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LIVELIHOOD ACTIVITIES AND FOOD SECURITY STATUS OF FARMING HOUSEHOLDS IN NIGER STATE, NIGERIA

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ABSTRACT
The study assessed the livelihood activities and food security status among farming households in Agwara LGA Niger state. Primary data were obtained from a total of 119 selected farming households in 5 farming communities. Descriptive statistics, Simpson's index of diversity (SID), Food security perception scale and ordered probit regression model were used to analyzed the data. The results revealed that the farmers in the study area have an average age of 38 years, household size of 8 persons and farm size of 4.02ha. 71.56% of the farmers were male and 75.23% of them were married. Crop farming, agro-produce trading, livestock farming, civil service, tailoring, agro-inputs trading among others were the major livelihood activities engaged in by the farming households. Majority of the farming household 81.65% were moderately diversified in their livelihood activities. Result on the food security status of the respondents shows that 4.59% were food secure, 29.36% were slightly insecure, 33.11% were moderately insecure and 33.94% were severely insecure. The determinants of food security of the respondents were level of livelihood diversification ($p \leq 0.01$), household income ($p \leq 0.10$), household size ($p \leq 0.01$) farm size ($p \leq 0.01$), access to credit ($p \leq 0.01$) and sex of household head ($p \leq 0.05$). Intensifying the amount farm work to increase output, diversifying into off-farms activities to increase income, and children eating first were the most adopted strategies of the households to escape food insecurity. The study concluded that livelihood diversification positively and significantly improved farmers food security status. Thus, it was recommended that farmers should diversify their livelihoods sources.

Keywords: Livelihoods, Diversification, Food security, Farming households, Agwara LGA.

INTRODUCTION
One of the major objectives of farmers livelihood activities is to gain a living, food security capabilities and assets essential to everyday life. An individual's livelihood involves the capacity to acquire the aforementioned necessities in order to satisfy the basic need of themselves and their households. Given the circumstance of limited resources to support household activities and consumption among farming households, diversification has become the most compelling means of making such resources available to guaranty a robust livelihood. *Diversification refers to attempts undertaken by an individual or household to find new ways of survival to raise income and endure shocks and stresses such as food insecurity.*

Food security has been defined as a situation when at all times people have physical, social, and economic access to sufficient, safe, and nutritious food preferences which meets their dietary needs for an active and healthy life (FAO, 2018). Food security for household means access by all members at all times to enough food for an active healthy life. However, food insecurity and poverty are particularly devastating in the developing countries. Although, a lot of efforts and resources has been channeled towards programmes aimed at eradicating

food insecurity and poverty by various international organizations and governments including in Nigeria. Relatively, farmers' livelihood activities have not been able to bring them out of the vicious cycle of poverty. Food insecurity still remain a major concern among farmers in Nigeria.

Moreso, there is little or no evidence of study done on the livelihood activities and food security status of farmers in Agwara Local Government Area of Niger State. The nexus between the farmers' livelihood and their food security has not been ascertained in the area. Based on these reasons this study conducted an assessment of the current situation of livelihood activities and food security of farming households in Agwara local government area of Niger State, Nigeria. Specifically, it identified the livelihood activities and analyzed the level of diversification, food security status, determinants of food security and the coping strategies adopted by the farming households.

The study brought to limelight thematic implications of the livelihood activities and food security of Agwara farming households. The findings will provide policy direction to government agencies towards intervention programmes that will enhance the livelihood of the farmers and improve their food security status. The outcome of this is study will also promote the frontiers of knowledge and guide the future researchers with interest in farmers' livelihood and food security analysis.

MATERIALS AND METHODS

The Study Area

The study was conducted in Agwara Local Government Area of Niger State. It has a projected population of 80,600 National Population Commission (2006) and an estimated population of 130,467 as at 2020 at a growth rate of 3.5%. It is located along Latitude 10°42′N and Longitude 4°35′E with a land area of 1,450km^2. The LGA shares boundaries with Yauri LGA in Kebbi State Borgu LGA in Niger state. The LGA is blessed with adequate rainfall with distinct season which comprises of dry and wet season. The tribes range from Bissan, Kambari, Hausa, Gungawa and Fulani. Crop farming, fishing, rearing of livestock, trading/business and civil service are the major occupation of the household in the study area.

