**Livelihood Diversification and Food Security Among Crop Farmers in Ekiti State, Nigeria**

**Abstract**

To address prevalent poverty and food insecurity, farming households in Africa are increasingly embracing a variety of livelihood strategies. In this light, this study examines how livelihood diversification affects food security among arable crop farming households in Ekiti State, Nigeria. The objective is to determine how diversification affects food security among these households. A multi-stage sampling procedure selected 120 respondents. Data were collected using structured questionnaires and personal interviews, then analysed with descriptive statistics, the food security index, Tobit regression, and Pearson Product-Moment Correlation (PPMC). The average age of respondents was 56 years, with males dominating farming (92.5%). Most (83.3%) were educated, and 84.2% were married. All had secondary occupations, with 40% acquiring land by purchase. The average farm size was 0.45 hectares, and 56.7% farmed out of personal interest. About 82% benefited from credit facilities. Average monthly income was ₦145,458, with farm income at ₦106,833 and food expenditure at ₦26,870. ADP was the primary agricultural information source for 60% of the population. Food security was achieved by 82.5%. According to the Household Diversification Index, 48.3% had low diversification, 43.3% average, and 8.3% high. Significant livelihood diversification determinants included age (P=0.000), household size (P=0.031), and weekly food spending (P=0.017). Diversification was positively correlated with food security, indicating that as households diversify their income sources, their food security status improves. However, 40% cited lack of capital as the main challenge. Many respondents were food-secure, and livelihood diversification aimed to increase income. The study recommends that the government promote non-farm jobs and improve rural infrastructure to support diverse incomes for rural households.

**Keywords:** Livelihood diversification, food security, arable crop farming, Tobit regression, Household Diversification Index (HDI).

**INTRODUCTION**

In response to widespread poverty and food insecurity, farming households across Africa are increasingly adopting diverse livelihood strategies. This shift includes various activities within and outside the agricultural sector, targeting significant income deficiencies and meeting urgent household requirements such as food, shelter, healthcare, and education for children (Arowolo et al., 2022; Vihi et al., 2021). Diversification enables households to stabilise income, facilitating farm expansion and participation in non-farm enterprises, which enhances overall living standards (Abiodun et al., 2019).

The sustainable livelihood approach emphasises economic access to food over simple physical availability, guiding livelihood diversification. This point of view is especially relevant in the framework of rural families, where informed agricultural research and development depend on knowing the strategies for guaranteeing sustainable livelihoods and food security. Many studies have looked at food security and livelihood diversification independently thus far; nonetheless, there is a clear knowledge vacuum about how different livelihood sources affect the state of food security of rural people. By looking at food security concerns through the prism of sustainable livelihood sources among arable crop farming households in Ekiti State, this paper seeks to close that gap.

Food security is a fundamental human necessity, defined by reliable physical, social, and economic access to adequate, safe, and nutritious food that fulfils dietary needs for an active and healthy life (FAO, IFAD, & WFP, 2013). It includes four essential dimensions: availability, accessibility, utilisation, and sustainability. Availability denotes the reliable provision of quality food, whereas accessibility emphasises how individuals acquire food, including economic, social, and physical aspects (FAO, 2019). Food utilisation emphasises the proper consumption of food, encompassing dietary diversity, food safety, and nutrition education, which are crucial for the prevention of malnutrition (WHO, 2021). Finally, sustainability guarantees the stability of food systems over time, enabling communities to endure production shocks and price volatility (FAO, 2019).

In Africa, food security is especially important since many countries struggle with both natural and manmade elements, causing food shortages that result in insufficient per capita consumption (Shala & Stacey, 2012). Identified as the most vulnerable area, Sub-Saharan Africa shows startling numbers, with an average daily availability of only 1,300 calories, just 48% of the world average (Ahmed et al., 2015). The complexity of food poverty calls for a careful investigation of how diversification of livelihoods might improve food security in rural agricultural households.

This study seeks to achieve the following objectives: (1) to assess the extent of livelihood diversification among arable crop farming households in Ekiti State, (2) to evaluate its impact on their food security status, and (3) to provide recommendations for policy and practice that can enhance both livelihoods and food security in the region. By addressing these objectives, the research contributes valuable insights into the intersection of livelihood diversification and food security, with the aim of fostering sustainable agricultural practices and improving the quality of life for rural households.

