EFFECTS OF LIVELIHOOD INCOME DIVERSITIFICATION ON FOOD SECURITY STATUS AMONG FARMING HOUSEHOLDS IN KATCHA LOCAL GOVERNMENT AREA OF NIGER STATE, NIGERIA

[1]Ubandoma, G. A., [1]Mohammed, U., [1]Adedeji, S. O., [2]Yakubu, D. H. and [3]Ismail, H. A.
[1]Department of Agricultural Economics and Extension Services, Faculty of Agriculture, Ibrahim Badamasi Babangida University Lapai, Niger State, Nigeria
[2]Department of Agricultural Extension and Rural Development, Faculty of Agriculture, Usmanu Danfodiyo University Sokoto, Sokoto State, Nigeria
[3]Department of Agricultural Extension Services, Faculty of Agriculture, Federal University Gashua, Yobe State, Nigeria
Correspondence details: ubandomagarba@gmail.com; 07060619690, 08128103716

ABSTRACT

The study assessed the effects of livelihood income diversification on food security status among farming households in Katcha Local Government Area of Niger State, Nigeria. Five wards were purposively selected using multistage sampling procedures and eighty respondents were selected for the study. Data was obtained using questionnaires and analysed using descriptive statistics and logit regression model. The study revealed that the respondents had a mean age of 35 years. They were young and active, ready to contribute towards household food security in the study area. About 93.8% were male and 21.39% female with 95.0% married with mean household size of 15 persons. The respondents were educated with 69% ranging from primary, secondary and tertiary education. The mean farm size was 1ha with 75% acquired through inheritance and the mean annual income was ₦2, 074,999:00K. The livelihood income diversifications were Pottery 90.0%, hunting 60.0% and trading 57.5%. The food security status was 92.5% food secure while 7.5% food insecure. The analysis further revealed that the determinants of food security that were positive and significant at 5% include: educational level, annual income; farm size and livelihood income diversification. Thus, household size was significant but negatively at 5%. This means as the household size increases there will be decreases in household food security. The constraints to income diversification were cultural norms 91.25%, lack of credit facilities 88.75% and lack of market 78.75%. The respondents should form cooperative societies, and Government should establish extension stations in the rural areas were offered as recommendations.

Keywords: Livelihood, Diversification, Income, Food, Security

INTRODUCTION

The concept of food security has evolved over the years and is now considered to be more than just access to food. To measure the quality of any food taken, there are classes of essential nutrients, which must be combined in appropriate proportion to ensure an adequate food intake. These include carbohydrates, proteins, fats and oil, vitamins and minerals (Ifeoma and Agwu, 2014). Food is a basic necessity of life and is regarded as the basic means of sustenance. Therefore, an adequate food intake in terms of quantity and quality is key to a healthy and productive life. Foods serve as important vehicles for transporting nutrients into the body and bringing about a healthy state, hence the need for food to be taken in the right quality and quantity. According to the Food and Agriculture Organisation (FAO, 2018), food security exists when all people, at all relevant times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for a vibrant, active and healthy life.

In Nigeria, the most populous country in Africa, households are food insecure, especially the rural farming households. The nation has the biggest number of hungry individuals or food unreliable families in the entire West-Africa sub-area and is positioned 103rd out of 119 countries on the Global Hunger index of 31.1 in 2018 (FAO, 2018). Several evidence have suggested that majority of the world's food insecure live and work in the rural areas (IFAD, 2011). This indicates that reducing rural food insecurity is very important to reducing overall food insecurity. Given the role of agriculture in the Nigerian economy, food insecurity and poverty could be attributed to the poor performance of the agricultural sector, which in turn, creates problems of food availability and accessibility at the household and national levels (Oluwatayo,2012). Food insecurity status in Nigeria is multifaceted, arising from climate change, poor agricultural practices, and inadequate infrastructural development. Additionally, insecurity has further worsened the situation by disrupting food supply chains and increasing food prices.