Sampling Procedure

A 2-stage sampling procedure was used to select respondents for this study. At the first stage five (5) communities were randomly selected in Agwara LGA. These were Agwara, Rofia, Gallah, Papiri, and Kokoli respectively. At the second stage, following Adewumi *et al.* (2018), 10% of the farmers were proportionately selected from each community. This gave a total sample size of 119 for the study.

Method of Data Collection

Primary data were used for this study. The data were collected from the respondents with the aid of structured questionnaire and were complement with the interview schedule. Data obtained from the respondents were based on the socio-economic characteristics, livelihood activities, household food security and the coping strategies to food insecurity.

Analytical Tools

The data were analyzed using descriptive statistics in form of frequency distribution, percentage and mean, 4-point likert type rating scale (4 = frequency used, 3 = occasionally used, 2 = rarely used, 1 = never used), Simpson Index of Diversity, Latin American and Caribbean food insecurity perception scale and a prototype ordered probit regression model.

1. The Simpson index of diversity: The Simpsons Index of Diversity (SID) adopted from Yisa *et al.* (2018) was used in this study to estimate the level of livelihood diversification among farm households. The SID takes into consideration both the number of livelihood sources

as well how evenly the distributions of the income between the different sources are. The SID ranges between Zero (0) and One (1). Thus, 0 denotes specialization and 1 the extremity of diversification. The more the SID value is closer to one, the more diversified the household is.

The SID general formula is given in equation 1 as:

$$SID = 1 - \sum_{i=1}^{n} P_i^2 \quad \ldots (1)$$

SID = Simpsons Index of Diversity,
n = number of livelihood sources,
P_i =Proportion of income coming from the livelihood source *i*,

2. Latin American and Caribbean food insecurity perception scale: Following Cordero-Ahiman *et al.* (2020), the Latin American and Caribbean food insecurity perception scale was used to determine the food security status of the farming household based on their experience in the previous 3 months. The food insecurity perception scale entails 15 questions. The first section is composed of 8 questions aimed at adults and household members in general and the second section is composed of 7 questions related to the conditions that affect children and adolescents under 18 years of age in the home. The use of the scale is on the basis of the number of questions given positive response and gives four categories of food security. They are:

i. Food secure (0 positive responses);
ii. Mildly insecure (1–3 positive responses for households with adults, 1–5 positive responses for households with individuals under the age of 18);
iii. Moderately insecure (4–6 positive responses for households with adults, 4–10 positive responses for households with individuals under the age of 18); and
iv. severely insecure (7–8 positive responses for households with adults, 11–15 positive responses for households with individuals under the age of 18).

The questions asked are:

1. Did you ever worry about your household running out of food?
2. Did your household ever run out of food?
3. Was your household deprived of eating a healthy diet?
4. Did you or any other adults in your household ever have an unbalanced diet?
5. Did you or any other adults in your household miss breakfast, lunch, or dinner?
6. Did you or any other adults in your household eat less than you should?
7. Were you or any other adults in your household ever hungry and have nothing to eat?
8. Did you or any other adults in your household not eat for a whole day or eat only once a day?
9. Were any household members deprived of a healthy diet?
10. Did any household members under 18 have an unbalanced diet?
11. Did any household members under 18 ever miss breakfast, lunch, or dinner?
12. Did any household members under 18 not have enough to eat?
13. Did you ever have to cut the size of the meals prepared for any household members under 18?
14. Were any household members under 18 ever hungry and have nothing to eat?
15. Did any household members under 18 ever not eat for a whole day or eat only once a day?

