

UNDERSTANDING THE DETERMINANTS OF HOUSEHOLD FOOD SECURITY STATUS OF FARMERS IN ZANGO-KATAF AND KACHIA LOCAL GOVERNMENT AREAS OF KADUNA STATE, NIGERIA

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Abstract

This study peeked into understanding the factors that determine household food security status among farmers in Zango-Kataf and Kachia local government areas of Kaduna State, Nigeria. Using random sampling, data were obtained from 150 farmers from a population of 1503 in four (4) communities, with the aid of structured questionnaire. Data were analyzed using Logit regression model and descriptive statistics. Household size (1%), dependency ratio (1%), use of consumption credit (10%), membership of association (5%), access to markets (10%), and annual health expenditure on family (10%) were found to be the most determining variables for household food security status. The study equally observed that, of the sampled farmers, 74% of them were found to be food secured, while 26% were not. The intensification of enlightenment campaigns and programs on birth control measures and the benefits of small household size is therefore recommended. Food buying cooperation in line with saving money by pooling food purchases, and where consumer cooperative is workable, it could be looked into to enhance food accessibility. The government intervention in community healthcare facilities to providing at least basic, primary health care for farmers so as not to allow ill-health impede production activities of farmers, is also recommended.

Keywords: Household food security, Determinants, Farmers, Zango-Kataf, Kachia, Kaduna state.

Introduction

Ensuring food security is one of the greatest challenges facing the world community presently because of soaring food prices, low agricultural productivity, incidences of pests and diseases, and political unrests. Food is a basic necessity of life. Its importance is seen in the fact that it is a basic means of sustenance, and an adequate food intake, in terms of quantity and quality, is key for a healthy and productive life. The challenge of household food insecurity is however said to be most critical in Low Income Food Deficit African countries, of which Nigeria is one (Odusina, 2014; FAO, 2008).

Food security for a household means access by all members at all times to enough food for an active healthy life (Omotesho, *et al*; 2007). Omotesho, *et al*; (2007), further added that food security includes, at a minimum, the ready availability of nutritionally adequate and safe foods; and an assured ability to acquire acceptable foods in socially acceptable ways (i.e. without resorting to emergency food supplies, scavenging, stealing or other coping strategies). Nigeria, being a country where a large proportion of the populace is involved in food production, does not guarantee that all people, especially the poor, will have access to the minimum food requirement because of

existing regional, economic and social inequalities (Alderman and Garcia, 1993). There may be food insecurity for some rural populations because they do not produce sufficient food and/or do not have sufficient purchasing power to cover their food needs. Particularly, many factors which may vary from region to region are known to be determinants of household food security status.

However, in order to be able to tackle the problem of food insecurity in a country, it is paramount to understand the determinants of food insecurity in the area. A failure to understand and address the problem of household food security in Nigeria, has the capacity of tilting the polity, thereby creating political and economic instability. Moreover, Adepoju and Adejare (2013) have suggested that there seems to be a consensus that in matters pertaining to food security, food insecure households ought to be properly identified and the reasons for their insecurity investigated. This study, therefore, seeks to;

- i. identify the proportion of sampled farmers cum households that are food secure,
- ii. determine the factors that are the major determinants of farmers' food security status,
- iii. peek into understanding the major

determinants that drive farmers' household food security status, and

- iv. make possible recommendations in line with worthy suggestions to attaining household food security.

Methodology

Kaduna State is one of the 36 states in the Federal Republic of Nigeria. It is situated between latitude 9°2'N, 11°35'N and between longitude 7°15'E and 9°6'E. It is bordered by the Federal Capital Territory and Nasarawa State in the South, South East by Plateau and Bauchi State, North East by Kano State, in the North by Katsina State, North West by Zamfara State and South West by Niger State, (Kaduna State Statistical Year Book, 2001).

Zangon-Kataf is a Local Government Area (LGA) in Kaduna State, Nigeria. Its headquarters are in the town of Zonkwa. It has an area of 2,668 km² and a population of 316,370 at the 2006 census, projected to 430,600 in 2016. The people are predominantly Jju (BAJJU) and Tyap, with other tribes and Hausa settlers (https://en.wikipedia.org/wiki/Zangon_Kataf). **Kachia** Local Government Area (LGA), also in Kaduna State, Nigeria, has its headquarters in the town of Kachia. It has an area of 4,632 km² and a population of 244,274 at the 2006 census (<https://en.wikipedia.org/wiki/Kachia>), projected to 340,900 in 2016. Generally, in these two (2) LGAs, the rainy season starts from April to October with August and September as the wettest months having an annual average temperature of 23°C-28°C. The people are predominantly involved in agriculture, with over 75% of the active population engaged in farming as their primary occupation (Shamah, 2009). The major cash crop is ginger where commercial quantities are produced annually (Kaduna State in Perspective, 2009). A simple random sampling technique was employed to select two communities each from the LGAs and they include Fadan Kaje, Ungwan Wakili, in Zangon-Kataf LGA; and Gidan Tagwai and Laduga communities in Kachia LGA. From a sample frame of 1503 households, a 10% sample size of 150 respondents were randomly sampled for questionnaire administration following the Creative Research Systems (2012) formulae.

