ANALYSIS OF FOOD SECURITY STATUS AND COPING STRATEGIES AMONG FARMING HOUSEHOLDS IN DEKINA LGA, KOGI STATE, NIGERIA

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Abstract
Food security is an important human welfare that is not negotiable globally. Data used for the study was primary wherefore; descriptive and inferential statistics such as logit regression was used to analyze the data. Results is in line witha priori expectations of the socio economic characteristics of respondents.The daily recommended per capita food calorie is 2260kilocalories. Using the mean per capital household food calorie, 59.17% of households in the study area were food insecure and 40.83% of the households were food secure.The logistic regression analysis shows a pseudo R^2 of 0.4459. Gender, educational level and farm size are positively related with food security status.Also, farming experience, age, household size and annual income are negatively related with food security status of the respondent but it is only age that is statistically significant at 1%. This implies that, the more these variables increase the more food insecure the people are. A number of strategies were adopted in event of food insecurity to cope with livelihood.Hence, it was recommended that prevalence of small scale farming be discouraged and enhanceincrease production and mechanization.Provision of accessible and affordable credit facilitiesbe made available to farmers for new technologies adoption and expansion of production scale. Agricultural extension agents through who farmers are educated should be given more recognition and their innovative information taken more seriously. The fight against food insecurity will only succeed if vulnerable households are promptly considered first in all the mitigating policies.

Introduction

Adequate intake of quality food is a key requirement for healthy and productive life (Okwoche and Asogwa, 2012). Food security exists when food is available to everyone at all times, they have means of access, and that it is nutritionally , adequate in terms of quantity, quality and variety also that it is acceptable, within the given culture (FAO, 2004). This implied food must be available to the people to an extent that will meet an acceptable level of nutritional standards in terms calorie, protein and minerals which the body needs; the possession of means by the people to acquire it and consistency in its supply at all times. Food security at one level does not imply food security at other levels i.e National and Household levels. Despite the huge financial investment in the agricultural sector, many

Nigerians cannot afford three square meals a day. The slow growth of agriculture and food production has resulted in growing food imports and food insecurity in the country. The role of agriculture in the development and growth of the Nigerian economy is primarily indicated in its contribution as a source of food supply. Food demand in Nigeria has generally grown faster than either food production or total supply. This situations are bad for farmers (who are left not knowing how and where to invest) and worse for consumers, especially the poor, who are unable to afford basic food (Sasson, 2012).

Previous studies by Arene *et al.* (2010) and Oni and Fashogbon (2013) are of the opinion that rural Nigeria is characterized by small scale agrarian livelihood as well as certain other primary production activities. These group are also most vulnerable to hunger with low and variable incomes, limited assets, few marketable skills and few powerful advocates to act on their behalf (FAO, 1996). Their literacy status has serious consequences on the level of agricultural production and hence food insecurity at household level. Bzugu *et al.* (2005) and Idrisa *et al.* (2006) had earlier recognized that low level of formal education among farmers make the introduction of improved agricultural technologies by extension agents difficult. According to Demeke and Zeller (2009), the size of a household member definitely has an effect on food insecurity though its direction cannot be known beforehand.

When there is food insecurity, households' tries to devise means to survive described as coping strategies for food insecurity. Coping strategies are the methods used by households to survive when confronted with unanticipated livelihood failure.The strategies pursued by households differ in several aspects, that is, within the household and between households (Maxwell and Cladwell, 2008). Even though, Nigeria has great agricultural potentials and abundant natural resources for all round development, most indicators of the economic well-being are still very low. Food insecurity and poverty are still widely spread across different parts of the country. Food insecurity situation in Nigeria has worsened with the passage of time due to the wide gap between the national supply and demand for food. Evidence suggests that Nigerians food production is increasing at less than 2.0% while population growth rate is estimated to be 2.5% per annum, (National Population Commission and Aku, 2012). Today, the problem continues to exist at an increasing pace as more than 900 million people around the world are still malnourished (FAO 2010). According to Adebiyi (2012) Nigeria remains a net importing nation, spending about N1.3 billion on importing of basic food items annually. The food security problem in Nigeria is pathetic as more than 70 percent of populace live in households too poor to have regular access to the food that they need for healthy and productive living with an increasing high levels of malnutrition and poverty (Babatunde *et al.*,2007).

