Analysis of Food Security Status among Farming Households in Zuru Agricultural Zone of Kebbi State, Nigeria

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Abstract: *This study was conducted to analyze the food security status among farming households in Zuru Agricultural zone, Kebbi state, Nigeria. A multi-stage sampling technique was employed in selecting a sample of 253 farming households in the study area. Descriptive statistics, Food security index and Logit regression model were used to analyze the data. The result indicated that 89.7% of the respondents were males, 34.8% of the respondents fall within the active work-age bracket of 40-49 years, 29.6% had farming experience of less than 6 years. 27.3%, had Quranic education and about 20.6% had an average monthly income of ₦20,383.45. The average farm size was 3.89 ha and average of 8 persons as the household size. 83.4% of the households were food insecure that were not able to meet 2/3 Mean per capita food expenditure (₦) 36,353.88. The major determinants that positively and significantly influenced food security in the study area were age, sex, level of education, household size, Access to credit, income, and farm size. The effective food coping strategy that were highly employed during food crisis among others, includes Buying from market (M = 2.04), Eating less preferred foods (M = 2.45), Borrowing money or food from friends/relatives (M = 2.03), Sale of livestock/household assets (M = 2.15) and Increased reliance on wild food like hunting (M = 2.01). It is therefore important to encouraged households to intensify combination of their enterprises with off-farm activities that could generate more income for the households and also help to improve their asset base.*
Keywords: *Analysis,Food Security Status, Logit Regression, Kebbi State.*

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I. Introduction

Nigeria is the most populous country in Africa, with majority of the households being food insecure, especially the rural farming households. Several evidences have suggested that majority of the world's food insecure live and work in the rural areas (IFAD, 2001). 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 food availability and accessibility problems at the household and national levels (Akinsanmi and Doppler, 2005). In other words, the poor performance of the sector directly creates supply shortages and indirectly creates demand shortages by denying the rural farming household's access to sufficient Income. Food security is defined as a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO, 2002). Food security entails ensuring sustainable access, availability and affordability of adequate quantity and quality food to all citizens to meet up with their physiological requirements (Okuneye, 2014). The main goal of food security is for individuals to be able to obtain adequate food needed at all times, and to be able to utilize the food to meet the body's needs. The World Bank (2001), identified three pillars underpinning food security; these are food availability, food accessibility, and food Utilization. On the other hand, food insecurity exists when there is constrained physical and economic access to secure sufficient quantities of nutritionally adequate food to allow individuals sustain an active and healthy living (Wolfe and Frongillo, 2001). Food insecurity comes with unpleasant conditions with consequences detrimental to human health, well-being and productivity (Ifeoma and Agwu, 2014).

With the democratic government in place from 1999 to-date, various governments have initiated some policies and programmes, which had impacted positively on the agricultural sector. Statistics from the FAO and IFPRI survey shown slight increase in per capita daily calorie intake from 2,050 Kcal in 1971-1981 to 2,430 Kcal in 1989-1991 and daily calorie intake also between 1991 and 2004 being 2,800 Kcal in 2002-2004. Similarly, the proportion of undernourished people declined from 13 per cent in 1990-1992 to 9 per cent in 2000-2002 and 7 per cent in 2002-2004 FAO (2005).

The problem of food security entails various elements in different countries such as lack of available food product, lack of technical ability to distribute the food, problem of food availability, affordability and

accessibility through convectional food channels hence, on the national level, the per capital growth of production of major food in Nigeria has not been sufficient to satisfy the demand of an increasing population (Kormawa, 1999). These result in a big gap between national supply and national demand for food.Malnutrition is widespread in the entire country, rural areas and communities are especially vulnerable to chronic food shortages, malnutrition, unbalanced nutrition, erratic food supply, poor quality foods, high food costs, and even total lack of food. This phenomenon cuts across all age groups and categories of individuals in the rural areas. There is a high level of malnutrition among children in rural area of Nigeria; the figures differ with geopolitical zones of Nigeria (Akinyele, 2009 in Oluwasun 2015).

