



**DIETARY DIVERSITY AND FOOD INSECURITY COPING STRATEGIES AMONG
FARMING HOUSEHOLDS IN KANO, NIGERIA**

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Abstract

The objectives of this study are to determine the dietary diversity and coping strategies of farming households in Kano, Nigeria. Using a sample size of 256 farming household heads drawn from 10 local government areas, the research investigated farming households dietary diversity status using dietary diversity score and coping strategies using in-context or original coping strategy index. Results from the dietary diversity score indicated that 53% of the farming households are classified under high dietary diversity, eating food groups ranging from (6 and above), average dietary diversity scores in Kano, Nigeria is estimated at 8 indicating 8 food groups consumed as average among the farming households in the study area. Results from coping strategy index also indicated that the most frequent and severe coping strategies in the area include selling of assets and livestock and skipping meals, while children eating first, eating less preferred foods and less expensive food, removing or relocating children to less expensive school, borrowing money or purchasing food on credit and reduction in consumption pattern of households all represent less severe coping strategies in the study area. The research suggested that, dietary diversity need to be improves and in term of coping strategy, households need to shift from selling of assets and livestock and skipping meals to a less severe and reversible coping strategies. Government needs to introduce policies that can directly affect the welfare of farming household especially in agriculture to reduce poverty.

Key words: Coping Strategy, Dietary, Poverty, Consumption, Severity

1. Introduction

According to the recent Global Hunger Index Nigeria is positioned 90th out of 105 countries in term of food hunger (Von Grebmer et al., 2016). Nigeria has an estimated population of over 180 million people, representing almost 47% of the entire West Africa's population, yet an estimated 69% or more are still under poverty line depending on less than US\$1.25 per day (Brock, 2013). The country's level of hunger was estimated at 25.5% with highest number found in rural areas (World Bank 2015; FAO, 2017).

Kano State has the highest population according to the recent estimation by National Population Commission [NPC] (2017) of about 14 million individuals; the state poverty level is estimated to be around 60%-70% with majority found in rural areas. Poverty usually results to food security challenges, with low level of productivity, due to traditional farming and government neglect in the area of agriculture, persistent conflicts, especially Boko Haram and Fulani Herdsmen conflicts. This resulted in a deteriorating food security status of households by the day, which warrants alternative coping strategies among households.

Food and Nutrition Technical Assistance [FANTA] (2003) defined coping strategy as those measures taken by the household as a result of inability to meet up or access enough food. Christiaensen and Boisvert (2000) noted that, households do not wait for their foodstuff to finish, before starting to



make adjustment on their consumption, especially when such problem is anticipated. Maxwell and Caldwell (2008) defined coping strategy index as food intake behaviour pattern adopted by the household in the event that they lack enough food or resources to buy food by counting the frequency of occurring in such behaviours with its severity. Dietary diversity on the other hand, identified the number of different groups of food that household consumed given a period of time (Hoddinott & Yohannes, 2002). Therefore the higher the food groups consumed, the more diverse a household is in term of food security. FAO (1970) introduced 12 sets of food groups to be considered for measuring household food diversity, including: cereals, root and tubers, vegetables, fruits, meat, poultry and offal, eggs, fish and seafood, pulses/legumes and nuts, milk and milk products, sugar/honey and miscellaneous. However, food utilization as a component of food and nutrition is represented by dietary diversity score (Magrini & Vigani, 2014).

Although various studies were conducted on dietary diversity and coping strategies in Nigeria, for instance Olayiwola, Tashikalma and Giroh (2017); Omotayo (2018); Olofin and Babatunde (2007) empirical evidence revealed that, little or no information concerning the dietary diversity status and coping strategies were known in Kano. Also, the previous studies adopted the Reduce Coping Strategy Index approach in analyzing the coping strategy index as a methodology, while this research intent to adopt in-context approach (original CSI) to determine the CSI.