Food security index constructed in this study involved identification and aggregation. The process of identification involved the definition of a minimum level of nutrition necessary for the maintenance of a healthy living. This is the food security line below which rural households in this study area were classified as food insecure. The aggregation step helped

to generate the food security statistics for the household. The food security index was derived based on the daily-recommended 2260 kcal and 65g protein as the food security line (Olayemi, 1998). Household calories availability was estimated using food nutrient composition in Babatude *et al.*, (2007).

Food Security Index (Z_i) =

$$\frac{\text{Household Daily Per capita Calorie/Protein Consumed (x)}}{\text{Household Daily Per capita Calorie/Protein Required (y)}}$$

For a household to be food secured, Z_i must be greater than or equal to 1 ($Z_i > 1$). If Z_i is less than 1 ($Z_i < 1$), the household is food insecure. The quantity of crops produced, purchased and received as gifts were converted to kilogram and further to calorie consumed per day per household and then compared with the standard (2260kcal) per capita per day.

To identify the determinants of food security status of farming household, the logistic model of the relationship between the household food security index (FSI) and its explanatory variables is specified as follows (Cohen *et al.*; 1999; Neupane, *et al.*; 2002; Bahiigwa 2002; Zakari, *et al.*; 2014).

$$\ln [P_i / (1 - P_i)] = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \dots + \beta_{15} X_{15i}$$

Where subscript i denotes the i -th observation in the sample, P is the probability of the outcome, β_0 is the intercept term and $\beta_1, \beta_2, \dots, \beta_{15}$ are the coefficients associated with each explanatory variable, X_1, X_2, \dots, X_{15} . The estimated coefficients do not directly indicate the effect of change in the corresponding explanatory variables on the probability (P) of the outcome occurring. Rather, the coefficients reflect the effect of individual explanatory variables on the odds ratio of the dependent variable (i.e., the household being food secure or food insecure).

Results and Discussion

Major determinants of farmers' food security status

The result in Table 1 shows the Logit estimate of food security status with some selected socio-economic variables. The socio-economic variables were age of household head in years, gender of household head, marital status of household head, education level of household head, farming as primary occupation, household size, dependency ratio, farm size in hectare, use of consumption credit in Naira, total crop production in grain equivalent, total income in naira, membership of association in years, access to markets,

annual health expenditure on household head in naira, and annual health expenditure on family in Naira. The result of the Logit regression model (Table 1) shows that household size (1%), dependency ratio (1%), use of consumption credit (10%), membership of association (5%), access to markets (10%), and annual health expenditure on family (10%) were significant determinants of household food security status. The

Logit model reveals a negative log likelihood estimate with a significant chi square at 1% probability level; depicting a good model fit.

It is pertinent to state that of the sampled households, 74% of the respondents were found to be food secured while 26% were not from the food security index (FSI) analysis.

Table 1. Logit estimate of household food security status with selected socio-economic variables

Variable	Coefficient	Standard Error	P[Z >z]
Constant	0.8578	2.1418	0.6888
Age of household head in years	0.0525	0.0501	0.2943
Gender of household head	-0.5926	1.1505	0.6065
Marital status of household head	1.3646	1.4631	0.3510
Education level of household head	0.1200	0.2455	0.6250
Farming as primary occupation	-0.6153	0.6679	0.3569
Household size	-0.7100	0.1752	0.0001*
Dependency ratio	-3.6689	1.3180	0.0054*
Farm size in hectare	0.6051	0.5958	0.3098
Use of consumption credit in Naira	-0.2907E-04	0.1563E-04	0.0629***
Total crop production in g rain equivalent in Kg	0.0001	0.0004	0.7734
Total income in Naira	0.2046E-05	0.2232E-05	0.3593
Membership of association in years	0.1690	0.0773	0.0289**
Access to markets	1.5718	0.8617	0.0682***
Annual health expenditure on H.H. head in Naira	-0.9861E-05	0.2938E-04	0.7372
Annual health expenditure on family in Naira	-0.3333E-04	0.2014E-04	0.0979***
<i>Log likelihood function = -48.5462. Chi squared = 74.8247. Prob. [ChiSqd > value] = 0.000*</i>			