3. Ordered logit regression model: A protype ordered logit regression model adopted and modified from Cordero-Ahiman *et al.* (2020) was used to estimate the determinants of food security among the farmers. The model is specified as:

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \ldots + \beta_9X_9 + e \quad \ldots(2)$$

where;
Y = Food insecurity status of the individual household (Severe = 0, Moderate = 1, Slight = 2, Food secure = 3)
X_1 = Level of livelihood diversification (SID value).
X_2 = Household income (₦).
X_3 = Household size (number of people).
X_4 = Age of respondent (years).
X_5 = Farming experience (years).
X_6 = Farm size (hectares).
X_7 = Access to credit (₦).
X_8 = Sex (male = 1, female = 0)
X_9 = Education (years of formal education).
β_0 = Constant.
β_1 - β_9 = Coefficients.
e = Error term.

RESULTS AND DISCUSSION

Socio-economic Characteristics of Farming Households

The results of the socio-economic characteristics of the respondents are presented in Table 1. It shows that 44.04% of the household heads were between the age of 30 to 40 years with the average of 38 years. This result is comparable with the average of 37years reported by Ibrahim *et al.* (2019) for farmers in Niger State. The result implies that majority of them were in their economical active and productive age, hence they are energetic to cultivate large size of farm to increased food production and engage in off farm work to increase household income. Also, 71.56% of the household are male. This finding agrees with the work of Fadairo *et al*. (2015) who reported that male participation in agricultural production is more pronounced than that of female. Men have easier access to farmland through inheritance than women in Nigeria. Based on this male headed households are expected to have more access to farmland for food production which could enhance their food security.

About 75% of the households are married. This potentially could have implication on the size of cultivated farmland and the amount of family labour to be used for household food production and food security. The results further show that the farmers in study area have an average of 8 person per household. This implies that most of the household have large household size which could also have a great implication for food household security in terms of size of farm land to cultivate and production of large quantities of food to meet household food requirement and income generation.

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Table 1: Distribution of socio-economic characteristics of the farming households

Socio- economic characteristic	Frequency	percentage	Mean
Age of respondent			38
Less than 20	1	0.92	
31 – 40	48	44.04	
41 – 50	24	22.02	
Gender of respondent			
Female	31	28.44	
Male	78	71.56	
Marital status			
Divorced	5	4.59	
Married	82	75.23	
Single	20	18.35	
Widowed	2	1.83	
Household size			8
1 – 5	41	37.61	
5 – 10	44	40.37	
11 – 15	13	11.93	
Above 15	11	10.09	
Level of education			
Adult education	3	2.75	
Non formal education	21	19.27	
Primary education	9	8.26	
Secondary education	47	43.12	
Tertiary education	29	26.61	
Farming experience			11
1 – 10	69	63.30	
11 – 20	29	26.61	
21 – 30	10	9.17	
Above 30	1	0.92	
Access to extension service			
Access	28	25	
No access	81	74	
Farm size range			4.02
0.01 to 2.50	43	39.45	
2.51 to 5.00	42	38.53	
Above 5.00	24	22.02	

Source: Field survey 2021

Result (Table 1) also show a relatively good level of education among the farmers as about 43.37% and 26.61% of the farming household have secondary and tertiary education respectively, which could indicate a positive impact on their livelihoods. This supports the argument of Salihu *et al.* (2018) that education could enhance the livelihood of farmers. Results in Table 1 show that the farmers have an average of 11 years farming experience. Farming experience has a great impact on the level of production and cultivation of food crops. Also, a great proportion of 68.81% of the farmers were members of cooperative society which could enhance the chance of those who are particularly members to access to credit facilities for food

production and consumption and also help them to market their produce in such away they will make maximum profit and earn more income.

Also, results show that majority (74.31%) of the farming household don't have access to extension services while only 25.69% has access to extension services. This means that the farmers may not be receiving adequate awareness and education on new farming practices and opportunities that can improve their livelihood. This result supports the argument of Adewumi *et al.* (2018) that many smallholder farmers suffer from dearth of information due to inadequate access to agricultural extension and farm advisory services. The result also shows that 39.45% has 1 to 2.5 hectare of farmland, 38.45% have 2.5 to 5.0 hectare and 22.02% have above 5 hectares. This indicates that majority of the households were peasant farmers, which suggests that they have to diversify to other income generating enterprises.