2. Literature Review

Various researches have been conducted on household dietary diversity and coping strategy. These include the work of Taruvinga, Muchenje and Mushunje (2013) in South Africa; Arimond and Ruel (2002) in Ethiopia; Brown Peerson, Kimmons and Hotz (2002) in Guatemala; Tarini, Bakari and Delisle (1999) in Niger; Onyango, Koski and Tucker (1998) in Kenya; Allen et al. (1991) and Nabuuma, Ekesa and Kennedy (2018) in Uganda; Nithya and Bhavani (2018) in India; Hailemariam et al. (2018) in Ethiopia; Sackey et al. (2018) in Ghana. Other works in the area of coping strategy, dietary diversity and food security in Nigeria include the work of Olayiwola, Tashikalma and Giroh (2017); Clover (2003); Smith, Alderman and Aduayom (2006); Olofin and Babatunde (2007); Agulanna, Ikpi, Okoruwa and Akinyosoye (2013); Omotayo et al. (2018); Mukhtar, Kamaruddin and Appanaidu (2018c) and Mukhtar (2019) and Omotayo (2018).

Smith and Subandoro (2007) identified households being food insecure when their Dietary Diversity Score (DDS) is lower than or equal to the average of the households in the upper quartile. According to Okwoche and Asogwa (2012); FANTA (2003) and Fawole, Ozkan and Ayanrinde (2016) households were regarded as food insecure or low dietary diversity if they achieved a DDS points of 6 and below and food secure or high dietary diversity if DDS is higher than 6 points. However, according to Swindale and Bilinsky (2006); Kennedy, Luo and Houser (2013) and Nabuum et al. (2018), DDS is classified into three as follows; DDS ranging from 1-3 food groups (3 points) and below is considered as low DDS, DDS ranging from 4-5 food groups (points) is medium DDS and DDS ranging from 6 food groups and above is high DDS.

Mbwana, Kinabo, Lambert and Biesalski (2016) identified the determinants of households' dietary diversity practice in rural Tanzania, by adopting the FAO's dietary diversity questionnaire together with 12 food groups. Multinomial model was used to create the relationship between food security and dietary diversity. Result revealed that 4.7 were the mean dietary diversity scores and cereals were highly consumed using 24-hour recall. Also Rashid, Smith and Rahman (2006) used household's coping strategy mechanism and dietary diversity together with two-stage least square regression to discover the determinants of food security. Results revealed that income, education, gender of the household heads and price of major foodstuff were the determinant factors in food security.



Olayiwola et al. (2017) conducted a research on the analysis of food security and coping strategies among rural households in Oluyole local government area of Oyo State, Nigeria. Results indicated that selling livestock to purchase food for the household, rationing money, purchasing food on credit, borrowing money, buying less expensive food, skipping meals, allowing children to eat first, harvesting immature crops, migrating to look for job, off farm jobs and consuming seeds reserve were the most frequent coping strategies adopted in Oluyole.

3. Methodology

Primary data was used for the study. A simple random probability sampling was employed to identify 256 farming respondents from Kano after stratifying the state into Kano urban and Kano rural. A Face to face survey was conducted on 256 farming household heads and was carried out using structured questionnaire. A stratified random sampling technique was used to select 10 local government areas from Kano, Nigeria. Four local government areas were selected each from Kano North and South, while two local government areas selected from Kano Metropolitan. Data analysis was carried out using descriptive statistics, household DDS and coping strategy index (CSI). In using the DDS, a 24-hour recall approach was used to measure the food groups (points), while specific in-context or original CSI was adopted to measure the coping strategy index.

3.1 Household Dietary Diversity Score

Dietary diversity of a household measures the various food groups that household consumed over a given period of time or reference. Data are best captured during food shortage in a location, to enable accurate changes in household diet diversity over time. Subsequently the exercise is to be repeated after a year at the same time. Normally prior of harvesting in order to avoid seasonal variation (Swindale & Bilinsky, 2006). FAO (2013) defined household dietary diversity score as the number of groups of food or food diverse eaten over a period of time reference which is usually 24-hour. Household dietary diversity score is the summation of all various food groups (12 main food categories) based on similar pattern consumed by a household over a given reference period (Kennedy et al., 2007; Ruel, 2003; Steyn et al., 2006; Arimond & Ruel, 2004; Savy et al., 2005).

