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Research Article

Assessment of Food Security Status and Coping Strategies Among Three Northern States of Sasakawa Africa Association, Nigeria Project

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Abstract: The study was conducted in three Sasakawa Africa Association target states of Northern Nigeria. Multi-stage sampling procedure was employed to select samples for the survey. Three states and three Local Government Areas (LGAs) from each state were purposively selected being the project states and LGAs for the Agro-processing Enterprise Centre Models (AECM). All the communities in each of the selected LGAs where the center model is implemented were considered. An online sampling calculator was used to arrive at a sample size of 300 respondents from which 100 respondents were randomly selected from each of the selected three states. Results of the analysis showed that Food utilization of households across the three states was generally acceptable as revealed by the FCSs. On average 98.7% of the households in the project area had acceptable FCS (FCS>35), while the food utilization by households indicated low dietary diversity in their consumption with 61.8% having HDDS of between 1-4. The most practiced coping strategies were relying on less preferred foods (5.61%), purchasing food on credit (5.61%), restricting consumption by adults (3.3%), borrowing food/relying on help (2.64%), and reducing volume at meal times (2.31%) among others. The study concludes that there is a high rate of adoption of innovations which has affected the yield and food security of the beneficiaries, however, households in the project had low HDDS value, it is recommended that capacity building on food fortification, diversification and utilization be given to beneficiary farmers in the project area.

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1. Introduction

The agricultural sector remains the backbone of most African country's economies as it accounts for about 65% and 35% of employment and gross domestic product (GDP) respectively, however, poverty remains high, especially in rural areas where most of the population depends on agriculture as a major source of living (NAERLS, 2014). Through sustainably raising farm productivity, generating more income and employment as well as reducing food prices, adopting climate-smart agricultural practices can be a more transformative instrument for reducing food insecurity and poverty in Africa. Nigeria which is the most populous country in Africa has a projected population of over 180 million as of 2015 with an annual growth rate of 3.2% and it is predicted to reach 289 million by 2050 (NPC, 2006). The country dives wholly within the tropics along the Gulf of Guinea on the western coast of Africa with a total land area of 923,768 km2. It is estimated that about 75% (68 million ha) of the total land area has potential for agricultural activities with about 33 million ha currently under cultivation (NISER, 2012). The highly diversified agroecological condition of the country makes the production of a wide range of agricultural products possible. Hence, agriculture constitutes one of the most important sectors of the economy.

The deficit in the food supply in Nigeria has been exacerbated by the low level of productivity of resources used in recent times. Increased output and productivity are directly related to improving production efficiency which arises from the adoption of improved technologies and efficient input usage (UNDP, 2019). In this regard, many policies and interventions were implemented in the country to reverse the trend of low productivity and reduce the poverty level.

Prevalence of undernutrition remains relatively high especially in Africa and Asia as close to 821 million people do not have sufficient access to nutritious foods, whereas an estimated 2 billion people suffer from micronutrient deficiency due mainly to low intakes of vitamins and minerals such as iron and zinc (IFPRI, 2014). Nutritional deficiencies have been responsible for a large number of health problems resulting in loss of productivity, impaired physical and mental human development, susceptibility to various diseases, and premature deaths (UNDP, 2019). Nutritional deficiencies are the result of low food quantity and quality of food consumed in addition to poor dietary diversity. Dietary diversity has been designated as a good indicator of a population's broader nutrition of population status, as more diverse diets tend to be associated with lower rates of stunting and overweight. Diversifying agricultural production can provide a wide range of different types of foods to be available and accessible to the poor population segments (Pingali, et al., 2015). Increasing dietary diversity among households is therefore an important strategy to improve nutrition and health.

The main objective of this study is to determine the food security status and describe the demographic characteristics of the Sasakawa Africa Association (SAA) program in three project states of Northern Nigeria.