Despite the fact that the situation of food security is improving in the developed countries, the overall food insecurity is increasing in Sub-Saharan Africa (SSA) (FAO, 2002). Food insecurity continues to be a major problem in Nigeria including Zuru Agricultural zone. (FAO, 2002) reported that smallholder farmers depend on agriculture for their livelihood. Agricultural production has remained low especially among smallholder farmers who constitute the majority of agricultural producers in Nigeria; hence they are vulnerable to food insecurity due to the fact that they depend on subsistence farming as their primary source of food as well as income.

The broad objective of the study is to analyze food security status among farming household in Zuru Agricultural zone of Kebbi state. The specific objectives of the study were to:
(i)   describe the socio-economic characteristics of the farming households,
(ii)   determine the food security status of the farming households,,
(iii)   identify determinants of food security among the farming householdsand
(iv)   identify effective coping strategies employed by the farming households, in mitigating the effects of food insecurity.

Reliable information on household food security is a pre-requisite for accurate and effective design, monitoring and development of a projects (Charletto, 2001). Hence many development agencies considered household food security a guiding principle for designing interventions in rural areas. Measurement of food security at the farm family level will provide the basis for monitoring future progress and assessing the impacts of various projects, programmes and policies on the beneficiaries' food security status (Hoddinot, 2001). The study hopes to contribute to the on-going debate in development literatures on household food security status to help policy makers in designing policies and programs implemented to improve food security billed to address diverse range of issues, including participation in and access to Federal food/agricultural assistance programmes, economic opportunity and job security, community development and social cohesion, ecologically sustainable agricultural production, farmland preservation, economic viability of rural communities, direct food marketing, and diet related health problems.

II. Methodology

2.1 Study Area

The study was conduct in Zuru Agricultural zone in Kebbi State, Nigeria. The zone comprises of four local government areas, namely: Danko-Wasagu, Fakai, Sakaba and Zuru. Zuru Agricultural zone is located in the southern part of Kebbi State in North-western part of Nigeria. It`s located on longitude 11° 25' 49" North and latitude 5° 14' 15" East and it's occupying an area of about 8176sq km with a population of 875,500 peoples (NPC, 2018).
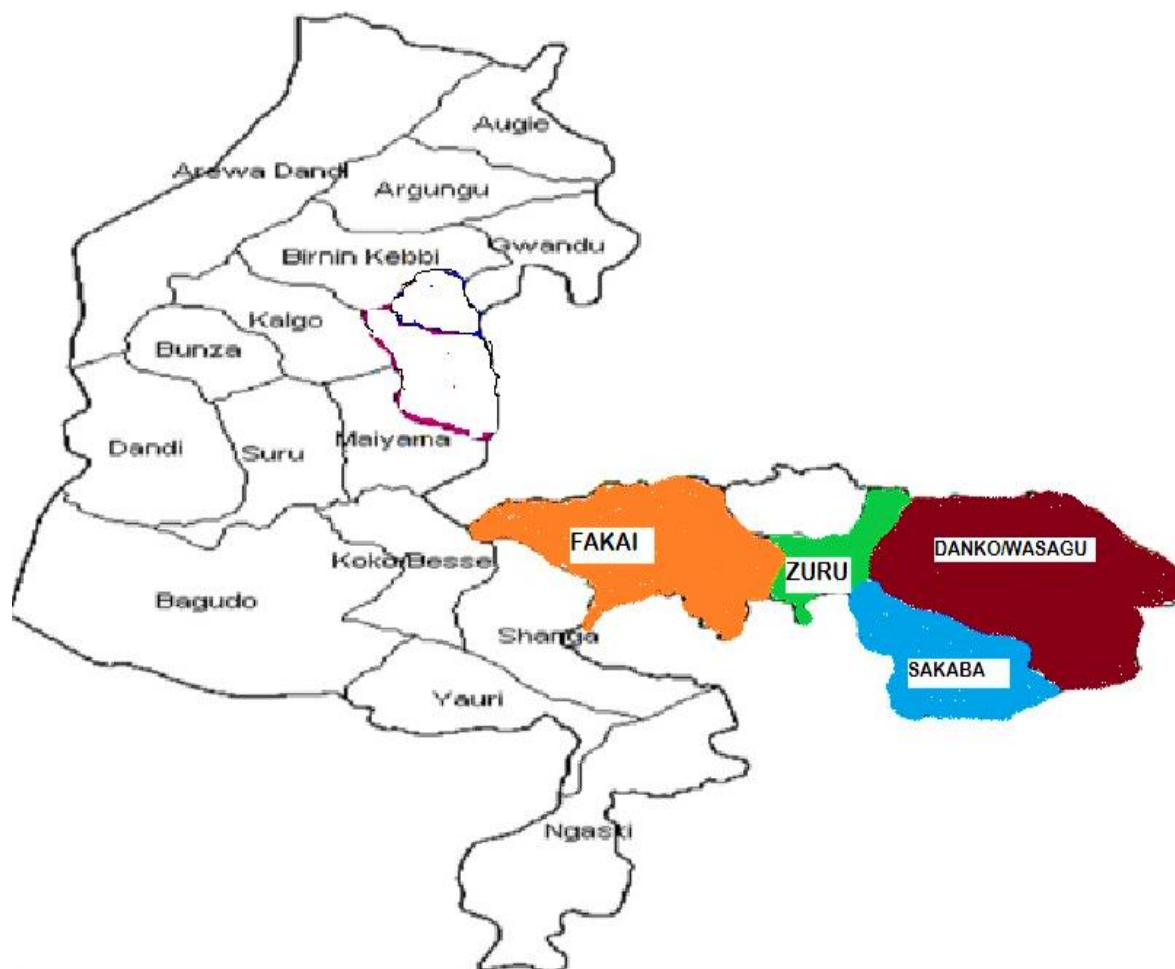
Fig 1 Map of Kebbi State
Source: *Google Maps, https:// goo.gl/ maps/ ×TtacgaNw4P2*