Data collected on the household food consumption are normally based on previous 24-hours (reference period) or sometimes called 24-hour recall – inaccuracy is borne to happen if longer reference period is used due to recall imperfection. The 24-hour reference period is divided into two types, normal 24-hour recall, when usual eating habit takes place in a house and a special 24-hour recall which normally occur during festivities or when majority of the household members were not around. Thus normal 24-hour recall is used to determine the dietary diversity. Questions were normally directed to the person sudden with cooking preparation in the household or a household member considered as an adult, who also ate in the last 24-hours in the household who represent the whole household (Swindale & Bilinsky, 2006). According to Swindale and Bilinsky (2006) as a general rule, any foods eaten that were not cooked in the household should not form part of the dietary diversity, even though such action may lead to underestimation of individual dietary diversity, thus household dietary diversity score is prepare in such a way to reflect household dietary diversity in term of food intake on the average among the entire household members.

3.2 Household Coping Strategy Index

According to FANTA (2007), coping strategy index (CSI) measures the number of times and severity of coping behaviors in household. When faced with serious problem of food security that required immediate solution, CSI serves as appropriate tools for such emergency situations, especially when other methods practically cannot be achieved. It has the advantages of quickly indicating the extent of food insecurity status of household. It can be used for food assistance programs monitoring. It serves



as an early warning signal for food crisis and it gives clue on the causes of malnutrition. In summary the index shows whether household food security status is increasing or decreasing.

Watts (1983) classified coping strategy into two, modest dietary adjustment which include eating less preferred foods and reducing portion size in the household, and a more extreme behaviours including sales of productive assets. Corbett (1988) and Devereux (1993) recognized that the more household food security deteriorated, the likelihood of adopting a coping strategies that are considered less reversible, which subsequently led to a more severe form of coping strategies and food insecure household. Coates et al. (2006); Bickel et al. (2000) and Maxwell et al. (1999) identified short term or immediate coping strategy as an indicator of household being food insecure, and that household do not wait for their food to finish before adopting the strategy.

According to FANTA (2006), CSI employed a set of straight-forwarded questions that were developed to measure individual’s frequent consumption pattern and relates it with coping strategy responses to access to food in a household or given area. Three main points form the basis of CSI, which include: the answer to the common question in the location should be based on the right list of coping behaviors in such area, their frequency of usage and severity of each. The index is calculated by considering the frequency of the behaviour, weighted by the identified severity of the behaviour, which eventually is summed up in all the behaviour lists which given the current and perceived future household food security status. Differences in the index suggested whether food insecurity is increasing or decreasing – higher score suggested a severe level of coping strategy and thus increased food insecurity. The index has the following formula:

$$CSI_i = \sum frq_{xi} (Svty_{xi}) \dots\dots\dots 1$$

where frq_{xi} is the number of days that a household had to depend on a particular strategy depending on each coping strategy, $Svty_{xi}$ is the consensus ranking on severity of each of the coping strategy. The outcome that is the product of day’s multiply by the severity gives weighted outcome and the total summation of the entire weighted outcome produce the index.

4. Results

4.1 Socio-Economic Profile of the Farming Household in Kano, Nigeria

Table 1 shows socio-economic profile of the farming household heads in Kano, Nigeria. Statistical evidence from the table reveals that, 91% of the total household heads were male with an average age of 38 years. Majority of the respondents or about 32% are within the age bracket of 31-40 years. As for educational qualification, 30% of the respondents have National Certificate in Education. In term of family size, averagely, each household has a minimum of 10 individuals. About 41% of the respondents have family size in the range of 6-10 individuals. Children under the age of 18 years old make up of 55% of the total population in the study area with 6 individuals as average, while adults constituted 45% with an average of 4 adults in a household.

Statistical evidence from Table 1 also reveals that 90% of the household heads engage in core farming activities and 10% involve in farming on part-time basis. Average farming experience among the household heads is 17 years, with 40% within the range of 11–20yrs in farming experience. Farmland cultivable average is 3 ha, while 89% of the farm size ranges from 1–10ha. In term of land ownership structure, 71% of the land ownership is family owned. Fertilizer application among the farmers is 100% with 46 kg as an average application of fertilizer by household head.