Nigeria has great agricultural potentials and abundant natural resources for all round development; however, most indicators of the economic well-being are still very low. Food insecurity and poverty are still widespread across different parts of the country. Food insecurity situation in Nigeria is worsening with the passage of time due to the wide gap between the national supply and demand for food (Salawu and Hassan,2021). Food security is a major challenge that affects many rural communities, particularly farmers who rely on agriculture for their livelihoods. Katcha Local Government Area (LGA) is one of the communities that faces food security challenges. It is on this premise that the study assessed the effects of livelihood income diversification on food security of farming households in Katcha Local Government Area of Niger State, Nigeria. The specific objectives were to: describe the socio-economic characteristics of farming households, identify the livelihood income diversification, determine the food security status of the farming households, examine the determinants of food security and identify the constraints to livelihood income diversification.

METHODOLOGY

The study was conducted in Katcha Local Government Area, Niger State. The area is located between latitudes 8^0 37" N 6^0 4E and longitudes $7^0$35'' N, 9^0 29'' E. This area covers 1,681km^2 and has a population of over 122,176 people and 139 districts. It is a Nupe kingdom which comprises of 10 wards namely: Katcha, Edotsu, Gbakogi, Bakeko, Sidi Saba, Dzwafu, Badeggi, Bisanti, Essa and Kateeregi. Other minority tribes include Hausa, Yoruba and Igbo among others. The climate is influenced by the Sudan-Sahel ecological zone, with variations including droughts, dust storms, and floods. It experiences a tropical climate characterised by seasonal rainfall, high temperatures, wind, and humidity. There are two distinct seasons namely wet and dry seasons, with the wet season from April to October and the dry season from November to March. Temperature fluctuations are minimal, with a maximum of 33°C in March and a minimum of 25.6°C in December. The region is mainly agrarian and relies heavily on rainfall, with an annual average of 1095 mm. The crops cultivated in the area includes rice, groundnut, sorghum, melon and cassava (Ahmed, 2012).

Multistage sampling procedures were used to select respondents for the study. In the first stage five wards namely: Katcha, Dzwafu, Essa Badeggi and Bakeko were purposively selected based on the number of farmers in each ward (Onoja *et al.*,2022). The second stage involved the selection of two villages from each of the selected wards to make a total of ten (10) villages. In the third stage, convenience selection of eight (8) farming households from the selected villages to make a total of eighty (80) farming households as the sample size for the study (Table 1).

Table 1: Sample size and location of the study area

SN	Wards	Villages	Number of Farmers
1.	Katcha	Echegi, Katcha	16
2.	Dzwafu	Egbanti, Dzwafu	16
3.	Essa	Dagba, Essa	16
4.	Badeggi	Babah, Badeggi	16
5.	Bakeko	Mudagu, Bakeko	16
		Total	**80**

Source: Field survey data, 2023

Both Primary data and secondary information were used for this study. A structured questionnaire was used to obtain primary data with the help of extension agents from Katcha Local Government. Primary data were obtained on socioeconomic characteristics of the respondents, livelihood income diversification, food security status, determinants of food security and constraints to livelihood income diversification. The secondary information on the number of farmers in each ward using journal.

Descriptive statistics such as frequency, percentage and mean were used to achieve objectives i, ii, and v., Food Security Index (FSI) was used to achieve objective iii and Binary Logit Regression was used to achieve objective iv.

Food Security Index (FSI): The food security index was estimated as per capita food expenditure for individual households divided by two-third of mean per capita monthly food expenditure of all households. Households were then classified into their food security status as food secure and food insecure households based on the food security index. The formula is given as:

$$FSi = \frac{\text{per capita food expenditure for ith household}}{\tfrac{2}{3}\text{ mean per capita food expenditure of all households}}$$

Where:
FSI = Food security index
FSI ≥ 1 food secure ith household
FSI < 1 food secure ith household