Reducing the number of food insecure households, therefore, continues to be a top priority of Nigerian government. However, despite the number of researcher that have worked on food security in Kogi State a little have been achieved in surmounting the menace of food

insecurity, hence the need to carry out this study on analysis of food security and coping strategies among rural farm households in Dekina Local Government Area. To fill this existing gap, the following research objectives serve as guide.

Objectives of study

Specifically, objectives are to determine the food security status of the respondents; examine the factors affecting households' food security status in the study area; identify the coping strategies adopted in event of food insecurity in Dekina LGA of Kogi State.

Methodology

Area ofStudy

Dekina is a local government area in the eastern part of Kogi State, Nigeria. Dekina LGA headquarters is located at Dekina town. The LGA is located at7°41'41?N7°01'20?Enortheasterly line of equal latitude and longitude passes through the southeast of the LGA. It has a total land area of about 5,091 km2, and a total population of 260,312 people. The Local Government is inhabited mainly by the Igala speaking tribes and minor tribes such as Bassa, Igbos, Ebiras and Hausas. Majority of the inhabitants are farmers while few are involved in trading and civil services. Major arable crops grown in the area are yam, maize, cassava, millet, guinea corn, cowpea, groundnut, and tree crops such as oil palm, citrus, mango and cashew. Major animals are cattle, sheep and goats and poultry. It has two main seasons in the year- the dry and rainy season. The rainy season is between April and October while the dry season is between November and March. It is within the guinea savanna ecological zone of Nigeria.

Population and Sampling procedure.

The population for this study comprises of all households in Dekina Local Government Area of Kogi State. Four-stage random sampling technique was employed in selecting the respondents for this study. In stage one; all the three (3) districts in Dekina Local Government Area were selected. In stage two; one (1) council ward was randomly selected from each of the districts. In stage three; two (2) villages was randomly selected from each ward giving a total of six (6) villages and in stage four (4); twenty (20) households were randomly selected from each village making a total of one hundred and twenty (120) respondents.

Data collection and methods of data analysis.

Primary data were collected through the use of a well-structured questionnaire and assisted with interview method for this study. Data for this research was analyzed using both descriptive and inferential statistics. Socio-economic characteristics of the respondents and coping strategies adopted on the incidence of food insecurity was analyzed using descriptive statistics such as frequency distribution, percentage, mean, mode, ranking etc. Food security status of the respondent was analyzed using food security index. Factors

affecting households' food security status was analyzed using log it regression analysis.

Measurement of Food security index

Households were then classified into their food security status as food secure and food insecure households based on the food security line. The formula is given as;

$$\text{Per Adult equivalent (AE)} = \frac{\textit{estimate total household calories intake}}{\textit{HH size (after adjusting to adult equivalent using age - sex category}} \quad (1)$$

$$\text{Daily per adult equivalent(DAE)} = \frac{\textit{household per adult calories intake}}{\textit{No of days of consuming given food items estimate total HH calorie intake}} \quad (2)$$

$$\text{Food security index (FSI)} = \frac{\textit{HH per adult equivalent by household}}{\textit{Standard requirement of daily per adult equivalent } (\frac{2100\text{kcal}}{\text{day}}/AE)} \quad (3)$$

Household whose caloric consumption is greater than or equal to 2260kcal/AE will be categorized as food security; on the other hand, household whose consumption is less than 2260kcal/AE will be categorized as food insecure.

The Foster, Greer, and Thorbecke weighted poverty index was adapted for the measurement of the food security status of the households. FGT measures the respondents` food insecurity incidence, food insecurity gap and food insecurity severity each of the indices puts different weights on the degree to which a household or individual falls below the food security line.