In term of economic profile, Table 2 reveals that average household monthly expenditure is N71, 815.31 (US\$235.46) with majority 72% within the range of N10, 000–N100, 000. Gwale has the highest monthly expenditure of N4, 877, 200 (US\$15, 990.82) while household heads spent more on fertilizer than any other items at 15% translated into N3,714,000 (US\$12,177.05). Average household head monthly income is N104,986.33 (US\$344.14), Kano Municipal has the highest monthly income of N6, 108,000 (US\$20,026.23). Table 2 also reports that off farm monthly income is N22, 191.41 (US\$72.76). Household production indicates that 90% of the farm production went to market for sales with an average of N966,003.91 (US\$3, 167.23) per year, while loan amount disbursed on the average was N33,937.50 (US\$111.27). Rice was the most preferred food item in term of consumption with 20% among the food items.

Table: 1 Socio-demographic Profile of Farming Household Heads

Factors	Pooled (n = 256)	
	%	mean
<i>Gender</i>		
Male	91	
Female	9	
<i>Age (yrs)</i>		38
19 – Below	0	
20 – 30	20	
31 – 40	32	
41 – 50	29	
51 – Above	19	
<i>Marital Status</i>		
Single	0	
Married	91	
Divorced	1	
Widowed	8	
<i>Educational Qualification</i>		
Primary Certificate	20	
SSCE/GCE	24	
NCE/OND	30	
Bsc/HND	21	
Msc/PhD	5	
<i>Family Size</i>		10
(1 - 5)	13	
(6 - 10)	41	
(11 - 15)	35	
(16 -20)	7	
(21 - Above)	4	
Children under 18 yrs	55	6

Table: 2 Pattern of Household Consumption, Expenditure and Income

Factors	Pooled (n = 256)	
	%	Mean
<i>Household Consumption (kg)</i>		
Millet	10	
Sorghum	12	
Maize	13	
Rice	20	
Groundnut	6	
Beans	8	
Bread	3	
Egg	5	
Meat	8	
Fish	4	
Butter	0	
Tea/Beverages	2	
Fruits	4	
Vegetables	5	
<i>Household Expenditure (N/\$)</i>		
Naira – Average		71,815.31
Dollar – Average		235.46
10, 000 - 100, 000 (US\$ 33 - US\$ 328)	72	
101, 000 - 200, 000 (US\$331 - US\$656)	19	
201, 000 - 300, 000 (US\$659 - US\$984)	6	
301, 000 – Above (US\$987 - Above)	3	
<i>Household Income (N/\$)</i>		



Children in School	18	2	Naira – Average	104,986.33
Adult above 18 yrs	45	4	Dollar – Average	344.14
Primary Occupation			10, 000 - 100, 000	
Private Sector	2		(US\$ 33 - US\$ 328)	41
Public Sector	8		101, 000 - 200, 000	
Farming/Agriculture	90		(US\$331 - US\$656)	44
Farming Experiences		17	201, 000 - 300, 000	
1 - 10yrs	18		(US\$659 - US\$984)	11
11 - 20yrs	40		301, 000 – Above	
21 - 30yrs	25		(US\$987 - Above)	4
31 – Above	17		Off farm Income (N/\$)	
Land Cultivated (ha)		3	Naira - Average	22,191.41
Land Ownership Structure			Dollar - Average	73.12
Individual	21		Household Production (N/\$)	
Family	71		Consumed	6
Community	2		Naira – Average	62,226.56
Rented	6		Dollar – Average	204.02
Farm Size (ha)			Sales	90
1 -10 ha	89		Naira - Average	966,003.91
11 -20 ha	7		Dollar - Average	3,167.23
21-30 ha	4		Seeds	2
31- Above ha	0		Naira – Average	25,656.25
Fertilizer Usage (kg)			Dollar – Average	84.12
Actual Usage (kg)		46	Donations	2
<i>Fertilizer Classification (kg)</i>			Naira – Average	15,527.34
1 - 100kg	52		Dollar – Average	48.95
101 -200kg	18		<i>Loan Amount Disbursed (N/\$)</i>	
201 - 300kg	29		Naira – Average	33,937.50
301 – Above	1		Dollar – Average	111.27