Binary Logit Regression Model: This was used to estimate the determinants of food security. The food security status of households, which is bivariate, taking the value of 1 for food secure households and 0 for food insecure households was used as the dependent variable. These are specified explicitly in the model as: $FSI = \beta0 + \beta\ 1X1 + \beta\ 2X2 + \beta\ 3X3 + \beta\ 4X4 + \beta\ 5X5 + \beta\ 6X6 + \beta\ 7X7 + \beta\ 8X8 + \beta\ 9X9 + \beta10X10 + U$

Where:
FSI = Food security index
β 0 = Constant
X1 = Age (years)
X2 = Sex (male = 1, female = 0)
X3 = Marital status (married =3, single =2, widow =1)

X4 = Household size (no)
X5 = Educational level (years)
X6 = Livelihood income diversification source (no)
X7 = Cooperatives Membership (yes =1, no =0)
X8 = Annual income (₦)
X9 = farm size (ha)
U= Error term

RESULTS AND DISCUSSION

Socioeconomic characteristics

Results in Table 2 revealed that 62.5% of the farming household heads were within the age range of 30 – 49 years with mean age of 35 years. This implies that the farming households in the study area were young and energetic to participate effectively in both farm and non-farm activities as well as diversify their livelihoods to increase their income and positively enhance their food security status. According to Dary and Kuunibe (2012), young people are more likely to take advantage of opportunities in the non-farm sector, but the likelihood of participation decreases with age. The result also showed that 93.8% of the farming household heads were male while 95.0% were married (Table 2). This implies that non-farm activities were practiced mostly by married male farmers to sustain the family. Most women's chances of participating in non-farm economic activities decrease when they get married (Dary and Kuunibe, 2012).

Table 2: Distribution of Respondents according to Socio-economic Characteristics (n = 80)

Variables	Frequency	Percentage	Mean
Age (in years)			
10-19	8	10.0	
20-29	14	17.5	
30-39	30	37.5	35 years
40-49	20	25.0	
>49	8	10.0	
Sex			
Male	75	93.8	
Female	5	6.2	
Marital status			
Married	76	95.0	
Single	1	1.3	
Widow	3	3.8	
Household size (in persons)			
5-14	42	52.5	
15-24	36	45.0	15 persons
25-34	2	2.5	
Educational status			
Adult education	25	31.3	
Primary education	28	35.0	
Secondary education	24	30.0	
Tertiary education	3	3.8	
Farm size (in hectares)			
0.5-1.5	57	71.2	
1.6-2.6	19	23.8	1ha
>2.6	4	5.0	
Farm source			
Purchased	9	11.3	
Inheritance	60	75.0	
Government	11	13.8	
Annual income (₦)			
100,000-1,099,999	50	62.5	
1,100,000-2,099,999	23	28.8	**₦2,074,999:00K**
2,100,000-3,099,999	6	7.5	
3,100,000-4,099,000	1	1.3	
Frequency of extension visits			
Yes	48	60.0	
No	32	40.0	

Source: Field survey data, 2023.

The result further revealed that farmers had fairly large household size with the mean of 15 persons. This suggests that the likelihood of having enough food decreases with household size. An increase in more people to feed in turn, lowers per capita income, expenditure, and food consumption (Adebayo,2012; Adepoju and Adejere, 2013).

Table 2 also showed that 68.8% of the respondents had formal education (Table 2) which invariably would assist in selecting economically viable activities that will contribute towards improving their household food security. The result revealed further that 71.2% of the respondents had farmland between 0.5 and 1.5 hectares with a mean farmland of 1hectare. Also, 75.0% of the farmland was acquired through inheritance. This obviously indicated that the farming households are small scale farmers with the mean annual income of ₦2, 074,999.00K attributed to remittances acquired from non-farm activities. The result indicated that 60.0% of the farming households had contact with extension services. Layan and Silva (2020) found that Agricultural extension services (AES) had a significant positive impact on farmers' knowledge, yield, and income.