**Methodology**

The study was carried out in Ekiti State, Nigeria. A multi-stage sampling technique was used to select respondents for the study. At the first stage, four Local Government Areas (LGAS) out of the 16 in the study area were selected randomly. The second stage involved randomly selecting three towns in each of the selected LGAS. At the third and last stage, a random selection of ten respondents from each selected town was made to create 120 respondents for the study. Primary data were collected using a pre-tested structured questionnaire through personal interviews. The questionnaire was used to gather information on the respondents’ socio-economic characteristics, household characteristics, Household food expenditure, etc. The information was complemented with personal observation by the researcher.

Descriptive statistics, food security index and Tobit regression model were the analytical techniques employed in the data analysis. Specifically, in order to identify the socio-economic characteristics of the arable crop farming households, descriptive statistics such as such as frequency counts, mean, percentages were used to describe and categorise the socio-economic characteristics of the respondents, know the extent of livelihood diversification among the respondents, and identify the challenges faced in diversifying livelihood activities among the respondents.

The food security status of the respondents was estimated by adopting household food expenditure methods, which have found wider application in several empirical studies (Ifeoma & Agwu, 2014; Arene & Anyaeji, 2010). The method entails constructing a food security index (Zi), which is then used to estimate the food security line for the respondents in the study area. The food security index (Zi) is given by:

 Zi = Per capita food expenditure for the ith household

 2/3 means the per capita food expenditure of all households…(1)

Where

Zi = food security index (when Zi ≥ 1 = food secure ith household, Zi < 1 = food insecure ith household).

 PC FE = Share of income spent on food

 Household size

 PCFE = Per capita food expenditure

 TPCE = Summation of PCE

 MTPCE = TPCE

 Total Number of Households

Hence, the food security line, required for considering a household as food secure or insecure, was estimated as two-thirds of the Mean Per-capita monthly Food Expenditure (MTPCE) of all households. Thus, a food-secure household has a per-capita monthly food expenditure greater than or equal to two-thirds of the mean per-capita food expenditure. On the other hand, a food-insecure household is one whose per-capita monthly food expenditure falls below two-thirds of the mean monthly per capita food expenditure.

The Tobit Regression Model was used to evaluate the determinants of livelihood diversification among the arable crop farming households in the study area. The analysis evaluated the effect of numerous socio-economic factors on the extent of livelihood diversification among the respondents.

The model is specified as:
Yi = βXi if i\* = βXi + ui> Ti………………m……………. (2)
Yi = β0 + βiXi + ui…………………………………………. (3)
Where:
ui = normally distributed with zero mean and constant variance
Xi = vector of explanatory variables
βi = vector of the parameter estimates
Yi = Livelihood diversification index obtained by dividing the number of livelihood sources employed by all the livelihood sources available in the study area.

Thus, the value of the livelihood diversification index ranges between zero (0) and one (1).

Thus, the explanatory variables used in the analysis are:

X1 = Age of household head (years)

X2 = Gender of household head (Male = 1; Female = 0)
X3 = Marital status (1= married, 0 = otherwise)

X4 = Household size (number of persons in the household)

X5 = Household head's monthly income (₦)
X6 = Credit access (Yes = 1, No = 0)

X7 = Farm size (hectares)
X8 = Membership of cooperative (Yes = 1, No = 0)

X9 = Distance of farm (Km)

Pearson Product-Moment Correlation (PPMC) was used to analyse the effects of livelihood diversification on the food security status of the respondents in the study area.

**RESULT AND DISCUSSION**

Table 1 shows that the mean age of the respondents was 56 years, while the maximum age was 82 years, and the minimum was 27 years. 0.8 % of the respondents were 30 years and below. Also, 8.3 % were between 31 and 40 years old, 24.2 % were between 41 and 50 years old, 30 % were between 51 and 60 years old, and 44 % were above 60 years of age. This indicates that the arable crop farmers in the sample area are relatively old, and this might affect their productivity due to the tedious nature of farming. Hence, there is a need to encourage younger people of active working age to embrace farming. This is in line with Ogunyemi et al. (2022), who reported similar results in their study of determinants and effects of livelihood diversification on farming households in Ekiti State, Nigeria.