Livelihood Activities of the Farming Households

Livelihood activities are activities or task essential to everyday life that are conducted over one's life span to earn a living. It is also a productive activity on which time is spent. The results presented in Table 2 show the distribution of livelihood activities of the farming household in the study area. Crop farming with multiple responses of 109 ranked first. This was followed by agro-produce trading/dealing with responses of 41 ranked second and livestock farming with 38 responses ranked third.

Table 2: Livelihood Activities distribution of farming household

Livelihood activities	***Frequency**	**Percentage**	**Rank**
Crop farming	109	100.00	1st
Agro-produce trading/dealing	41	37.61	2nd
Livestock farming	38	34.86	3rd
Civil service	29	26.61	4th
Tailoring	18	16.51	5th
Agro-inputs trading/dealing	17	15.60	6th
Trading business	16	14.68	7th
Artisanal fishermen	13	11.93	8th
Mechanic	11	10.09	9th
Transporters	10	9.17	10th
Carpenter	9	8.26	11th
Welder	8	7.34	12th
Bricklaying	7	6.42	13th
Total	326		

* = multiple responses recorded.
Source: Field survey 2021

Other livelihood activities undertaken by the farmers (Table 2) in the area include civil service, tailoring, agro-inputs trading, trading and artisanal fishing among others. This shows that the farming household engaged in different livelihood activities in order to meet their food requirement and increased income generation to cater for other household needs. This gives credence to the argument of Jirgi *et al.* (2018) that farmers diversify into different profitable livelihood activities in order to increase their gross earnings towards better standard of living. A cursory look at the results revealed that the farm activities seem to be more vital to the

farming households than the off-farm activities in the study area since majority of the farmers derive their livelihood from activities in this sector. This is similar to the findings of Yisa *et al.* (2018) who reported that farmers are more diversified in farm enterprises than off-farm enterprises in Shiroro LGA of Niger State.

Level of Diversification of the Farming Households

Level of diversification is the degree at which individual households diversify to multiple means of income generating activities. It is also the extent or proportion to which the livelihood contributed to the farming household welfare. The result presented in Figure 1 shows the distribution of the households according to the level of diversification which was classified into four groups. Those with high level of diversification were 2.75%, moderate level diversification was 81.62%, low level of diversification was 9.17% while those who specialized in just one livelihood activity represents 6.43% of the farming households. This result suggests that majority of the farmers were moderately diversified in the livelihood activities in Agwara LGA. This result is relatively lower than the high level of livelihood diversification reported by Ogaji *et al.* (2018) among fish farmers in Niger State. However, the result is contrary to that of Yisa *et al.* (2018) who reported that farm households in Shiroro LGA of Niger State are more specialized in the livelihood activities.