Livelihood income diversification activities

The contribution of most cultivating families in assorted livelihoods for economical provincial business can't be over underscored. According to Oni and Fashogbon (2013), "means of making a living" are the various activities and resources that enable people to live. The first definition of diversification is "an increase in the number of sources of income or the balance among the different sources. Livelihood income diversification activities are tasks essential to everyday life that are conducted over one's life span to earn a living. It is also a productive activity for which time is spent. The results presented in Table 3 showed the distribution of farming households' livelihood income diversification activities in the study area. Pottery, ranked 1st, hunting ranked 2nd, trading ranked 3rd driving ranked 4th, butchering ranked 5th and bricklayer ranked 6th. This implies that the farming households engaged in different livelihood income diversification activities in order to increase income generation and enhance household food security. This is in line with Kuku-shittu *et al.* (2018) who rtot farmers diversified into different profitable livelihood activities to increase their gross earnings for better standard of living and household family food security.

Table 3: Distribution of Farming Households' Livelihood Income Diversification Activities

Activities	*Frequency	Percentage	Rank
Pottery	72	90.0	1st
Hunting	48	60.0	2nd
Trading	46	57.5	3rd
Driving	45	56.25	4th
Butchery	24	30.0	5th
Bricklayer	6	7.5	6th

Source: Field survey data, 2023.
*****Multiple responses

Food Security Status of Farming Households

Food security index was used to classify the farming households into food secure and food insecure households in a bid to establish the food security status of the individual households. The food security index was estimated as per capita food expenditure for individual households divided by two-third of mean per capita monthly food expenditure of all households. Households were then classified into their food security status as food secure and food insecure households based on the food security index A food secure household is therefore, that whose monthly food expenditure per capital is at least two-third of the mean per capital monthly food expenditure. On the other hand, a food insecure household whose monthly food expenditure per capital is less than two-third of the mean monthly per capita food expenditure. The mean per capita food expenditure per month was estimated to be ₦48,462.82. The calculated food security index was ₦32,308.55. Table 4 showed that the food security index was ₦32,308.55. This implies that all farming households whose monthly food expenditure per capital is equal to or above ₦32,308.55 were regarded as being food secure. The finding further indicated that 92.5% of the farming households were food secure while 7.5% were food insecure. This implies that more than half of the farming households in the study area are food secure. This result corroborates Jabo *et al*., (2014) who reported that most farming households in Nigeria are food secure.

Table 4: Distribution of Farming Households according to their Food Security Status

Variables	Frequency	Percentage
Food secure	74	92.5
Food insecure	6	7.5
Total	80	100
FSI = ₦32,308:55		

Source: Field survey data, 2023

Determinants of food security status of farming households

Table 5 shows the determinants of security status of farming households using Binary Logit regression model. The R^2 was 0.725, which implies that all the explanatory variables included in the model explained approximately 73% of the variability in food security status of households in the study area. The respondents' household size (α= -0.0961), educational status (α= 0.5874), livelihood income diversification activities (α= 0.5386), annual income (α= 0.2470) and farm size (α= 0.2469) are significantly ($p<0.05$) related to household food security.

The finding revealed that household size has a coefficient of -0.09617. This implies that there is an inverse relationship between household size and food security. In other words, an increase in family size would lead to a decrease in household food security status. Specifically, an increase in household size decreases the probability of household being food secure by 0.09617. This is in agreement with Adebayo (2012) and Adepoju and Adejere (2013) who found that an increase in one family member increases the chances of a household becoming food insecure by indirectly reducing income per head, expenditure per head, and per capita food consumption. This may be attributed to the fact that household size exerts more pressure on consumption than it contributes to production (Kim, 2011).

The coefficient of years of formal education has a positive relationship with household food security. Specifically, the probability of being food secure is increased by 0.58743 for households whose heads had higher level of formal education. This suggests that, increase in years of formal education increases the likelihood of households to be food secure. This is as expected, because the level of education should positively affect the income earning capacity and efficiency of managing households' food resources. The result coincides with those of, Adebayo (2012), Adepoju and Adejere (2013), and Oni and Fashogbon (2013**)**.