About nine farmers, representing 7.5% of the respondents, were female, while 111 farmers, representing 92.5%, were male. The result shows that male-dominated farming activities are prevalent in the study area. Farming is generally regarded as a male occupation because of its rigorous nature and vigorous farm work. This is in line with the findings of Echebiri *et al. (2017), who also reported that the male gender dominates farming*.

About 20 respondents, representing 16.7 % of the total respondents, did not have any formal education, and 10 respondents, representing 8.3% of the respondents, completed primary school education. A total of 22 respondents, representing 18.3 %, had secondary school education, while 68 respondents, representing 56.7%, had tertiary education. This implies that educated people are interested in farming in the study area. The result shows that the majority of the respondents were literate, and this can enhance the food security status of the respondents. The high level of literacy observed is good for the respondents as they are expected to have greater knowledge of the importance of diverse income sources. Agreeing with Aderoumu (2021) and Nofiu (2019), who opined that “literate status can improve food security status and livelihood diversification”.

The majority (45.8%) were civil servants, 40.8% of them were traders, and 13.3% of the respondents were in other occupations, such as driving, shoe mending, etc., as a means of secondary occupation. This implies that the majority of the respondents were not full-time farmers; they engaged in one or more enterprises apart from farming. This is at variance with the findings of Olutumise et al. (2021) and Osuafor (2017), who said that small-scale agrarian livelihoods mainly characterise rural Nigeria.

Also, the result shows the distribution of respondents based on the mode of land acquisition. Larger proportion (40.0%) of the respondents acquired land by purchasing, 30% of the respondents acquired their farm land through inheritance, 17.5% of the respondents rented their farm land, 11.7% of the respondents got their farm land through lease agreement and only 0.8 % of the respondents acquired land through squatting on their farm. This implies that land is not a barrier because it is readily available to the farmers regardless of the mode of land acquisition.

Majority (40.8%) of the respondents cultivated 0.3 hectares of land and below, 25.0% of the respondents had farm size between 0.31 and 0.40 hectares of land, 7.5% of the respondents had farm size between 0.41 and 0.50 hectares, 10.0% had between 0.51 and 0.60 hectares of land and 16.7% had a farm size of 0.61 hectares and above. This implies that most of the respondents in the study area are smallholder farmers. The finding revealed that farmers in the study area are mainly small-scale farmers. Hence, food production is at the subsistence level, which could lead to farmers diversifying into non-farm activities to be food secure. This finding corroborates the finding of Arowolo et al. (2022) that “the majority of Nigerian farmers are small-scale farmers who cultivate less than 5 hectares”.

The average monthly income recorded was ₦145,458.33 with a standard deviation of ₦126,796.32. The minimum and maximum income recorded were ₦25,000 and ₦800000.00, respectively. Only 5.8% of the respondents had an income of ₦40000 and below, 31.7% had an income between ₦41001 and ₦80000:00, and 21.7% had an income between ₦80001 and ₦120000. Also, 13.3% had income between ₦120001 and ₦160000, 12.5% had income between ₦160001 and ₦200000, and 15.0% had income above ₦200000:00. The average income recorded by the respondents indicated that the respondents are not core poor. This negates the findings of Aruwajoye and Ajibefun (2013) that, despite the respondents’ diversification efforts, farming household incomes have mainly been for survival rather than totally coming out of poverty.

The average monthly food expenditure recorded was ₦26870 with a standard deviation of ₦11371.39. The minimum and maximum incomes recorded were ₦7000 and ₦75000, respectively. Only 5.0% of the respondents spent ₦10000 and below on food items monthly, 37.5% of the respondents spent between ₦10001 and ₦ 20000 on food items monthly, and 39.2% of the respondents spent between ₦20001 and ₦30000 on food items monthly. Also, 6.7% of the respondents spent between ₦30001 and ₦40000 on food items monthly, 10.8% of the respondents spent between ₦40001 and ₦50000 on food items monthly, and only 0.8% of the respondents spent above ₦50000 on food items monthly.