2. Material and Methods

2.1. Description of the Study Area

The study states are located in the Sahel Savannah zone of the extreme Northern region of Nigeria. Gombe state was created in 1996 from part of the old Bauchi state. It is surrounded by Borno, Yobe, Taraba, Adamawa, and Bauchi States. It is located within the Savanah region having coordinates of 10.2833^0N, and 11.1667^0E. The state has an estimated population of 2,365,000 with an area of 20,265 km^2. It has two distinct climates which are the dry season (November – March) and the rainy season (April – October) with an average rainfall of 850mm. The mean average temperature of the state is between 16 – 26^0C at night and day respectively.

Gombe state has its major river 'Gongola' which flows into the state from the northwest through Bauchi and flows eastwards through the Dukku and Nafada Local Government Areas of the

state. Also, Dadin Kowa is a dam in Gombe state that provides irrigation to farmers. Major crops cultivated are rice, maize, sorghum, wheat, cowpeas, groundnuts, and Bambara nuts. Also, they are known for cattle rearing. Jigawa is located in Northwestern Nigeria and lies between latitude 10 57' North to 13 03 North and Longitude 8 08 East to 10 37. The state shares a boundary with Katsina and Yobe states; Niger Republic to the North, Bauchi State to the East and South, and Kano State to the West. The population of the state was 4,348,649 in 2006, National Population Census with an expected growth rate of 2.9%. By 2022, the estimated population was 6,870,690. The state has a land mass of 23,154 square kilometers. Vegetation is predominantly Sudan Savannah in the northern part and Guinea Savannah in the southern part. There is vast arable land for crop production and grazing land for livestock production. Major crops produced in the state include millet, groundnut, sorghum, cowpea, and sesame. Livestock production in the state includes cattle, small ruminants such as goats, sheep, and poultry.

Kano State has been a commercial and agricultural state. It is located in North Western Nigeria. The state was created on May 27th, 1967 from the then Northern Region. Kano State shares borders with Katsina to the northwest, Jigawa State to the northeast, Bauchi State to the southeast, and Kaduna State to the southwest. The State is located between Latitudes 11^0 30" and 12^0 30" N and Longitudes 8^0 30" and 11^0 E. It lies within the Semi and Sudan savannah region of West Africa. The state occupies a total land area of 20,131 sq km. The 2006 census figures ranked the state as the most populous state in Nigeria with a population of 9,383,682 people and a population density of 470 people/sq km.