Food insecurity gap/surplus index (P)

$$P = \frac{1}{N} \sum_{t=1}^{Q} \left(\frac{Z - Y}{Z} \right)^{\alpha} \quad (4)$$

Where;

á = the parameter that measures the prevalence, gap and severity of food insecurity respectively with number 0, 1 and 2 representing the food insecurity incidence, gap and severity respectively.

N = total number of households, Q = number of food insecure households. Z = food security line or food security threshold which is the recommended daily calorie intake (2260kcal)

Yi = individual calorie consumed (per adult equivalence) i.e. the food consumed by the i^{th} household.

Food insecurity gap measures the extent to which households are food insecure and surplus index measures the extent by which food secured households exceeded food security line. This index as estimated by Babatunde *et al.* (2007) is given as:

$$P = \frac{1}{M} \sum_{i=1}^{m} Gi \quad (5)$$

Where,P = Food insecurity gap or surplus index;M = Number of households that are food secured (for surplus index) or food unsecured (for food insecurity gap); andGi = Per capita calorie intake deficiency (or surplus) faced by i^{th} household.

$$Gi = \left(\frac{Y - R}{R}\right) \quad (6)$$

Food security index (Z) is mathematically defined as:

$$Z = \frac{Yi}{R} \quad (7)$$

Where, Yi is the daily per capita calorie consumption of i^{th} household; and R the households' minimum recommended daily per capital calorie requirements. Base on food security index (Z), two food security indices; shortfall and surplus will be calculated. These two indices measure the extent to which the households are above the minimum recommended daily per capita calorie requirements in the case of surplus index and the extent to which the households are below threshold in the case of shortfall index otherwise known as food insecurity gap.

The shortfall/surplus index, p, is given as

$$P = \frac{1}{M} \sum_{j=1}^{m} Gj \quad (8)$$

Where;

$$Gj = \left(\frac{XjR}{R}\right) \quad (9)$$

Equation 9 measures the shortfall j, Xj is the daily per capita calorie consumed by the jth household while M is the number of households that are food secure (for surplus index or food insecurity gap). Household calorie availability was estimated using food nutrient composition table considering each household adult equivalent.

Logistic Regression Model

This model was employed to assess the factors influencing the achievement of food security status in the study area. Logit regression model is implicitly specified as follows;

$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6 + b_7X_7 + b_8X_8 + b_9X_9 + b_{10}X_{10} + e$

Y = (1 if respondent is food secured, 0 if otherwise), B_0= constant, X_1= farming experience, X_2= age, X_3=gender, X_4=household size, X_5= educational status, X_6= farm size, X_7= annual income, e=stochastic error term.

Results and discussion

Results and findings for the study are discussed accordingly. Socio-economic characteristics of the respondents, food security status among the respondents, determinants of food security status and Coping Strategies adopted in event of food

insecurity in the study area were discussed.

Table 1.Socio-economic characteristics of respondents.

Socio-economic characteristics	Frequency	Percentage	Mean
Age			
21-30	12	10.00	
31-40	19	15.83	50years
41-50	30	25.00	
51-60	32	26.67	
61-70	27	22.50	
Gender			
Male	92	76.67	
Female	28	23.33	
Marital status			
Single	11	9.17	
Married	102	85.00	
Divorced	2	1.67	
Widow	5	4.17	
Household size (numbers)			
1-5	36	30.00	
6-10	66	55.00	8persons
11-15	14	11.67	
16-20	4	3.33	
Level of Education			
No formal education	57	47.50	
Primary education	33	27.50	
Secondary education	20	16.67	
Tertiary education	10	8.33	
Occupation			
Farming	76	63.33	
Civil servant	31	25.83	
Other income generating activities	13	10.83	
Farming experience (years)			
1-10	74	61.67	
11-20	35	29.16	21years
21-30	9	7.5	
31-40	2	1.66	
Extension contact			
Yes	45	37.50	
No	75	62.50	
Farm size (hectares)			
0.5-3.0	110	91.67	
3.1-6.0	10	8.33	2.0
6.1 and above	0	0.00	
Cooperative membership			
Yes	68	56.67	
No	52	43.33	

Annual income (Naira)			
below or equal ₦100000	32	26.67	
₦101000 - ₦200000	52	43.33	
₦201000 - ₦300000	13	10.83	₦ 248.414
₦301000 - ₦400000	15	12.50	
Above ₦400000	8	6.67	
Access to credit			
Yes	44	36.67	
No	76	63.33	

Source: Field Survey, 2019.