The majority (60.0%) stated that their primary source of agricultural information was from ADP, 13.3% sourced agricultural information from the internet, and 10.8% from friends and other farmers. In comparison, 8.3% and 7.5% got agricultural information from Radio/Television and newspaper, respectively. This may be as a result of the cosmopolitan nature of the study area, where tertiary institutions are located, and the potential application of technology by farmers to improve agriculture. This is in line with the findings of Aderoumu (2021), which state that “most farmers depend on extension agents for agricultural information and that agricultural information transfer, sourcing, and usage thrive better in places where farmers are highly educated”. Furthermore, 33.3% planted maize, followed by 29.7% who planted pepper, 27.2% who planted potatoes, 24.2% who planted yams, and 15 % who planted vegetables. This shows that the majority of the respondents were maize farmers.

**Table 1: Descriptive Statistics of Socio-economic Variables**

|  |  |  |  |
| --- | --- | --- | --- |
| **Variables** |  **Frequency** |  **Percentage** | **Mean** |
|  | **Age (years)** |  |  |  |
|  ≤30 | 1 |  0.8 |  |
| 31-40 | 10 |  8.3 |  |
| 41-50 | 29 |  24.2 |  |
| 51-60 | 36 |  30.0 | 56.46 |
| >60 | 44 |  36.7 |  |
| **Gender** |  |  |  |
| Female | 9 | 7.5 |  |
| Male |  111 |  92.5 |  |
| **Level of Education** |  |  |  |
| No formal education | 20 | 16.7 |  |
| Primary school | 10 | 8.3 |  |
| Secondary School | 22 | 18.3 |  |
| Tertiary Education | 68 | 56.7 |  |
| **Secondary Occupation** |  |  |  |
| Trading | 49 | 40.8 |  |
| Civil Services | 55 | 45.8 |  |
| Others | 16 | 13.3 |  |
| **Mode of Land Acquisition** |  |  |  |
| Purchase | 48 | 40.0 |  |
| Rented | 21 | 17.5 |  |
| Lease | 14 | 11.7 |  |
| Inheritance | 36 | 30.0 |  |
| Squatting | 1 | 0.8 |  |
| Farm Size (Ha) |  |  |  |
|  ≤0.30 |  49 | 40.8 |  |
| 0.31- 0.40 |  30 | 25.0 |  |
| 0.41 - 0.50 |  9 | 7.5 | 0.45 |
| 0.51- 0.60 |  12 | 10.0 |  |
|  > 0.60 |  20 | 16.7 |  |
| **Household Average Monthly Income in Naira** |  |  |  |
|  ≤ 40000 |  7 | 5.8 |  |
| 41000-80000 |  38 | 31.7 |  |
| 81000-120000 |  26 | 21.7 |  |
| 121000-160000 |  16 | 13.3 | 145458.33 |
| 161000-200000 |  15 | 12.5 |  |
| >200000 |  18 | 15.0 |  |
| **Household Average Monthly Food Expenditure** |  |  |  |
| ≤10000 | 6 | 5.0 |  |
| 10001-20000 | 45 | 37.5 |  |
| 20001-30000 | 47 | 39.2 | 26870.00 |
| 30001-40000 | 8 | 6.7 |  |
| 40001-50000 | 13 | 10.8 |  |
| ≥50000 | 1 | 0.8 |  |
| **Sources of Agricultural Information** |  |  |  |
| Radio/Television | 10 | 8.3 |  |
| Friends and other farmers | 13 | 10.8 |  |
| Internet | 16 | 13.3 |  |
| Agricultural Development Program | 72 | 60.0 |  |
| Newspaper | 9 | 7.5 |  |
| **Arable Crops Cultivated\*** |  |  |  |
|  Vegetables | 18 | 15.0 |  |
| Potatoes | 33 | 27.5 |  |
|  Maize | 40 | 33.3 |  |
|  Yam | 29 | 24.2 |  |
|  Pepper |  35 |  29.7 |  |

Source: Field Survey, 2023, \*Multiple Response recorded

Figure 1 shows that the majority (84.2%) of the respondents were married, 6.7% of the respondents were divorced, 6.7% of the respondents were widowed, while a few (2.5%) of the respondents were single. This indicates that married people constitute the bulk of the household heads in the rural areas due to tradition and social orientation. This may encourage diversification of livelihood to meet family responsibilities. They are mature and have high responsibility and expectations to meet household demands (Oluwatusin, 2014).