2.2 Data Collection, Sampling Procedure and Sample Size
Primary data for this study were collected from the farming households through the use of structured questionnaire, comprising closed and open-ended questions. A multi-stage sampling technique was employed in selecting a sample of 253 farming households from 32 communities across four rural local government areas of Zuru Agricultural zone. The local government areas, includes Danko-Wasagu, Fakai, Sakaba and Zuru.

2.3 Analytical Technique
Descriptive statistics such as frequency counts and percentages; mean scores, food security index, Likert scale type and logistic regression were employed to fulfil the objectives of the study.
The food security index formula is given by:

$$F_i = \frac{\text{Per capita food expenditure for the ith household}}{{}^2\!/_3 \text{ mean per capita food expenditure of all households}}$$

Where F_i = Food security index
When $F_i \geq 1$ = Food secure ith household
$F_i < 1$ = Food insecure ith household.
A food secure household is therefore that whose per capita monthly food expenditure fall above or is equal to two third of the mean per capita food expenditure. On the other hand, a food insecure household is that whose per capita food expenditure falls below two-third of the mean monthly per capita food expenditure (Omonona*et al.,* 2007).
Based on the food security index (Fi), logistic regression model was used to estimate determinants of food security among the respondents. Logistic prediction equation used is as specified below:
$Fi = b_0 + b_1X_1 + b_2X_2 + \ldots \ldots + b_{10}X_{10} + U$
Where F = Logit for food security = Logit (p) where Fi =1 is food secure and Fi = 0 is food insecure
b_o = Constant