Source: Field survey, 2018

Table 3 indicates the severity of each of the coping strategies into each group as perceived by the respondents from different locations. Eight coping strategies were identified in the location and frequently used by the households. The consensus ranking was achieved after requesting household heads to indicate the severity of each of the coping strategies in each of the local government areas in the scale of 1–4 from less severity to the highest severity, then an average was taken from each local government area. After obtaining the local government area average, overall average was taken to ascertain the ranking as in Table 3. Respondents consensus placed selling assets and livestock to feed household and skipping meals for the whole day as the most severe coping strategy in the location, which ranked 4th. This is then followed by children eating first which ranked 3rd, followed by reducing consumption and removing children from expensive school which ranked 2nd, and borrowing or purchasing food on credit and depending on relative and government which have less severity and ranked 1st together with Household eating less preferred food.



Table: 3 Coping Strategies Consensus Ranking According Severity by Locations in Kano

Coping Strategy	D/T ofa	Ga ya	Gw ale	Gwa rzo	Munic ipal	Kar aye	Kun chi	Ku ra	Sum aila	Wu dil	Av g.	Rank ing
Borrowing money/purchase on credit	1	1	1	1	1	1	1	1	1	1	1.1	1
Selling assets/livestock	4	4	4	3	4	4	4	4	4	4	4	4
Children eat first before adult	3	3	3	2	3	3	3	3	3	3	3	3
Reducing consumption of food	3	2	3	3	3	3	3	3	3	3	2	2
Depend on assistances-family & friend	1	1	1	1	1	1	1	1	1	1	1	1
Skipping meals for a day	4	3	4	4	4	4	4	3	4	3	4	4
Eating less preferred food	0	0	0	0	0	0	1	0	1	0	0.3	0
Remove/relocated to less expenses school	1	1	1	1	1	1	1	1	1	1	1.1	1

Source: Field survey, 2018

The number of days that a household had to depend on a particular or various coping strategies represents the frequency (number of days), ranging from “Not at all” (0 day), “sometimes” (2–4 days) and “always/everyday” (6–7 days). By multiplying the frequency (day/days) with severity, which gives the weighted scores. Table 4 reports the CSI among households in Kano North. The table indicated that, Kunchi has the highest index in term of coping strategy of 85 indicating that food insecurity is the highest among households in Kano north. The most frequent coping strategies adopted include skipping of meals and selling of asset/livestock among the farming households. Overall, the location has an average CSI of 55 among the households. This finding is in line with discovery made by Mukhtar *et al.* (2018a); Mukhtar *et al.* (2019) that identify high level of food insecurity in Kano North.

Table 4 Coping Strategy Index Indicating Scores among Kano North Households

Coping Strategy	D/Tofa			Gwarzo			Karaye			Kunchi		
	S	F	W	S	F	W	S	F	W	S	F	W
Borrowing money/purchase on credit	1	2	2	1	1	2	1	3	3	1	5	5
Selling assets/livestock	4	3	12	4	2	7	4	4	15	4	5	18
Children eat first before adult	3	2	7	3	2	6	3	4	11	3	5	13
Reducing consumption of food	2	3	6	2	2	5	2	4	9	2	5	10
Depending on assistances-family & friend	1	2	2	1	2	2	1	3	3	1	5	6
Skipping meals for a day	4	2	9	4	1	5	4	4	14	4	5	19
Eating less preferred food	1	2	2	1	2	2	1	4	4	1	6	6
Removing/relocated to less expenses school	1	1	1	1	2	2	1	3	4	1	7	9
	42			29			64			85		

Note: S=Severity; F= Frequency; W= Weighted
 Source: Field Survey, 2018



Table 5 represents CSI among household in Kano Metropolitan, comprising two local government areas. Statistical evidence indicates that Kano Municipal has the highest CSI of 55, suggesting that food insecurity and food insecure households are higher than in Gwale. Average CSI in Kano Central is 38, suggesting that food insecurity is not as intense as in Kano North. The frequent coping strategies adopted by the households in the location include skipping of meals and selling of assets and livestock.