The findings shows that, majority (76.67%) of the respondent are male with the mean age of the 50 years. Majority (85%) of the respondents are married with a mean household size of 8 persons which imply that the household size in the study area is large. Most (47.50%) of the respondents had no formal education with 63.33% having farming as a primary occupation with 91.67% of the household heads having a mean farm size of 2 hectares and a mean farming experience of 23years. The study also shows that, most (43.33%) of the respondents have a mean annual income of **N**248.414 naira.Although, 63.33% of the respondents did not have access to credit facilities and also 62.50 of the respondents have no access to extension contact.

Table 2. Food security status among the respondents

Variables		
Food security profile	Food secure	Food insecure
Percentage of Households	40.83	59.17
Number of Households	49	71
Household size/adult equivalent	4.7	71
Per capita calorie	3286.61	
Food Security Index(FSI)		
Food insecurity gap/surplus	0.454	0.279
Food insecurity severity		0.078
Head count		0.591

Source: Field survey, 2019. Recommended daily calorie intake is 2260kilocalorie

The respondent's food security status is presented in table2 and FSI which is per capita calorie for the i^{th} household divided by 2/3 mean per capital calorie of all households was used to determine the food security status. Household with FSI (F1) ≥1 was considered food secured. The recommended threshold of the daily per capita food calorie is 2260kcal. Hence, about 59.17% of the households in the study are were food insecured the threshold having 1629.23kcal daily per capita calorie which implies these household are food insecure. This implies that 59.17% of households in the study area were food insecure and 40.83% of the households were food secure. Hence, 59.17% of the farming households in the study area were food insecure while 40.83% were food secure. This disagrees with the findings of Olayiwola (2013) who reported that, 52% of smallholders' farmers were food secured and this is in line with the findings of Solomon *et al.* (2005) who reported that, there is high incidence of food insecurity in rural Nigeria.

Table 3. Determinants of food security status.

Food security	Coef.	Std. Error	Z	P>/z/
Farming experience	-.0329	.3124	-1.05	0.292
Age	-.0807	.0252	-3.20	0.001
Gender	2.0339	.7686	2.65	0.000
Household size	-.0277	.0922	-0.30	0.763
Educational status	1.8113	.4182	4.33	0.000
Farm size	0.6146	.3177	1.93	0.053
Annual income	-0.0931	.2400	-0.39	0.698
_const.	-1.2243	1.6965	-0.72	0.471
Log likelihood	-45.492619			
Pseudo R2	0.4459			
LR Chi2 (7)	73.23			
Prob. > Chi2	0.0000			

Source: Field survey, 2019.

The logistic regression analysis shows a pseudo R^2 of 0.4459 in table 3 which implies that 44.59% of the changes that occur in food security status are caused by the variables included in the model. The result further shows that, gender, educational level and farm size are positively related with food security status. This means that, any unit increase in these variables will lead to a better food security status. The result also shows that, farming experience, age, household size and income are negatively related with food security status of the respondent but it is only age is statistically significant at 1%. This implies that, the more these variables increase the more food insecure the respondents are. Arene and Anyaeji (2010) on the other hand, found older household heads to be more food secure than the younger household heads. Hence the expected effects of age of household head on food security could be positive or negative.

Table 4. Coping Strategies adopted against food insecurity in the study area.