The livelihood diversification activities of household are positively related to the food security status. This implies that, increase in the livelihood activities increases the possibility of a household becoming food secure by 0.5386. Therefore, households involved in diverse activities tend to be more food secure than those who are into fewer activities. This is because diversification is one of the livelihood strategies that provide additional income to rural household. It enhances household economy and food security by providing additional income, decrease food deficit and also minimises the sales of farm produce that should be consumed. Alternative income sources outside farming provide food security for household livelihood. This is in line with the *a priori* expectation and the findings of Aidoo *et al*. (2013), Awotide *et al. (*2012), and Frimpong and Asuming-Brempong (2013), that alternative income sources provide food security for household livelihood.

Annual income has a positive and significant ($p<0.05$) relationship with food security. This signifies that for a unit rise in income, the level of food security will increase by 0.24698. This implies that, an increase in household income increases the possibility of a household becoming food secure. This is due to the fact that remittances contribute to household income possibly increase per capita food expenditure and consequently improve household food security status. This finding corroborates Asogwa and Umeh (2012) and Adepoju and Adejere (2013) studies who revealed that, households with access to remittances have a lower probability of being food insecure.

The coefficient of farm size was positive and statistically significant at the 5% level. This means that as a household's farm size increases, food security tends to increase. Specifically, the probability of being food secures increases by 0.2469 for every hectare increase in farm size. That is, households with larger farm sizes tend to be more food secure than those with smaller sizes. This can be attributed to the greater efficiencies in the use of resources associated with the large farms than those with small farms. Consequently, small farm holdings may result to low productivity, low income, and food insecurity among the farm households. This outcome is consistent with the finding of Asogwa and Umeh (2012) who opined that household food security increases with increase in farm size under cultivation.

Table 5: Logit Regression estimates of Determinants of Food Security

Variables	Coefficients	z-value	p-value
Age	-0.04841	-0.960	0.467
Sex	0.76059	1.158	0.216
Marital status	0.78105	0.643	0.765
Household size	-0.09617*	-1.954	0.037
Educational status	0.58743*	2.152	0.041
Livelihood income diversification	0.53862*	2.845	0.031
Farm size	0.71949*	3.148	0.029
Annual income	0.24698*	1.863	0.048
Constant	2.8762	1.794	0.481

Source: Field survey data, 2023. Level of significant = 5%

Constraints to Livelihood Income Diversification

Table 6 reveals that the farmers had constraints related to cultural norms(91.25%), lack of knowledge (88.75%), lack of market (88.75%), lack of awareness (83.75%), lack of credit facilities (78.75%) lack of information (76.25%), lack of infrastructure (52.50%) and lack of capital (50.0%). This implies that cultural norms and lack of credit facilities were the most severe constraints to livelihood income diversification by farmers in the study area.

Table 6: Constraints to Livelihood Income Diversification

Constraints	*Frequency	Percentage
Cultural norms	73	91.25
Lack of knowledge	71	88.75
Lack of credit facilities	71	88.75
Lack of awareness	67	83.75
Lack of market	63	78.75
Lack of information	61	76.25
Lack of Infrastructure	42	52.50
Lack of Capital	40	50.0
Total		**100**

Source: Field survey data, 2023. *Multiple responses

CONCLUSIONAND RECOMMENDATIONS

The findings from the study revealed that the farmers had mean age of 35 years, male and married. This implies that a typical farmer in the study area is still young and energetic to participate effectively in both farm and non-farm activities so as to increase their income which may positively influence their food security status. The farmers were small-scale using a small farm acquired through inheritance. The farmers were involved in pottery, trading and bricklayers as their non-farm activities to diversify their income to sustain family food security. The respondents in the study area were food secured. The determinants found to be significant to food security status includes household size, educational status, livelihood income activities, annual income and farm size. The constraints to livelihood income diversification were cultural norms and lack of credit facilities.

The recommendations derived from the study are as follows:

1. The farmers should be encouraged to form cooperative societies to make funds available for their farming activities.
2. Government should establish extension service stations for sensitization of the farmers on cultural norms and its implications to modern farming.

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