$b_0, b_1,…,b_{10}$ = the regression coefficients which interpret the effect of X on F
X = independent variables
K = number of independent variables
P = probability of presence of characteristic of interest
u = error term
In the logistic regression analysis, the independent variables are as follows;
X_1 = age of household head (years)
X_2 = gender of household head (D=1 for male; D=2 for female)
X_3 = marital status (D=1 for married, D=0 otherwise)
X_4 = educational status of household head (D =1 for educated; D =2 for not educated)
X_5 = household size (number of household members)
X_6 = household head access to credit facilities (D = 1 for access; D = 0 for no access)
X_7 = income (₦)
X_8 = farm size (ha)
X_9 = farming experience (number of years)
X_{10} = household head participation in social organization (D = 1, if yes; D = 0, otherwise)
To ascertain the perceived coping strategies employed by households in mitigating the effects of household food insecurity, a three point Likert-type scale will be used. The response options and values assigned were as follows: "Very effective = 3"; "Effective = 2"; and "Not effective = 1". These values will be added and divided by 3 to obtain 2.0, which was regarded as the mean. Strategies with mean scores greater than or equal to 2.0 was regarded as "effective" while strategies with mean responses lower than 2.0 was regarded as not effective.

III. Results and Discussion

3.1 Socio-Economic Characteristic of Farming Household

The respondents' personal characteristics such as age, sex, marital status, level of education years of farming experience, household size, extension contacts, farm size, access to credit and income are used to assess the status of household farmers and how they relate with food security in the study area. These characteristics have social and economic implications to the accessibility and availability of food within the household Idrisa, *et al.,* (2008) and Victoria, and Benjamin, (2012).

Table 1: Socio Economic Characteristic of Farming Household

Variable	Frequency	Percentage %	Mean
Age			
20-29	36	14.2	
30-39	61	24.1	
40-49	88	34.8	43
50 and Above	68	26.9	
Sex			
MALE	227	89.7	
FEMALE	26	10.3	
Marital Status			
Married	194	76.7	
Divorced	7	2.8	
Widowed	28	11.1	
Single	24	9.5	
Education Status			
No formal Education	22	8.7	
Quranic Education	69	27.3	
Primary Education	47	18.6	
Secondary Education	56	22.1	
Adult Education	34	13.4	
Tertiary Education	25	9.9	
Years of Farming Experience			
Less than 6 years	75	29.6	
6-10 years	72	28.5	
11-15 years	50	19.8	12
Above 15	56	22.1	
Household Size			
1-5	84	33.2	
6-10	140	55.3	8
11-15	18	7.1	
16-20	11	4.3	
Extension Contacts			
Yes	93	36.8	
No	160	63.2	
Farm Size (Ha)			
Less than 3 Ha	91	36.0	

3-5 Ha	120	46.6	3.89
6-8 Ha	24	9.5	
Above 8	18	7.1	
Participation In Social Organization			
Yes	155	62.8	
No	93	37.2	
Access To Credit			
Yes	97	38.3	
No	156	61.7	
Monthly Income			
₦1000 - ₦ 10,000	98	38.7	
₦ 10,001- ₦ 20,000	52	20.6	
₦ 20,001- ₦ 30,000	16	6.3	
₦ 30,001- ₦ 40,000	7	2.8	₦ 20,383.45
₦ 40,001- ₦ 50,000	9	3.6	
₦ 50,001 and above	16	6.3	
No Responded	55	21.7	

Source: Field Survey 2019

Table 1. Showed that the socio-economic profile of household heads. About 34.8% of the household heads were within the age of 40–49 years. Within this age range, the respondents are expected to be very active and energetic to cultivate large hectare of farm land for increase in production which will increase household income. Also, about 89.7 % of the household head were male. This was in accordance to Ifeoma, and Agwu, (2014) men have easier access to farmland through parental inheritance than women in Nigeria, and about 76.7 % of household head are married.

Furthermore majority of the household heads were found to be educated at different levels; Quranic 27.3% education, primary education 18.6%, secondary education 22.7%, adult education 13.4% and tertiary education 9.9%. According to Babatunde*et al.,* (2007) education is a social capital, which could impact positively on a household's ability to take good and well–informed production and nutritional decision.

Year of farmingexperience,Majority of household heads with 29.6% has spent more than one (1) year in farming activities. An experienced household head is expected to have more insight and ability to diversify his or her production to minimize risk of food shortage. Research findings discovered a positive link between farming experience and food security status. Kuwornu, *et al*., (2011).