*, ** and *** indicates 1, 5 and 10% levels of significance of the variables respectively

Understanding the Significant Determinants of Food Security Status

Household size

The disaggregation by household size, revealed a negative relationship between household size and food

security. In other words, household food insecurity increased as household size increased. The impact of large family size is such that it reduces the per-capita food consumption of the family thereby aggravating food insecurity in that household. This result is in line with the findings of Babatunde *et al.*, (2007) and

Omonona and Agoi (2007) which revealed that the incidence of food insecurity increased with increase in household size. The distribution of the household size of the sampled farmers are presented in Table 2. The mean figure is given as 7.87, noted to be large, and the group

average is 5-10 household members at 61.33%. Only just 2% of the sampled farmers had household members in excess of 15 members. Large household members could mean large and cheap family labour but it certainly also means more mouths to feed.

Table 2. Distribution of household size of sampled farmers

Household size	Frequency	Percentage
< 5	28	18.67
5-10	92	61.33
10-15	27	18.00
> 15	3	2.00
Mean	7.87	
Standard Deviation	3.25	
Total	150	100

Dependency ratio

A further disaggregation of the household size is the measure of the dependency ratio. The dependency ratio of household, is defined as the proportion of household members that are not actively contributing to the family economy to those that are. This is expected to decrease the food security status of households as it increases, and this is so indicated by its negative coefficient as presented in Table 1. However, looking closely at the distribution of the number of household members below and above 14 years of age and the elderly/sick household members gives a further disaggregation of the family size and indicate the dependency ratio as a measured determinant of household food security status. These measures are presented in Table 3. The household members ages above 14 years are expected to be more actively involved in farming activities than

those below 14 years of age. Consequently, more household members above age 14 years may mean more family labour and more farming activities which can lead to higher agricultural production and consequently food security. As shown in Table 3, the average number of household members above 14 years, was observed to be 4.6 among the farmers, with about half (48%) of the respondents observed to be greater than 4. It is expected that these household members would contribute to the farm family economy, and by that, increase the likelihood of household food security status. For the household members with ages below 14 years, the household members were mostly less than 4 (97.33%). This are the consumers who did not contribute substantially to the household food economy, and could potentially lower food security. Only 19.33% of the respondents had aged sickly family members and dependents as shown in Table 3.

Table 3. Distribution of number of children and aged/sick household members

Children < 14 years	Frequency	Percentage
< 4	146	97.33
4-7	3	2.00
8-11	1	0.67
>11	0	0.00
Mean	2.03	
Standard Deviation	1.24	
Others family members > 14 years		
< 4	78	52.00
4-7	53	35.33
8-11	17	11.33
> 11	2	1.33
Mean	4.60	
Standard Deviation	3.09	
Aged/Sick family members		
0	120	80.00
<3	29	19.33
>3	1	0.67
Total	150	100

Use of consumption credit

Access and usage of consumer credit was found to be significant at 10% level as shown in Table 1. The regression coefficient was found to be negative. This result further confirms the earlier findings that access to credit in the study area have very little significance to the food security status of farm households. The reason for this could be due probably to the smallness of credit—a microcredit. Consumption credit worth just about N10,000 for a poor farmer can hardly make any

significant impact on food security status. This is in agreement with the findings of Adelakun (1998) and Adebayo (2010). Also, loan diversion—many that accessed credit do not use the loans for the purpose for which they were advanced, for example, some either sell or share with their friends, loans that they advanced without directly using it for what they are meant for. These possibilities tend not to impart on food security status of households as would be expected. Besides, only just 12 respondents amounting to about 8% of the respondents accessed credit (See Table 4).

Table 4. Distribution of consumption credit accessed by the sampled farmers in Naira

Credit accessed in Naira	Frequency	Percentage
No access	138	92.00
≤ 25,000	8	5.33
25,001-50,000	2	1.33
> 50,000	2	1.33
Mean	3,114.67	
Standard Deviation	17,419.75	
Total	150	100

Membership of farmers' association

Membership of association generates a form of social capital, with its unique emphasis on relational rather than technical tools. Social capital can take the form of trust, norms, and networks, and it is in these contexts that the influence of farmers associating can be examined with regard to effect on household food security status. Among other things, it was suggested that information and knowledge about innovations, agricultural productivity, marketing, etcetera, spread more quickly within a group compared with individual farmers, enhancing confidence about efficient implementation and application (and , 2014). This variable, measured in summed years of group membership, was found to positively determine

household food security status at 5% level of probability. The mean years of membership as presented in Table 5 is given as 3.95 years as about 50% of the sampled respondents indicated non-membership of any society. The modal group and range of years of membership for those that belonged to at least an association was observed to be 6-10 years at 22.67% prevalence rate. It has been suggested by Fakayode (2015), that the farmers' associations influence members in terms of information on better or improved farm practices, storage techniques, marketing outlets and other life improving tactics, that would go a long way to impact the farmers' decision about food consumptions, and consequently, food security status. This result therefore corroborates Fakayode (2015).