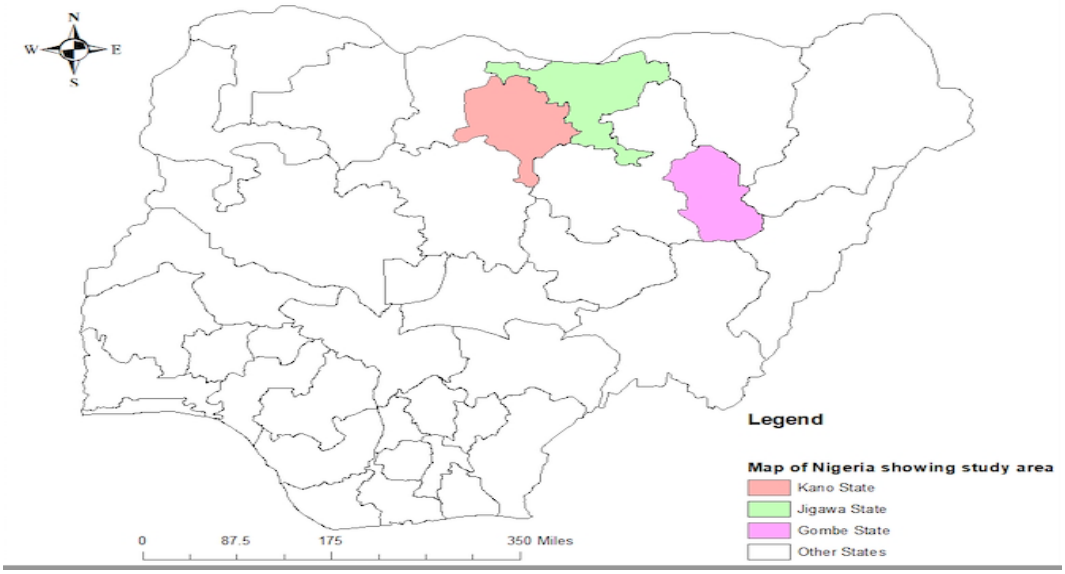

Figure 1. Map showing the study area

2.2. Sample Size and Sampling Procedure

A multi-stage sampling procedure was employed for the survey. Three states were purposively selected based on the fact that they are the states where the Agro-processing Enterprise Centre Models (AECM) were implemented by the SAA project. Three Local Government Areas (LGAs) each were also purposively selected in Jigawa and Kano and four Local Government Areas were selected in Gombe being the LGAs where AECM was implemented. All the communities in each of the selected LGAs where the center model is implemented were considered. Based on the population of the farmers who received the intervention, an online sampling calculator was used to determine the total sample size of three hundred respondents (300 respondents) in which 100 respondents were randomly selected from among each of the selected three states.

Table 1. States, LGAs, and Communities Selected

States	LGAs	Communities	Respondents
Gombe	Akko, Balanga, Billiri and Yamaltu Deba	Maiganga,Talese, Pobawure and Dadinkowa	100
Jigawa	Auyo, Birnin Kudu & Ringim	Ayama, Babu wawa, Kafingana and Gujaba	100
Kano	Gwarzo, Kura and Sumaila	Kutama, Getso, Bugau, Gani, Danbazau yamma and Riyi	100

2.3. Data Collection, Processing, and Analysis

A multi-disciplinary team of experts carried out the study under close supervision and in conjunction with SAA state coordinators. The data was analyzed using Stata 17 to achieve the survey objectives. Descriptive statistics and household food consumption scores as well as household dietary diversity scores were used to analyse the data.

2.3.1. Descriptive statistics

Mean, standard deviation, frequency distribution, and percentages were used to describe and benchmark key impact indicators of the project. In this regard, basic information and data on the socioeconomic activities of communities and individual households were sourced and described.

2.3.2 Food consumption score (FCS)

Food Consumption Score for each household was computed by summing up the products of the consumption frequency for each food group and its corresponding assigned nutritional weight. Therefore, the FCS is a composite measure of dietary diversity, food frequency, and relative nutritional importance of different food groups. Data on these parameters were collected from each household using a 7-day recall. The food frequency was measured as the number of days a particular food group consumed in the seven days. The food groups and weighting applied to each based on their respective nutritional values are shown in Table 2. For each household, FCS is computed by summing up the products of the consumption frequency for each food group and its corresponding weight. It is thus calculated as;

$FCS = x_{staple}y_{staple} + x_{pulse}y_{pulse} + x_{veg}y_{veg} + x_{fruit}y_{fruit} + x_{animal}y_{animal} + x_{sugar}y_{sugar} + x_{dairy}y_{dairy} + x_{oil}y_{oil}$ ----------(1)

Where: FCS is the food consumption score, y_s are the frequencies of food consumption = number of days for which each food group was consumed during the past 7 days (7 days was designated as the maximum value of the sum of the frequencies of the different food items belonging to the same food group), x_s is the weight of each food group

Table 2. Food groups and their corresponding weight

S/No	Types of foods	Food Group	Weight
1.	Maize, millet, sorghum, rice, bread/doughnuts, pasta, cassava, yam, plantains, other tubers	Cereals and tubers	2.0
2.	Groundnuts/legumes (cowpeas, beans, peas, etc)	Legumes	3.0
3.	Vegetables (+ leaves)	Vegetables	1.0
4.	Fruits (mangoes, oranges, bananas, etc)	Fruits	1.0

5.	Meats, fish, seafood, snail, eggs	Animal Proteins	4.0
6.	Milk/Dairy products	Dairy products	4.0
7.	Sugar, honey, and other sweets	Sugar	0.5
8.	Oil and fats	Oils	0.5
9.	Condiments, spices	Condiments	0.0

Source: World Food Programme

Households with FCS equal to and or less than 21 points are grouped as poor, those between 21.5 and 35 as borderline, and those households with FC score of above 35 as acceptable, see Table 5 (WFP, 2015; Butaumocho and Chitiyo, 2017).