Fig 1: **Marital status Distribution of the Respondents**

Source: Field Survey, 2023

The result in Figure 2 shows the distribution of respondents by access to credit. The majority of respondents (82%) in the study area had benefited from credit institutions. In comparison, a few (18%) of the respondents had not benefited from a credit institution and hence relied on their savings. Access to credit plays a crucial role in the decision to diversify. An increase in access to credit by a given household will increase the level of non-farm diversification. However, this finding is at variance with the findings of Vihi et al. (2021), who stated that “people experiencing poverty who do not have information about credit providers and, when even so, are unable to present any forms of collateral seldom have access to the credit facility”.

Figure 2: Distribution of households by access to credit facility

Source: Field Survey, 2023

**Food Security Status Analysis**

The food security status of the respondents was estimated using the Food Security Index. The index was used to classify the respondents into food-secure and food-insecure households. The mean per capita food expenditure (MPCFE) of the respondents in the study was ₦5597.56, while the benchmark, that is, two-thirds of the mean per capita food expenditure, was ₦3731.71. This means that households with per capita expenditure (PCE) less than ₦3731.71 were classified as food insecure. In contrast, households with per capita expenditure greater than or equal to ₦3731.71 were regarded as food secure. Based on this criterion, Table 2 shows that 82.5% of the respondents were food secure while 17.5% were food insecure. The high percentage of food-secured households could be attributed to the prevalence of diverse livelihood sources among the respondents.

**Table 2: Food Security Status of the Respondents**

|  |  |  |
| --- | --- | --- |
|  **Food Security** | **Frequency** | **Percentage Remark** |
|  <3731.71 |  21 | 17.5 Food Insecure |
|  >3731.71 Total  |  99 120 | 82.5 Food Secure 100 |

Source: Field Survey, 2023

**Extent of Livelihood Diversifications among the Respondents**

The extent of livelihood diversification among the respondents was calculated as an index of Household Diversification Index (HDI) and presented in Table 3. The indices range from 0 to 1, indicating the strength of diversification. A total of 48.3% of respondents have a diversification index ≤0.3 and are therefore classified into the low diversification category. 43.3% of respondents have a diversification index between 0.31 and 0.70 and are therefore classified as average diversification. 8.3% of the respondents have a diversification index greater than 0.70 and are thus classified as having a high level of livelihood diversification.

**Table 3: Extent of Livelihood Diversifications among the Respondents**

|  |  |  |
| --- | --- | --- |
| **Levels of Diversification** |  **Frequency** |  **Percentage** |
| Low diversification ≤ 0.3  |  58 |  48.3 |
| Average diversification 0.31 – 0.70  |  52 |  43.3 |
| High diversification ≥0.70  |  10 |  8.3 |

 Source: Field Survey, 2023

**Determinants of Livelihood Diversification Among the Arable Crop Farming**

**Households**

The Tobit regression model was used to estimate the determinants of livelihood diversification among the crop farming households in the study area. The result of the Tobit regression model is shown in Table 4. The chi-square value of 12.53, which was significant at 1%, suggests that the model has a strong explanatory power. It was revealed that age (P>|t| = 0.000), household size(HS) (P>|t| = 0.031), spending on food item per week (SFW) (P>|t| = 0.017) were the variables that significantly determines livelihood diversification among the respondents. The coefficient of age is significant and positively related to involvement in numerous livelihood activities, implying that with advancement in age of household heads, their involvement in diverse enterprises increases. This finding agrees with *a priori* expectations and agrees with (Dilruba & Roy, 2012) firstly because experience increases with age and consequently, experienced persons have more prospects of enterprise diversification. The coefficient of household size has been positively signed, implying that with an increase in the number of household members, households will seek other livelihood means. An additional income source is expected to make more money available to meet the various demands of the increasing household membership**.** The coefficient of monthly food expenditure was also statistically significant at 1% and positive. This implies that a naira increase in the amount spent on food items by the household head increases the probability of household diversification to more enterprises. This may be due to the need to make more money to keep up with the household spending on food items.

