Row.