Table 3. Food Consumption (FC) Thresholds

S/No	Profiles	Food Consumption Score
1.	Poor Food Consumption	1.0 – 21.0
2.	Borderline Food Consumption	21.5 – 35.0
3.	Acceptable Food Consumption	>35.0

Source: World Food Programme, (2015)

2.3.3. Household dietary diversity score (HDDS)

HDDS as an indicator, measures the number of different kinds of food groups that the household had consumed and the frequency with which they eat them over a given reference period. It occasionally involves weighting these groups with the result being a score that represents the dietary intake but not necessarily the quantity. It is the same as the FCS but does not provide information on the frequency of consumption of the food groups and does not assign weights to food groups based on their nutritional value. It is calculated by a binomial variable that has two values and attaching them to the food groups. Then the binomial variables are added up to create the Household Dietary Diversity Score. The new variable will have a range from 0 through the maximum number of food groups collected. The HDDS which ranges between 0-12 is used to measure a household's dietary diversity and also ranked accordingly into high dietary diversity (6-12) and low dietary diversity (0-5) (Wineman, 2014).

3. Results and Discussion

3.1. Socioeconomic Characteristics of Respondents

Socioeconomic characteristics of Respondents play an important role in influencing their willingness to learn about new ideas and consequently adopt innovation which could improve productivity. Thus, the socioeconomic characteristics of respondents in the study area were assessed to know how those characteristics affect the adoption of the innovations brought to them by the Sasakawa Africa Association (SAA) project.

The results of the socioeconomic characteristics of the respondents in the study area are shown in Table 4. The results depict that the mean age of the respondents was found to be 39 years thus implying that this age can influence respondents' adoption of improved agricultural practices and other important technologies. This finding is in agreement with the findings of Nazifi et al. (2021) who reported a mean age of 39 in their study of the impact of contract farming on productivity and food security status of smallholder maize farmers' households in Kano and Kaduna states, Nigeria and that of Dingchou et al. (2022) who also reported a mean age 39.69 years in their study on the evaluation of food security status among rice farming households in Kano state Nigeria. Results further showed the mean respondents' experience of about 16 years. This means that most of the respondents have experience of at least 16 years in one or more post-harvest activities thus

implying that they have acquired enough experience that will assist them in multiplying their level of output which will therefore assist in reducing food insecurity of their respective families.

The results further showed the mean years respondents spent in cooperatives was about 6 years and the mean credit amount received by them was found to be NGN222,632 ($525.20) only.

It can be seen from the results that Gombe state had the lowest mean age of about 36 years which is followed by Jigawa with around 41 years and then Kano with 42 years as the mean age. Kano on the other hand had more years of experience (22 years) and more years spent in a cooperative society (10 years) and Jigawa had the least experience and years spent in a cooperative society (7 years and 3 years respectively).

On the mean amount of credit received by the respondents, Gombe state respondents had received an average of Nigerian Naira (NGN) 302,307 ($713.16), and Jigawa state respondents reported NGN50,000 ($117.95) as the mean credit received by the respondents while Kano state respondents reported having no credit at all.

Table 4: Mean Age, Years of post-harvest Experience, Years in Association & Credit amount

State	**GOMBE**		**JIGAWA**		**KANO**		**POOLED**	
Variable	Ave	SD	Ave	SD	Ave	SD	Ave	SD
Age	35.6	13.1	40.7	9.3	41.8	8.6	39.4	10.8
Post-harvest Experience	18.0	13.1	10.5	8.6	21.7	10.1	15.6	11.5
Years in Association	6.2	4.1	3.4	0.9	10.2	4.4	6.3	4.4
Credit amount (NGN)	302,307	217,491	50,000	27386	-	-	222,631	215086

Note: $ = NGN423.9 (2022)

3.1.1. Sex of the Respondents

Results of the respondent's sex as revealed in Figure 2 showed that males constituted about 69% while females constituted about 31%. However, state-wise reports showed less participation of females in Kano where only 1% of the respondents were female. This is similar to the findings of Dingchou et al. (2022), who revealed that male farming households participate more (85%) than their female counterparts (15%). This is an indication that males contribute more to the attainment of food security in their respective households.