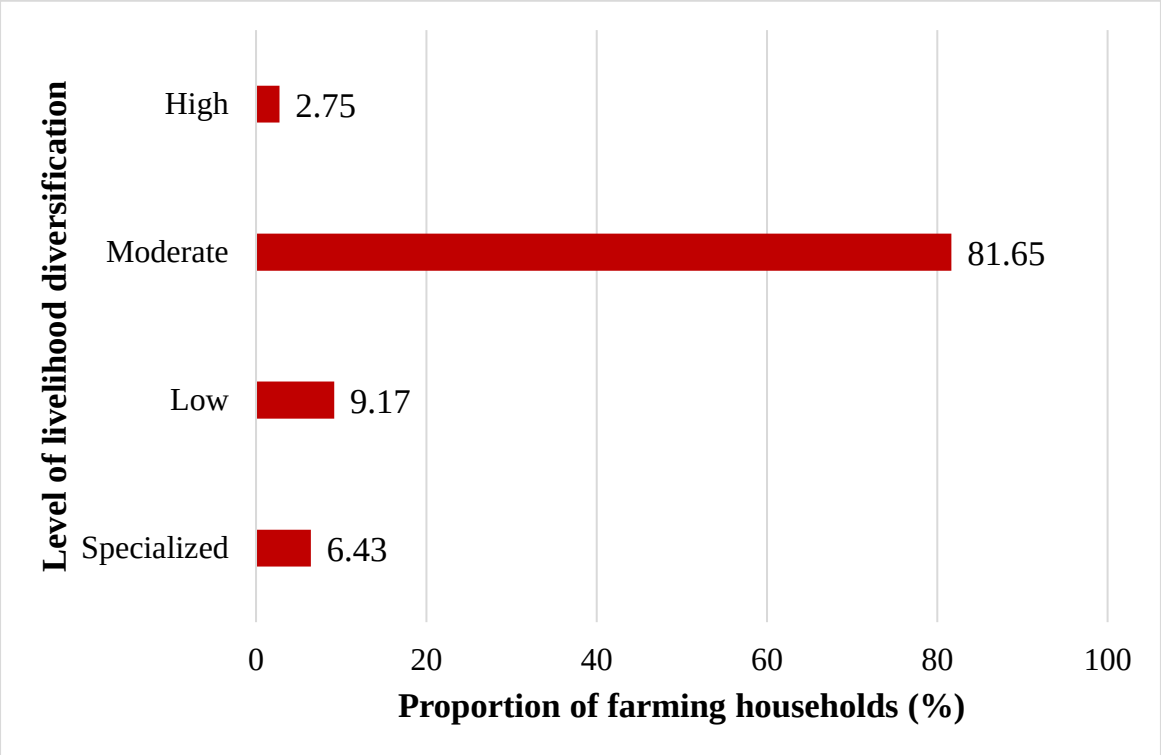

Figure 1: *Level Of livelihood diversification of the farming households*
Source: Field survey 2021.

Food Security Status of Farming Household

The farming households were profiled into food secure, slightly food insecure, moderately food insecure and severely food insecure respectively based on the food security indices computed from the Latin American and Caribbean food security perception scale. The results presented in Figure 2 show that those that are food secure represents only 4.59% of the

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farming households. On the other hand, those that are categorized as slightly food insecure represents 29.36%, while those that were moderately and severely food insecure represent 32.11% and 33.94% of the sampled farming households in the study area. This result clearly indicates that majority of the farming households under study are food insecure. It further suggests that food insecurity remains a major issue of concern among the households in the study area. This finding is in contrast to those of Durba *et al.* (2019) who reported that farmers in Kaduna State were relatively food secure.