Coping strategies	Frequency	Percentages
Borrowing	89	74.17
Rationing money	94	78.33
Skipping meals	96	80.00
Unconventional food	110	91.67
Reduction of children's food	96	80.00
Employment	109	90.83
Help from relatives	83	69.17
Credit purchase	87	72.50
Whole day skipping meals	87	72.50
Less expensive food	85	70.83
Selling of assets	108	90.00
Eating of fruits	100	83.33
Feeding children first	111	92.50
Eating of reserved seed	83	69.00
Immature harvesting	109	90.83
Livestock selling	103	85.83

Source: Field Survey, 2019. Multiple responses recorded

The respondent's coping strategies in the event of food insecurity in the study area is presented in table 4and showed that majority of the respondentspracticecoping strategies of feeding of children first (92.50%) in the study area, eating unconventional food (91.67%), employment (90.83%), immature harvesting of farm produce (90.83%), selling of assets (90.00%) and livestock selling (85.83%). Also the least coping strategies adopted are; whole day meal skipping (72.50%), credit purchase (72.50%), less expensive food (70.83%) and help from relatives (69.17%) hence multiple responses was considered. This shows that, the respondents are devising every means possible towards coping with the adverse effect posed by food insecurity. However, studiesby Akerele *et al.* (2013), Orewa and Iyangbe (2010), refer to the use of coping strategies like skipping meals and eating less expensive foods, as strategies that will not alleviate food insecurity but "secure" the continued existence of people in compromised living conditions. In a study by Gupta *et al.* (2015), 63.7 % of food insecure households in the urban areas of Delhi, India relied on less preferred and less expensive foods to cope with food insecurity. In the same study, 30.9 % of food insecure households took limited portion sizes at mealtimes. Several other studies, like Mabuza *et al.* (2016), Norhasmah *et al.* (2010), Kempson *et al.* (2003), and Dore *et al.* (2003), show that the most preferred coping strategies of food insecure households are to rely on less expensive foods. Gupta *et al.* (2015), in a similar study, found that strategies compromising quality and quantity of food are first observed as a household falls into food insecurity. Gupta *et al.* (2015) indicated that "coping strategies used by households can be seen as an expression of negotiated decisions to minimize the impact of food insecurity in the household".

Conclusions and Recommendations

The study analysis of food security status among farm households in Dekina Local Government Area of Kogi State concluded that household heads in the study area were mostly married within their economically productive age with large household size, small farm size, educated, low annual income, membership of cooperative society and little contact with extension agents.Majority of the respondents are food insecured although, some of these respondents 40.83 percent were considered to be food secured.Gender, educational level and farm size are positively related with food security status and regarded are the major determinants of food security status in the study area.Coping strategies most adopted in the study area are feeding of children first, eating unconventional food, employment, immature harvesting of farm produce, selling of assets and livestock selling.Based on the research findings, the following recommendations are made: Policy makers should discourage the prevalence of small scale farming by developing appropriate policy that will enhance increase production and mechanization which should be corroborated with provision of credit facilities to farmers in order to change their production techniques of smallholder farm. Agricultural extension services should be strengthened with a view of educating farmers and rural households on the use of

improved techniques to improve the food availability through expansion of production.The fight against food insecurity will only succeed if the subsections of the society who are more vulnerable are considered first in all the mitigating policies.Gender equality in agricultural farming system that is if all gender involve in agricultural food production, this will boost or encourage food production hence increase food security.Policies should be formulated so as to ensure farm lands are easily accessible by the farmers to encourage commercial farming instead of the subsistence farming and so mounting the land tenure menace.

REFERENCES

Adebiyi, B. (2012). Jonathan's Agricultural Business plan. Nigeria Tribune, Wednesday 13 June, 2012.

Akerele, D., Momoh, S.and A.B. *et al.* Aromolaran, (2013).Food insecurity and coping strategies in South-West Nigeria. *Food Security Journal*.**5:** 407–414 (2013). https://doi.org/10.1007/s12571-013-0264-x

Arene, C. J and R. C. Anyaeji (2010). Determinants of food security among households in Nzukka metropolis of Enugu state Nigeria. Pakistan Journal of Social Sciences, 3(1): 9-16.