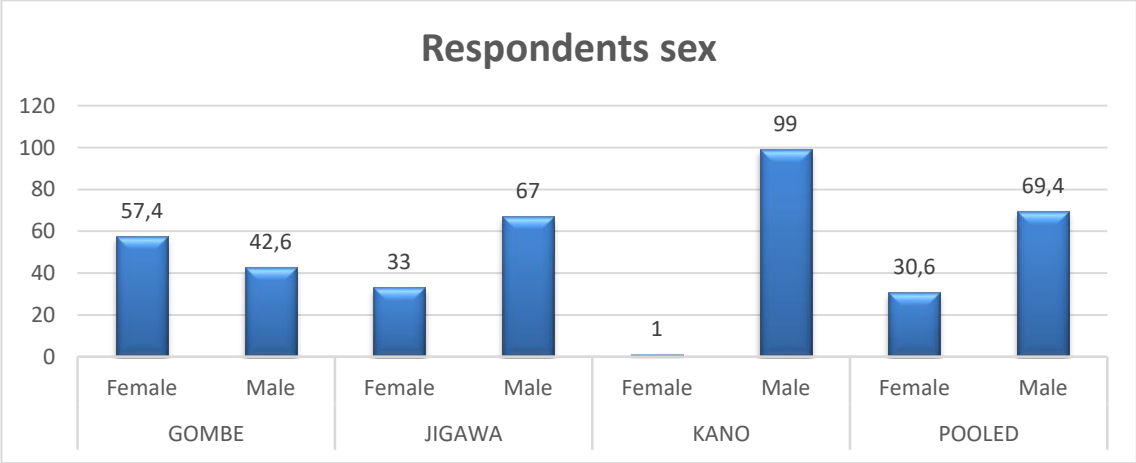

Figure 2. Sex Distribution of the respondents

3.1.2. Marital status of the respondents

The marital status of the respondents is presented in Figure 3. The breakdown of the total respondents showed that 86 % were married while only about 14% were single. Gombe state had the highest (32.7%) single respondents while Kano had the highest (98%) married respondents. This is in agreement with the findings of Dingchou *et al* (2022) who reported that 82% of their respondents were married.