Table 5 Coping Strategy Index Indicating Scores among Kano Metropolitan Households

	Gwale			Municipal		
	S	F	W	S	F	W
Borrowing money/purchase on credit	1	1	1	1	3	3
Selling assets/livestock	4	1	3	4	3	11
Children eat first before adult	3	1	3	3	3	9
Reducing consumption of food	2	2	3	2	4	8
Depend on assistances-family & friend	1	2	2	1	4	4
Skipping meals	4	2	6	4	4	13
Eating less preferred food	1	1	1	1	3	3
Remove/relocated to less expenses school	1	2	2	1	4	4
			21			55

Note: S=Severity; F= Frequency; W= Weighted
Source: Field Survey, 2018

Table 6 shows CSI among households in Kano South. Statistical evidence indicates that food insecurity in Gaya Local Government Area is the high; this is due to high index of 86 among the four local government areas. Here also the frequently used coping strategies include, selling of assets/livestock and skipping of meals among the farming households and the overall average in the Kano South is 69, clearly above that of Kano Central and Kano North, suggesting that among the three regions, Kano South has the highest rate of food insecurity in Kano. The finding is also in line with the finding of Mukhtar et al. (2018b), which identify Kano South as having the highest level of food insecure households.

Table 6 Coping Strategy Index indication scores among Kano South Households

	Gaya			Kura			Sumaila			Wudil		
	S	F	W	S	F	W	S	F	W	S	F	W
Borrowing money/purchase on credit	1	5	5	1	4	4	1	3	3	1	4	4
Selling assets/livestock	4	5	18	4	4	16	4	2	9	4	4	17
Children eat first before adult	3	5	15	3	4	12	3	4	11	3	4	13
Reducing consumption of food	2	5	11	2	4	7	2	3	6	2	4	9
Depending on assistances-family & friend	1	5	5	1	4	4	1	2	3	1	4	5
Skipping meals for a day	4	6	20	4	4	15	4	3	10	4	4	16
Eating less preferred food	1	5	5	1	4	4	1	4	4	1	4	4
Removing/relocating to less expenses school	1	5	6	1	4	5	1	3	4	1	5	5
			86			68			49			73

Note: S=Severity; F= Frequency; W= Weighted
Source: Field Survey, 2018

Table 7 shows the most frequently used coping strategies adopted by the farming households in Kano, Nigeria. Statistical evidence indicated that selling of assets/livestock and skipping meals were the most frequently used strategies adopted in Kano, then followed by children eating first, before adults in the households, others include borrowing or purchasing food on credit mostly from the retailers and shops owners closest to the household; depending on relatives, friends and government for food assistance; eating less preferred foods or less expensive/cheap foods; and relocating or removing children from expensive school.



Table 7 Frequent Use Coping Strategies among Households in Kano, Nigeria

	Kano North	Kano Central	Kano South	Pooled	Avg.
Borrowing money/purchase on credit	12	4	17	33	11
Selling assets/livestock	38	14	61	114	38
Children eat first before adult	28	12	50	91	30
Reduce consumption of food	25	11	32	68	23
Depending on assistances-family & friend	13	6	17	36	12
Skipping meals for a day	32	19	61	113	38
Eating less preferred food	13	5	17	35	12
Removing/relocating to less expenses school	15	6	20	41	14

Source: Field survey, 2018.

Average coping strategy index among the households in Kano, Nigeria as shown in Table 8 indicates that CSI on the average among the households was 57, indicating that food insecurity among households is extremely high. However comparison needs to be made with another research sometime next year to determine whether there is an improvement or deterioration among the households in the study area. Food insecure households were highest in Gaya and Kunchi local government areas with CSI of 86 and 85 respectively, while Gwale, Gwarzo, Dawakin Tofa and Kano Municipal have low level of food insecure households of 21, 29, 42 and 55 respectively. This finding is in line with outcome of a research conducted in Kano by Mukhtar et al. (2018b); Mukhtar *et al.* (2019) that also discovered lower food insecure households in these locations.