**Table 4: Tobit regression model estimate of determinants of livelihood diversification**

 **HDI Coef. Std. Err. t P>|t|**

 AGE 0.0213204\*\*\* 0.0074941 2.84 0.000

 SEX 0.0701714 0.0781238 0.90 0.371

 YS 0.0035731 0.0039141 0.91 0.363

 HS 0.0108052 \*\* 0.0051249 2.11 0.031

 FS 0.0812406 0.2685643 0.30 0.763

 LUC -0.2841912 0.3188495 -0.89 0.375

 FE -0.0013356 0.002166 -0.62 0.539

 AMI 1.89e-07 2.43e-07 0.78 0.439

 SFW 0.012912\*\* 0.005427 2.38 0.017

 \_cons -0.0749652 0.1579852 -0.47 0.636

 Sigma 0.1840454 0.0204553

 Source:Data Analysis, 2023 \*\*, \*\*\*, Significant at 5% and 10% respectively

 Diagnosis

 Number of obs = 120 LR chi2(9) = 12.53

 Prob > chi2 = 0.0050 Pseudo R2 = 0.1816

 Log likelihood = -28.240032 65 left-censored observations at hdi ≤ 0

 55 uncensored observations zero right-censored observations

**Effects of livelihood diversification on the food security status of the farmers**

A Pearson Correlation Analysis was carried out to examine how livelihood diversification, calculated as Household Livelihood Diversification Index (HDI), affects food security as indicated by Household per Capita Food Expenditure (HPCFE). This is presented in Table 5. A positive correlation (0.127) was found to exist between livelihood diversification and food security. This is in line with the findings of Echebiri *et al. (2017),* who reported “a significant positive correlation between livelihood diversification and food security among the rural farming households in Abia State. This implies that increasing the number of livelihoods engaged in by a household will increase/improve the food security status of the households in the study area”. It is therefore worth noting that livelihood diversified households are more food secure than non-diversified households.

 **Table 5: Effects of livelihood diversification on the food security status of the farmers**

|  |  |  |
| --- | --- | --- |
|  |  HPCFE |  HDI |
| HPCFESig. (2-tailed)N |  1 120 |  0.127 0.165 120 |
| HDISig. (2-tailed)N |  0.127 0.165 120 |  |

 Source: Field Survey, 2023

**Significant Constraints to Livelihood Diversification**

The result of the evaluation of significant constraints to livelihood diversification in the study area is presented in Table 6. The identified constraints are as follows; majority (40.0%) identified lack of capital as their primary challenge to livelihood diversification, limited market opportunity (24.2%), Time constraints (14.2%), Lack of knowledge or skill (12.5%) and Social stigma (9.2%) were all identified as constraints to livelihood diversification among the responds. This is supported by the findings of Ogunyemi et al. (2022)

**Table 6: Major Constraints to Livelihood Diversification**

|  |  |  |
| --- | --- | --- |
|  **Constraints** |  **Frequency** | **Percentage** |
| Lack of capital |  48 |  40.0 |
| Lack of knowledge or skill |  15 |  12.5 |
| Limited market opportunity |  29 |  24.2 |
| Time constraint |  17 |  14.2 |
| Social stigma |  11 |  9.2 |
| Total  |  120 |  100 |

Source: Field Survey, 2023

**CONCLUSION AND RECOMMENDATION**

It can be concluded from the study that a high percentage of the respondents were food secure, which could be attributed to the prevalence of diverse livelihood sources among the respondents. Diversification of livelihoods supports the idea that it improves food security for farmers growing arable crops in the study area. Additionally, the study found that the overwhelming desire to boost households' income portfolio and address the threat of food insecurity is what drives farmers to engage in livelihood diversification activities. As a result, the study's overall conclusion is that livelihood diversification is a good idea and a countermeasure to the ongoing threat of food insecurity in the studied locations.

Based on the study's findings, it is recommended that the government promote non-farm employment as an alternative income-generating activity in addition to farming enterprises. By assisting farmers in growing their farms, this might be a good approach to increase rural household income. This could then have a positive impact on their food security status by influencing their per capita food spending. In addition to increasing agricultural output, future government policies should support a variety of livelihood development techniques. Improved rural infrastructure and the creation of skill-acquisition facilities that give rural residents a variety of earning possibilities will help achieve this.

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1.

2.

3.

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