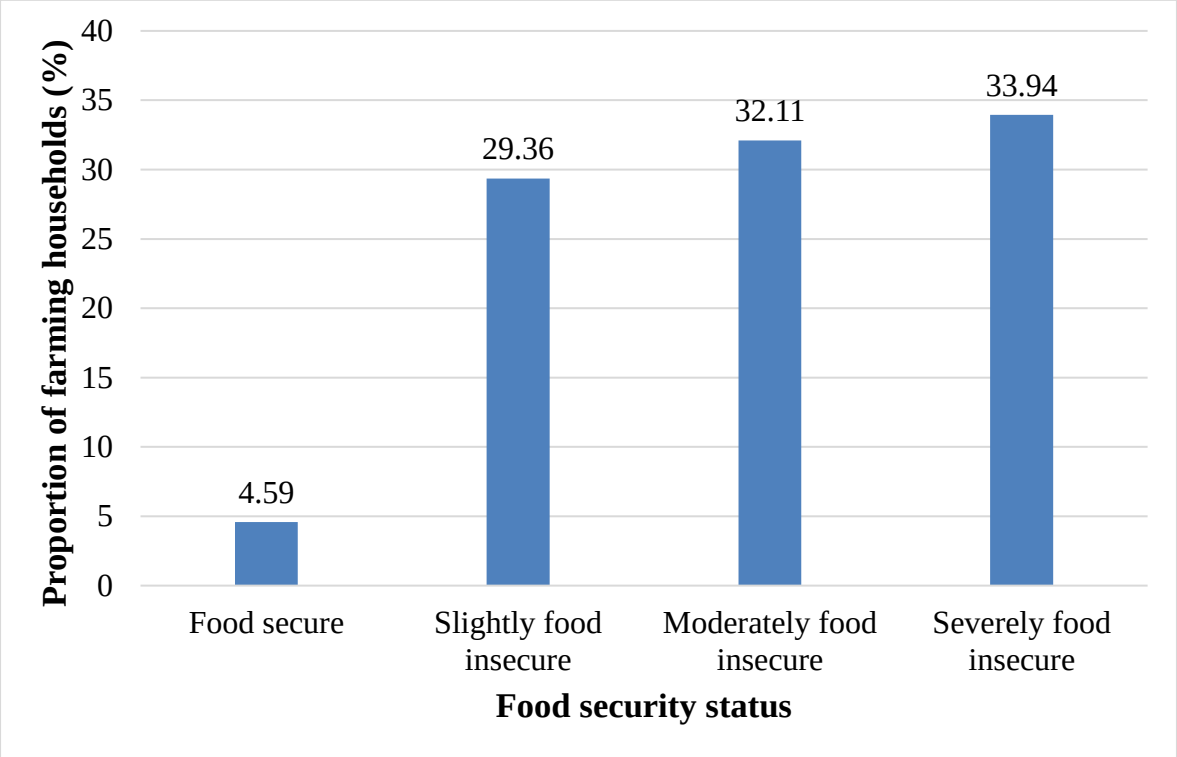

Figure 2: *Food security status of farming households*
Source: Field survey 2021

Determinant of Food Security Status of Farming Household

The result of ordered probit regression model is presented in the Table 3. The regression analysis result shows that the LR Chi-square value of 121.17 for the model was significant at $p \leq 0.01$ level of probability. This implies that the model has good explanatory power and the estimated coefficients are statistically different from zero. It also implies that there is a significant relationship between the dependent variable (food security status) and independent variables (livelihood diversification and other covariates) in the model.

Results further revealed that six out of the nine variables analyzed were found to be significant determinants of food security status among farming households in Agwara LGA. The estimated coefficient of livelihood diversification was positive and significant at $p \leq 0.01$ probability level. The implication of this is that the likelihood of being food secure among the farmers in the area is significantly higher with for households that diversified that means of livelihood compared with the households that specialize in one livelihood source. This further implies that livelihood diversification germane to attaining food security among the farmers. The coefficient of household income (0.0004) was also positive and significant at $p \leq 0.10$ probability level indicating that households with higher income have probability of been food

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secure. This is in agreement with the Household size (-0.0769) had a negative coefficient and was significant at p≤0.01 probability level. This implies the farming households with large household size are more likely to be food secure compared to households with small to moderate household size. This result is in agreement with the finding of Yisa *et al.* (2020) who reported that household size is a significant factor influencing food security status of farming households in Niger State.

Table 3: Ordered probit regression estimates of determinants of food security

Variables	Coefficients	z-value	p-value
Level of livelihood diversification (SID value)	2.9938	2.99***	0.003
Household income (₦)	0.0004	1.93*	0.054
Household size (number of people)	-0.0769	-2.76***	0.006
Age of respondent (years)	-0.0169	-0.93	0.352
Farming experience (years)	0.0032	0.16	0.872
Farm size (hectares)	0.2345	3.69***	0.000
Access to credit (₦)	0.0001	2.66***	0.008
Sex of household head (male = 1, female = 0)	0.6055	2.16**	0.031
Education (years of formal education)	-0.0362	-1.47	0.141
Diagnostics statistics			
LR Chi-square	121.27***		