Table 8 Summarized and Average coping Strategy Index among the Households in Kano, Nigeria

	D/To fa	Ga ya	Gwa le	Gwar zo	Munici pal	Kara ye	Kunc hi	Ku ra	Suma ila	Wu dil	Avg. CSI
Coping Strategy Index	42	86	21	29	55	64	85	68	49	73	57

Source: Field Survey, 2018.

Table 9 shows the dietary diversity scores among the farming households in Kano, Nigeria. The report indicates that following Swindale and Bilinsky (2006), Kennedy et al (2013) and Nabuuma et al (2018) classifying food intake into three group (less than or equal 3 groups of food) low dietary diversity score; (4–5 food groups) medium dietary score and (greater than or equal 6 food groups) high dietary diversity score, about 6% of the food classification among households in Kano have low dietary diversity with majority of households from Kunchi Local Government Area. Dietary diversity score of (4–5 food groups) classified as medium dietary score among the farming households in Kano is 41%, Sumaila, Karaye and kunchi have the highest number of household under this classification with 60%, 55% and 46% of the households respectively. Majority of the households were under high dietary diversity score, eating between 6 and above food group in the study area, representing about 53%. Gwale has the highest percentage of households with 78%, followed by Municipal with 70% and Gaya with 60%. Average dietary diversity score among farming households in the study area was 8 food groups, indicating a minimum of 8 food groups consumed on the average among the households in the study area. This outcome indicated a relatively high number of dietary diversity in the location. Source of households' dietary diversity indicates that 60% of the farming households sourced their dietary diversity through owned food production, 38% sourced their dietary diversity through purchased, while 2% sourced their dietary diversity through assistance from family, friends and government.



Table: 9 Percentage of Dietary Diversity Classification According Food Groups in each Local Government Area

	D/Tof a	Gaya	Gwal e	Gwarz o	Municip al	Karay e	Kunc hi	Kura	Sumai la	Wud il	Poole d
<i>Factor</i>											
Low Dietary (1- 3 Food Groups)	5	5	0	7.5	2	5	15	5	5	12	6
Moderate Dietary (4-5 Food Groups)	40	35	22	37	28	55	46	42	60	43	41
High Dietary (6 - 12 Food Groups)	55	60	78	55.5	70	40	39	53	35	45	53
N	18	16	15	11	24	36	32	40	38	26	256

Source: Field survey, 2018

5. Conclusion and Recommendations

The paper determined the dietary diversity among farming households in Kano, Nigeria and the coping strategies adopted by the farming households in the study area. Statistical evidence revealed that the minimum dietary diversity in the study area is 9 food groups, which clearly suggested a high diversity in term of food intake among the farming households. Coping strategies adopted in the study area are considered less reversible and therefore represented severe coping strategies. The strategies include selling of assets/livestock to feed and skipping meals. CSI on the average also indicated that the area is suffering from serious food security challenge.

Descriptive statistics also revealed that average age among the households was 38 years, an indication that majority of the household heads were within the productive age and can easily impact positively on the farming activities. Also in term of educational qualification, majority of the farming household have a minimum educational qualification if National Certificate of Education, this will make application of modern agricultural practice easy among the farming households. Majority of farming household heads were engaged in farming activities (90%), with 17 years farming experience and an average cultivable land of 3 ha per household head and fertilizer application by all the farming household heads. Statistical evidence also revealed that average monthly income generation by the household head was N104, 986.33 (US\$344.14), average monthly expenditure was N71, 815.31 (US\$235.46) among household heads, while annual sales from farming production was N966, 003.19 (US\$3, 167.23).

Outcome from the CSI and DDS represent fair reflection of households' activities in the study area. Therefore DDS and CSI findings could be used as a yardstick for measuring dietary diversity as well as finding coping strategies adopted during food stun among the households in Northwest, Nigeria in particular and Nigeria at large. Income generation directly influence dietary diversity of farming household heads, therefore it is strongly recommended that households should engage in activities that will result in income generation especially during the off-farm period. Also household should desist from using their assets and livestock as their coping strategies, because the strategy is considered very severe and irreversible. Government interventions in the area of agriculture are highly recommended.

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