The research show that majority of household size has a number 6-10 persons 39.5% This indicates that most of the farming household had large household sizes, which could serve as a protection against shortfalls in the supply of farm labour. According to Ifeoma, and Agwu, (2014) household size has a great role to play in family labour provision in the agricultural sector. Table 1 also revealed that the farming household have a farm size of 3-5 ha (46.6%) of land which is in conformity with (Jayne *et al*., 2005). The larger the farm size of the household, the higher the projected level of food production. It is, therefore, anticipated that a household with a larger farm size to be more food secure than a household with a smaller farm size. In the rural areas, the data also revealed that majority (57.7%) of the household heads do not have access to credit facilities due their inability to meet the conditions in terms of interest rates and payment periods.Table 1 further showed that majority 63.2% of the farming household has no contact with extension agents. This lack of contact with extension agents could be due to inadequate funding of extension agents in Nigeria by the government (Ozor*et al.,* 2007). This may decrease the likelihood of households having access to better crop production, techniques, improved inputs as well as other production incentives, provided by extension agents.

3.2 Food Security Status of Farming Household
The household's food security status were classified into food secure and food insecure group's base on their monthly per capita food expenditure. The food insecurity line is define as two-third of the mean per capita food expenditure of the total households in the studies. The food insecurity line for the study was calculated as (₦)36,353.88 per month.

Table 2:Summary Statistic of Food Security Status in the Study Area

Variable of Food Security Status	Number of Households	Percentage of Households	Head count Ratio (H)
2/3 Mean per capita food expenditure (₦) 36,353.88			
Food secure	42	16.6	0.16
Food insecure	211	83.4	0.84
Total	**253**	**100**	

Source: Field Survey 2019

Table 2 showedthat 83.4% of the ithfarming household whose per capita food expenditurefalls less than (₦) 36,353.88 were food insecure while 16.6% ithfarming household whose per capita food expenditure falls equals or greater than(₦) 36,353.88 were regarded as food insecure. This showed that only 16.6% of farming household that were food secure were living above the recommended new minimum wage by the federal government of Nigeria as compared to 83.4% farming households in the rural area are living below the index (36,353.88) that were food insecure. These was in conformity with Arene and Anyaeji, (2010) that more than half of the respondents (60%) are food insecure since their monthly per capita food expenditure falls below two-third (2/3) of the mean monthly per capita food expenditure. According to Ambali*et al.,* (2013)The monthly mean per capita food expenditure for the total household is N 19,000.98 and the 2/3 mean per capital food expenditure for all the household is N1,267.32. The food security incidence for the insecure household is 0.59 while that of the food secure household is 0.41. This implies that 40.8% of the farming households in the study area were food secure while 59.2% were food insecure.

3.3 Determinants of Food Security Status of the Respondents

The result of the logit regression is presented in Table 3. Seven (7) out the ten (10) variable including the model analyzed were found to be significant determinants of food security status of the households in the study area. The variables that were found to be significant and positive were age, sex, level of education, household size, access to credit, income and farm size. The coefficient of variables in the model were significant at 1% ($P<0.01$) and at 5% ($P<0.05$) levels.

Table 3:Determinants of Food Security Status of the Respondents

Variable	Coefficient	Standard Error	Z	P>z
Constant	3.136249	1.086545	2.89***	0.004
Age	.5159426	.2126745	2.43**	0.010
Sex	.0375635	.017336	2.17**	0.030
Marital Status	.4824646	.5055457	0.95	0.340
Educational Level	.2410202	.0559188	4.31***	0.000
Household size	.1324757	.0511911	2.59**	0.002
Access to Credit	1.264431	.3188965	3.97***	0.000
Income	.3013242	.1001258	3.01***	0.000
Farm size	.0000122	6.06e-06	2.01**	0.045
Farming Experience	-.0479223	.0578843	-0.83	0.408
Social Organization	-.0896921	.0569134	-1.58	0.115