Babatunde, R.O, Omotesho, O.A and O.S. Sholotan (2007). Socio-Economic Characteristics and food Security Status of farming Households in Kwara state, North-central Nigeria. *Pakistan Journal of Nutrition* 6(1): 49-59.

Bzugu, P. M., Gwary, M. M. and Y. Idrisa (2005). Impact of Extension Services on Rural Poverty Alleviation among Farmers in AskiraUba Local Government Area, Borno State. *Sahela Analyst*, 7(1-2): 94-1.

Dore, A.R., Adair, L.S. andB.M Popkin (2003). Low income Russian families adopt effective behavior strategies to maintain dietary stability in times of economic crisis. *Journal of Nutrition*, 133:3469-3475.

FAO (2004). Food and Agricultural Organization of the United Nations. The State of Food Insecurity in the World: Monitoring progress toward the world food summit and Millennium Development Goals. Rome, FAO, 2004.

Food and Agriculture Organization (2010). Food Insecurity in the World: Addressing Food Insecurity in Protracted Crisis. Food and Agriculture Organization of the United

Nations, Rome. Online available at: hhtt://www.fao.org/docrep/013/;1683e.pdf accessed on 25/02/2012

FAO (2012). Gender inequalities in rural employment in Ghana an overview. Prepared by the Gender, Equity and Rural Employment Division, FAO, Rome, Italy.

Gupta, P. Singh, K., Seth, V., Agarwal, S and P. Mathur (2015). Coping Strategies Adopted by Households to Prevent Food Insecurity in Urban Slums of Delhi, India. *Journal of Food Security*, 3(1): 6-10.

Kempson, K., Keenan, D.P. Sadani, P.S. and A. Adler (2003). Maintaining food sufficiency: Coping Strategies identified by limited-resource individuals versus nutrition educators, *Journal of Nutritional Education Behavior*, 35:179-188.

Mabuza, M.L., Ortmann, G.F. andE. Wale (2016). Frequency and extent of employing food insecurity coping strategies among rural households: determinants and implications for policy using evidence from Swaziland. *Food Security*, 8:255-269.

Maxwell, D. and Cladwell, R. (2008). The coping strategies index: field methods manual, 2nd ed.p.1-17, Boston: Tufts University.

National Population Commission (NPC) and P.S. Aku (2012) Agriculture, Population Explosion and implication for Nigerian Economy; Unpublished, Ahmadu Bello University, Zaria

Okwoche V.A. and Asogwa B.C. (2012). Analysis of food security situation among Nigerian rural farmers; World Academy of Science, Engineering and Technology. International. *Journal of Biological, Food, Veterinary & Agricultural engineer.*, 6(12).

Olayiwola S.A, Awotide D.O andC.E Emesowum (2013). Determinants of food security among smallholders' farmers in Yewa North Local Government Area, Ogun State, Nigeria. *Int. J. Appl. Res. & Techn.*, 2(5): 15 – 21.

Orewa, S.I. and C.O. Iyangbe (2010). Determinants of daily food calorie intake among rural and low income urban households in Nigeria. *Academic Journal of Plant Science*.3 (4): 147-155.

Olayiwola, S. A., Tashikalma, A. K. and D. Y. Giroh (2017). Analysis of food security

status and coping strategies among rural Households in Oluyole Local Government area of Oyo State, Nigeria.

Norhasmah, S.; Zalilah, M. S.; Mohd Nasir, M. T.; Kandiah, M and A. S Asnarulkhadi (2010). A Qualitative Study on Coping Strategies among Women from Food Insecurity Households in Selangor and Negeri Sembilan. *Malaysian Journal of Nutrition*. 16 (1): 39-54.

Sasson, A. (2012). A Special Report on Feeding the World: The 9 billion-people question. *The Economist*. 2012. Pp8-11.

Solomon A, Velerie andA. Adeyemi (2005). Enhancing the food security of smallholders in Iwo community through extension communication and education. *Nigeria Journal of rural Soc.*, 5(1&2): 2005.