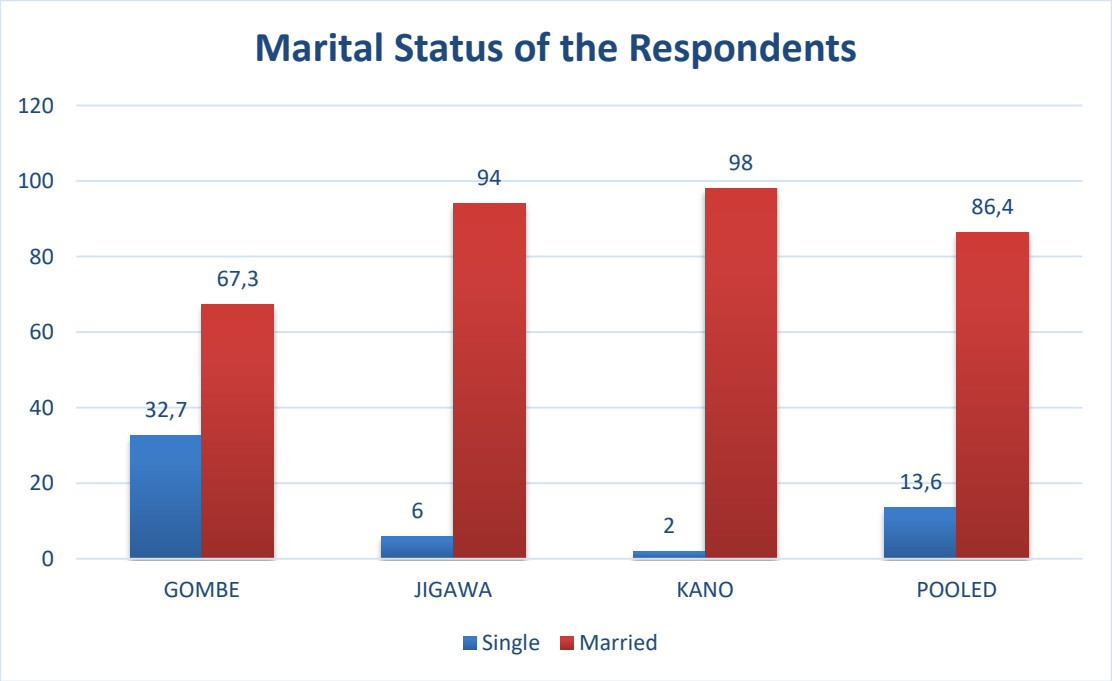

Figure 3. Marital Status of the Respondents

3.1.3. Respondents' Relationship with Household Head

Results in Table 5 depict respondents' relationship to the household head. The summary of the relationship between the respondents and the household head revealed that about 63% were the household heads themselves, 22.3% were spouses of the household heads, 11.6% were found to be children, 1.7% were other family members, and 0.3% each were siblings and non-family members. This shows that many people (37%) were relying on the household head thus, implying that as the number of dependents on the household head increases the chance of food security decreases thereby increasing food insecurity.

Table 5. Distribution of Respondent according to Relationship to Household Head

State	**GOMBE**		**JIGAWA**		**KANO**		**POOLED**	
Relationship to Household Head								
Child	29	28.7	6	6.0	-	-	35	11.6
Household head	31	30.7	63	63.0	98	98.0	192	63.8
Non-family member	-	-	1	1.0	-	-	1	0.3
Other family members	1	1.0	3	3.0	1	1.0	5	1.7
Sibling	1	1.0	-	-	-	-	1	0.3
Spouse	39	38.6	27	27.0	1	1.0	67	22.3
Total	101	100	100	100.0	100	100.0	301	100.0

3.1.4. Respondents' Educational Level

The result of the educational attainment of the respondents is presented in Table 6. It showed that about 93.4% of the respondents had one form of education or the other while the remaining 6.6% had no formal education. The majority (42.2%) of the respondents completed secondary education and only a few (6.6%) had some secondary education.

This implies that the respondents are exposed to adopting new practices and thus help in identifying challenges affecting their activities thereby improving their food security situation. This is in agreement with the findings of Folorunso et al. (2023) who reported in their study on Assessment of Food Security Determinants and Coping Strategies of Urban Households during COVID-19 Pendamic Lockdown in Jos, Plateau State, Nigeria that, all the respondents had attended formal education.

Table 6. Distribution of Respondent according to Educational Level

State	**GOMBE**		**JIGAWA**		**KANO**		**POOLED**	
Education Attainment	Freq	%	Freq	%	Freq	%	Freq	%
Adult literacy training	1	1.0	-	-	-	-	1	0.3
Completed primary education	9	8.9	11	11.0	6	6.0	26	8.6
Completed secondary education	58	57.4	28	28.0	41	41.0	127	42.2
No formal education	14	13.9	4	4.0	2	2.0	20	6.6
Post-secondary education	5	5.0	10	10.0	35	35.0	50	16.6
Qur'anic education	2	2.0	42	42.0	7	7.0	51	16.9
Some primary education	4	4.0	2	2.0	-	-	6	2.0
Some secondary education	8	7.9	3	3.0	9	9.0	20	6.6
Total	101	100	100	100	100	100	301	100

3.1.5. Respondents' Primary Activity

The major activity of the respondents as presented in Table 7 was found to be crop production (83.4%) and this is followed by livestock production (8.0%). The least was formal private employment, Non-agricultural trading business, Artisans, mechanics, retired and Unemployed with only 0.3% each. This is in contrast to the findings of Folorunso et al. (2023) who reported that civil servants constitute the major primary occupation of the household in their study location.

The breakdown of the respondents' primary activity based on state showed that crop production is the main activity carried out by the majority (92.1%, 86%, and 72% respectively in Gombe, Jigawa, and Kano states). This entails that Agriculture gives more occupation opportunities for rural households than any other occupation in rural areas.