*** = Significant at 1% and ** = Significant at 5%
Source: Field Survey 2019

The determinants of food security status as obtained from logit regression weresignificant at 1% level of significance are food security index (Z= 2.89), educational level (Z= 4.31), access to credit (Z= 3.97) and income (Z= 3.01) were while age (Z= 2.43), sex (Z= 2.17), household size (Z=2.59) and farm size (Z= 2.01) were significant at 5% level of significance. This implies that household with highly educated head are more likely to be food secure than those with low level of education. This also implies that food security is assured with increase in age, household size, access to credit, and income.

3.4 Food Coping Strategy

To combat food shortages, the households engage in food-acquiring activities or change their eating behavior; these responses are known as food-coping strategies. Food-coping strategies are defined as the mechanisms employed by households when the means of meeting needs are interrupted by one or a combination of factors, including drought, low income, or high food prices (Ninnoet al., 2003).

Table 4:Food Coping Strategy

Coping Strategies	Very effective (3)	Effective (2)	Not effective (1)	WS	WM	RANK
	Frequency (%)	Frequency (%)	Frequency (%)			
Buying from market.	99(39.1)	78(30.8)	64(25.3)	517	2.04	3rd
Eating less preferred foods.	110(43.5)	70(27.7)	40(15.8)	620	2.45	1st
Borrowing money or food from friends/relatives.	98(38.7)	90(35.6)	40(15.8)	514	2.03	4th
Mother limiting their own food	50(19.8)	80(31.6)	84(33.2)	394	1.55	6th

				WS	WM	
intake in order to ensure that their children get enough to eat.						
Reduction in quality and quantity of food consumed.	51(20.2)	76(30.0)	84(33.2)	389	1.53	7th
Sale of livestock/household assets.	90(35.6)	68(26.9)	50(19.8)	546	2.15	2nd
Increased reliance on wild food like hunting.	115(42.3)	69(27.3)	28(11.1)	511	2.01	5th
Skipping one or two meals per day.	28(11.1)	88(34.8)	87(34.4)	347	1.37	8th

Source: Field Survey 2019
Note: WS = weighted sum and WM = weighted mean

The effective food coping strategies employed by the farming household to mitigate against food insecurity were: buying from market have a mean score of (2.04), eating less preferred foods (2.45), Borrowing money or food from friends/relatives (2.03), sale of livestock/household assets (2.15) and increased reliance on wild food like hunting (2.01) were regarded as an effective food coping strategy. These strategies are almost similar to those identified in other empirical studies (Maxwell *et al.,* 2003). According to Oluwaseun, (2015) the simplest form of Food Coping Strategy employed by household to combat food shortage is buying from the market. It falls under the first category of the four generic categories of Food Coping Strategy. This strategy is a readily engaged tool when farming household noticed that the household fall shortage food supply from its store.

IV. Conclusion

Based on the analysis food security status of farming households in Zuru Agricultural zone of Kebbi State, Nigeria. The study observed that the majority of households were food insecure with lessthan ₦ 36,353.88 as the 2/3 mean per capita food expenditure of the ith households. The coefficients that determinants the food security status were age, sex, household size, farm size educational level, access to credit and income.While the effectivefood coping strategy employed to combat food insecurity at the time of food shortage were buying from market, eating less preferred foods, borrowing money or food from friends/relatives, sale of livestock/household assets and increased reliance on wild food like hunting.

V. Recommendation

Based on the findings of this study, the following policy measures aimed at improving households' food security status in the study area were recommended as follows:
1.   Household income was also identified to have significant effect on food security status of households especially during lean periods. It is therefore important to encouraged Households to intensify combination of their enterprises with off-farm activities that could generate more income for the households and also help to improve their asset base.
2.   Large household sizes and farm size were also found to be significant on food security status of in the study area. Therefore, effective policy on land acquisition and policy effective community participation in design of concepts aimed at imparting knowledge about family planning and access to family planning facilities should be given adequate attention and priority by the government.

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