Table 5. Distribution of membership of farmers' association of sampled farmers.

Membership of farmers' association in years	Frequency	Percentage
Non-membership	76	50.67
1-5	29	19.33
6-10	34	22.67
11-15	9	6.00
>15	2	1.33
Mean	3.95	
Standard Deviation	4.84	
Total	150	100

Access to Markets

Markets are of fundamental importance in the way of life of most farmers, rich and poor alike. Markets are where, as producers, they buy their inputs and sell their products; and where, as consumers, they spend their income from the sale of crops to buy their food requirements and other consumption goods. Farmers' access to markets and agricultural support services should be a major concern of policy makers, as agricultural policies have fundamentally been conceived of as a response to perceived market failure

and weak access to markets by smallholder farmers (Chapoto and Jayne, 2011). This study revealed that access to markets was found positively significant to household food security status at 10% level, as presented in Table 1. Table 6 however shows that only about 65% of the respondents had access to markets, while 35.33% had no access to markets. The indication here is a high market participation observed among the sampled farmers, consequent upon which a higher percentage of the respondents were found to be food secured (74%).

Table 6. Distribution of respondents' access to markets

Access to markets	Frequency	Percentage
Market accessibility	97	64.67
Non-access	53	35.33
Total	150	100

Annual family health expenditure

One other variable that was found significant (at 10% level) was the annual amount expended on health care for household members measured in Naira. This was as expected as health comes first in the household consideration. Farmers will even prefer to go hungry in order to be able to care for a sick family member. With increasing amount of money committed to healthcare, this study shows that a strong relationship exists, as the likelihood is that, such household will tend to food insecurity. In other words, the total amount of money expended yearly on household members' health is significantly, negatively related to the household food security status. Furthermore, a situation where a family member(s) falls sick, its effect can be further felt on family labour, as the sick will no longer contribute to the family economy. In fact, other member(s) of the family may be drafted to care for the sick thereby further reducing the family labour (Ojeleye, 2015).

Ojeleye, (2015), further adduced that, certain income that could have been channeled to feeding the household are used to care for the sick. A situation where stored food for future consumption are sold to care for the sick may even ensure, further endangering the chances of household food security. Therefore, as it has been found out, that the health status and in fact the total amount expended on medical care of farm family significantly affect its food security status. Table 7 however shows the distribution of the annual family health expenditure of sampled farmers. The average household health expenditure was observed at N15,524.67 with a standard deviation of 16,793.27, indication a high coefficient of variation. In other words, there is a high variability among the population sampled. The table, Table 7, in fact shows that about 44% of the respondents expended less than N10,000.00, as about 7% spent greater than N40,000.00 on medical expenses on family members (See Table 7).

Table 7. Distribution of annual family health expenditure of sampled farmers in naira.

Annual family health expenditure in naira	Frequency	Percentage
Zero health expenditure	10	6.67
≤ 10,000	66	44.00
10,001-20,000	32	21.33
20,001-30,000	27	18.00
30,001-40,000	5	3.33
> 40,000	10	6.67
Mean	15,524.67	
Standard Deviation	16,793.27	
Total	150	100

Conclusion and Recommendations

This study, which empirically assessed the food security status found household size, dependency ratio, use of consumption credit, membership of association, access to markets and annual health expenditure on family to be the most determining variables of household food security status of farmers surveyed in Zango-Kataf and Kachia Local Government Areas of Kaduna State. The study equally observed that, 74% of the sampled farmers were found to be food secured, while 26% were not. In the bid to strengthening the determinant of food security status of the farmers, it is therefore recommended that there should be intensification of enlightenment campaigns and programs on birth control measures and on the benefits of small household size. In line with optimizing farmers' association and food accessibility/security, food buying cooperation is

recommended to the farmers in line with saving money by pooling food purchases. Where consumer cooperative is workable, it could be looked into to enhance food accessibility. Health statuses of the household members as reflected in the amount expended yearly on health-related matters came significant but negatively related to household food security status. The government intervention in community healthcare facilities to provide at least basic, primary health care for farmers so as not to allow ill-health impede production activities of farmers is recommended. While the need exists to improve the rural marketing system that is readily accessible to the farmers by the provision of basic infrastructure like good roads network.

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