*** and ** = p≤0.01 and p≤0.05 probability levels of significance, respectively
Source: Field survey 2021.

More so, the coefficient of farm size (0.2345) was positive and significant at p≤0.01 probability level. This indicate that as farm size increase, more food is produced both for consumption and sale to earn more money resulting in increased food security. Access to credit (0.0001) also had a positive and significant coefficient at p≤0.01 probability level suggesting that a farmer with access to borrowed capital for livelihood activities will have adequate capital to produce in large quantities to for household consumption and commercial purposes. This will then result in food security for the household. This result is similar to previous findings of Omotayo (2016), Yisa *et al.* (2019) and Essien *et al.* (2021) who reported that farm size and access to credit had significant influence on food security status of farming households in Nigeria. The sex of the respondents (0.6055) having a positive coefficient and significant at p≤0.05 probability level indicates that households that is head by a male is more likely to be food secure compared to households that is headed by a woman in in the study area. In essence, livelihood diversification, household income, household size, farm size, access to credit and sex of household head were that significant determinants of food security among the farming households in Agwara LGA of Niger State.

Food Insecurity Coping Strategies

The result of the prevailing food insecurity coping strategies adapted by the farming households in the study area presented in the Table 4. Each strategy and the extent to which such strategy was utilized by the households was ranked using the weighed sum and weighed mean scores computed from their responses. The result show that intensifying the amount of work done on farm to increase output was the most adopted strategy which ranked first ($\bar{X}$ = 4.35). This was closely followed by diversifying to off farm activities to increase income ($\bar{X}$ =

4.25), children eating first ($\bar{X}$ = 4.23), reduction in food quantity ($\bar{X}$ = 4.10), reduction of food diversity ($\bar{X}$ = 4.01) which ranked 2nd, 3rd, 4th and 5th respectively. Eating less preferred food ($\bar{X}$ = 3.83), spending of saved income ($\bar{X}$ = 3.61), selling of assets to increase income ($\bar{X}$ = 3.41), reduction in the number of meals taken per day ($\bar{X}$ = 3.33) and purchasing items on credit ($\bar{X}$ = 3.31) were other food insecurity coping strategies adopted by the farming households in the study area. This result suggests that the households have built resilience against food insecurity in one way or the other. Nonetheless, not all these strategies are sustainable in the long run. Hence, the farming households need to do more in diversifying their livelihood activities by undertaking other profitable farm and non-farm enterprises to improve their food security status and attain a sustainable standard of living.

Table 4: Food insecurity coping strategies

Food insecurity coping strategies	**Weighted Sum**	**Weighted Mean**	**Rank**
Intensify the amount of work done on the farm to increase output	474	4.35	1st
Diversify off-farms activities to increase income	463	4.25	2nd
Children eating first	461	4.23	3rd
Reduction in food consumption	447	4.10	4th
Reduce food diversification	437	4.01	5th
Eating less preferred food	418	3.83	6th
Spending of saved income	393	3.61	7th
Selling of assets to increase income	372	3.41	8th
Reduction in the number of meals taken per day i.e., Skipping of meals	363	3.33	9th
Purchasing items on credit	361	3.31	10th
Rely less on expensive cloths	359	3.29	11th
Reliance on help from relatives and friends.	330	3.03	12th
Borrowing money for the household upkeep	329	3.02	13th
Allocating children to friends and relatives	218	2.00	14th
Relocating to other places	199	1.83	15th
Others (specify)	144	1.32	16th

Source: Field survey, 2021

CONCLUSION AND RECOMMENDATIONS

The study assessed the livelihood activities and food security status of farming households in Agwara LGA. Based on the result that obtained, the study concluded that the household were moderately diversified in their livelihood activities. The farming households were not food secure. However, food security status of the households was directly related to their level of livelihood diversification. Thus, engagement in diversified livelihood activities can reduce the risk of food insecurity among the farming households in the study area. Household income, household size, farm size, access to credit and sex of household head were other significant determinants of food security among the farming households. The study recommended that;

1. Farming households should diversify their economic activities to earn more income to enable them improve the food security status of their household members.

2. Government should create enabling socio-economic environment such as provision of infrastructures, amenities and market linkages for farm outputs that will increase farming households' income in the study area.

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