Table 7. Respondent according to Primary Activity

State	**GOMBE**		**JIGAWA**		**KANO**		**POOLED**	
Primary Activity	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**	**Freq**	**%**
Crop production	93	92.1	86	86.0	72	72.0	251	83.4
Livestock production	3	3.0	-	-	21	21.0	24	8.0
Domestic duties	-	-	5	5.0	-	-	5	1.7
Agricultural processing	-	-	4	4.0	-	-	4	1.3
Agricultural trading business	-	-	-	-	4	4.0	4	1.3
Students in school any type	-	-	2	2.0	-	-	2	0.7
Traditional medical practitioners	-	-	-	-	2	2.0	2	0.7
Transportation business	1	1.0	-	-	1	1.0	2	0.7
Public sector employment	-	-	2	2.0	-	-	2	0.7
Formal private employment	1	1.0	-	-	-	-	1	0.3

Non-agricultural trading business	-	-	1	1.0	-	-	1	0.3
Artisans incl. mechanics	1	1.0	-	-	-	-	1	0.3
Retired	1	1.0	-	-	-	-	1	0.3
Unemployed	1	1.0	-	-	-	-	1	0.3
Total	101	100	100	100	100	100	301	100

3.1.6. Respondents' Major Sources of Income

The results in Table 8 revealed the average income per annum of the respondents. Looking at what was reported in Table 7 above, where crop production was found to be the major activity of the respondents, our findings here are corroborated with that of the major activity (crop production) which is reported to offer the highest income of (NGN) 641,870 ($1,514.20) followed by agricultural trading NGN 504,750 ($1,190.73) and then non-agricultural trading NGN397,444 ($937.59). These figures are quite below the reported average national income of NGN907,146 ($2,014) per annum (www.statista.com/gross-national-income-per-capita-in-nigeria/).

Table 8. Respondents' Major Sources of Income

State	**GOMBE**		**JIGAWA**		**KANO**		**POOLED**		**POOLED**	
Variable	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Freq**	**%**
Crop Production	518.131	318.080	592.946	413.519	908.523	549.758	641.870	446.616	251	83.39
Livestock Production	235.884	105.975	284.926	124.649	446.436	296.747	348.374	233.131	24	7.97
Poultry Production	160.000	192.412	123.077	56.330	50.000	-	140.556	151.831	9	3.00
Fisheries	425.000	388.909	350.000	150.000	-	-	380.000	225.278	4	1.33
Agricultural Processing	230.714	346.319	188.000	140.098	-	-	199.074	205.875	4	1.33
Agricultural Trading	100.000	-	582.353	328.320	47.500	24.749	504.750	356.125	4	1.33
Non-Agric. Trading	230.000	183.848	216.250	130.600	424.615	233.789	397.444	232.483	1	0.33
Transportation	300.000	141.421	240.000	-	70.000	-	227.500	135.984	2	0.66
Construction	225.000	184.842	200.000	-	-	-	216.667	143.759	2	0.66
Total									301	100

3.1.7. Households with acceptable FCS (>35)

The study analyzed food utilization of the households by computing their Food Consumption Scores and the results are presented in Table 9. Food security of households across the three states was generally acceptable as revealed by the FCSs. On average 98.7% of the households in the project area were analyzed to be at the acceptable stage in terms of food security level. Our finding is in agreement with the findings of Dingchou et al. (2022) who reported that 72.6% of their respondents were food-secured. It is also in agreement with the findings of Folorunso et al. (2023) who reported that 75% of the individuals in their study area were food secure.

The results further showed that in Jigawa state, all the respondents were found to be food-secure while in Gombe and Kano states 2% and 1% of the respondents were found to be at the borderline.

Table 9. Food Security Level of Respondents using FCS

State	GOMBE		JIGAWA		KANO		POOLED	
FCS2	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
0-21 (Poor)	1	1.0	-	-	-	-	1	0.3
21.5-35 (Borderline)	2	2.0	-	-	1.0	1	3	1.0
>35 (Acceptable)	98	97.0	100	100	99.0	99	297	98.7
Total	101	100	100	100	100	100	301	100

3.1.8 Household Dietary Diversity Score (HDDS)

The study also analyzed the household's food utilization by computing their HDDS and the results are presented in Table 10. From the results. it can be inferred that households in the project area had low dietary diversity in their consumption as 61.8% had HDDS of between one to four, while only about 5.3% had the highest HDDS of nine to twelve. The majority (32.9%) of the household had a medium diversity score of five to eight. This is contrary to the findings of Nazifi et al. (2021) who reported that 52% of their respondents had a medium dietary diversity score.

Table 10. Food Security Level of Respondents using HDDS

State	GOMBE		JIGAWA		KANO		POOLED	
HDDS	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
1-4 (Low HDDS)	44	43.6	56	56.0	86	86.0	186	61.8
5-8 (Medium HDDS)	44	43.6	42	42.0	13	13.0	99	32.9
9-12 (High HDDS)	13	12.9	2	2.0	1	1.0	16	5.3
Total	101	100	100	100	100	100	301	100

3.1.9. Coping Strategies for Food In-secure Households

The study identified the coping strategies adopted by the households to mitigate the effects of food insecurity in the study area and the findings are presented in Table 11. The most practiced coping strategies were relying on less preferred foods (5.61%), purchasing food on credit (5.61%), restricting consumption by adults (3.3%), borrowing food/relying on help (2.64%), and reducing volume at meal times (2.31%) among others. This is in line with the findings of Oluwafunke Opeyemi et al. (2020) who reported in their study on Assessing the Household Food Insecurity Status and Coping Strategies in Abeokuta, Ogun State, Nigeria that, the most common
coping strategies included; compromising food quantity, food quality, and finances; taking a loan to buy food, selling sheep and goats, eating once a day, reducing food quantity as well and skipping meals for children.

Table 11. Copping Strategies for Food Insecurity

Coping Strategies	Gombe (%)	Jigawa (%)	Kano (%)	Pooled (%)
Rely on less preferred and less expensive foods	34.6	91.8	50.0	67.7
Borrow food. or rely on help from a friend or relative	15.4	-	100.0	9.3
Purchase food on credit	53.9	40.5	-	44.6
Consume seed stock held for next season	11.5	5.4	50.0	9.2
Send household members to eat elsewhere	3.9	5.4	-	4.6
Send household members to beg	-	-	50.0	1.5

Reduce volume at mealtimes	30.8	35.1	-	32.3
Restrict consumption by adults for small children to eat	-	5.4	-	3.1
Reduce the number of meals eaten in a day	11.5	10.8	-	10.8
Skip entire meals like breakfast, Lunch, or dinner	3.9	24.3	-	15.4
Planting Short Day crop	-	-	50.0	1.5
Sale of Production Asset	7.7	5.4	-	6.2
Sale of Household Assets	15.4	-	-	6.2
Diversification of Production	3.9	10.8	50.0	9.2
Irrigation Farming	7.7	-	-	3.1

4. Conclusion and Recommendations

The result of the Food utilization of households across the three states was generally acceptable with an average of 98.7% of the households in the project area at the acceptable stage (FCS >35) in terms of food security level, at the same time, the food utilization by households using their HDDS shows low dietary diversity in consumption. The most practiced coping strategies reported were relying on less preferred foods (5.61%), purchasing food on credit (5.61%), restricting consumption by adults (3.3%), borrowing food/relying on help (2.64%), and reducing volume at meal times (2.31%) among others. This is an indication that the respondents have several coping strategies to deal with poverty and food shortages.

RECOMMENDATIONS

- The results showed that some of the respondents (<5%) were still at the borderline of food security, thus the project needed to improve its strategies to not allow those on the edge to cross the border.
- Also, findings showed that households in the project area had low dietary diversity scores hence it is recommended that capacity building on food fortification, diversification, and utilization be given to beneficiary farmers in the project area.
- Even though the evaluation results indicated a large number of the respondents have one form of coping strategy or the other, these need to be strengthened around a crop-livestock combination. This combination can increase resilience by generating better nutrition and income, while also maintaining natural environmental conditions through the use of organic manure produced.

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