EFFECT OF OFF-FARM INCOME ON THE FOOD SECURITY STATUS OF MAIZE FAMERS IN LOKOJA LOCAL GOVERNMENT AREA, KOGI STATE, NIGERIA

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ABSTRACT
The study was carried out to analyze the effect of off-farm income on the food security status of maize famers in LokojaLocal Government Area(L.G.A)Kogi State Nigeria.Primary data were used for the study. A total of 110 households were selected using multi-stage random sampling technique. Data collected were analyzed using descriptive statistics, binary logit regression and mean score from Likert scale. The result shows 46.4% of the households were food secure while majority (53.6%) were food insecure. The result alsorevealed food insecurity gap of 36%, while the food insecurity severity to be 13%.The result of the logit regression model showed that Age, household size, farming experience and off-farm income were the variables that significantly influenced household food security in the study area.Age and household size had negative coefficients which were statistically significant (1%), years of farming experience and off-farm income were both positively associated with household food security and significant at (10%) and (1%) respectively. The result of the study further showed that the households adopt variouscoping strategiesin event of food insecurity. The study recommends that the farmers should be encouraged to participate in off-farm activities to help them cope with the challenges of food insecurity.
Keywords: Off-farm, Income, Food security, Kogi State, Nigeria

INTRODUCTION
Food is regarded as a basic necessity of life that must be met before any other developmental matter. Inadequate food is considered as a form of poverty (food poverty) in many societies. According to Chand &Gartia (2016) Food, nutrition and livelihood security are essential for a nation. Food security and nutritional security are the subsets of livelihood security. Despite this fact, Worldwide, about 852 million men, women, children are chronically hungry due to extreme poverty; while up to 2 billion people lack food security intermittently due to varying degree of poverty (FAO, 2003;Omoteshoet al.,2007&Adewumiet al., 2007).
Food insecurity exists whenever food security is limited or uncertain.Food insecurity refers to limited, uncertain availability, or inability to acquire nutritionally adequate, safe, and acceptable foods due to financial constraints (Ames et al.,2016). Also, Food insecurity is typically described as not having consistent access to adequate food for active, healthy lives for all household members. Food insecurity may have an impact on health and well-being, as stated in a study carried out by Gundersonet al., (2011). While, food security for a household means access by all members at all times to enough food for an active healthy life. 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).

Ensuring food and nutrition security is a challenge for Nigeria, given its huge population and high levels of poverty and malnutrition. The level of food absorption is also low. Food and nutrition security is broadly characterized by three pillars: availability, accessibility, and absorption (nutritional outcomes). Risk factors for food insecurity include any factors that affect household resources and the proportion of those resources available for food acquisition. Potential consequences of food insecurity include hunger, malnutrition and (either directly or indirectly) negative effects on health and quality of life (Campbell,1991).

Reducing food insecurity continues to be a major public policy challenge in developing countries. Almost 1 billion people worldwide are undernourished, many more suffer from micronutrient deficiencies, and the absolute numbers tend to increase further, especially in Sub-Saharan Africa (FAO, 2008; Babatunde&Qaim, 2010). Obviously, agricultural development is crucial for reducing hunger and poverty in rural areas, but non-agricultural growth can be important as well (Diaoet al., 2007). Specifically for African countries, with strong population growth and increasingly limited agricultural resources, the potential role of the rural off-farm sector deserves particular consideration.

With the economic importance of maize to the teeming populace in Nigeria, Maize is one of the most key staple foods in the world today; maize, rice and wheat combine to supply more than 50% of global caloric intake (World Atlas, 2017). According to Girei, et al., (2018) maize is the most important staple food in Nigeria and it has grown to be local 'cash crop' most especially among small-scale maize farmers under various cropping systems. It is presently the fourth most consumed cereal ranked below sorghum, millet and rice (FAOSTAT, 2012). Maize appears to be the third most important cereal after sorghum and millet (Juma, 2010). It has been

recognized to be one of the longest ever cultivated food crops. Maize is also grown in several regions of the world and is referred to as the world best adapted crop (IITA, 2008). In Nigeria, the demand for maize is increasing at a faster rate daily (Sadiq*et al.,* 2013). Maize consumption is widespread across the country and among households. According to the Mundi Index, maize consumption in Nigeria in 2017 stood at 10.9 million metric tons.

Traditionally, it is believed that rural economy is purely agriculture and off farm sector as a low productivity sector. However, recent years have witnessed a shift away from this position towards recognition of the rural off farm contribution to economic growth, rural development and poverty reduction, promoting growth and welfare by slowing rural urban migration (Lanjouw, 2013). Also, Off-farm income refers to the portion of farm household income obtained off the farm. In rural Africa, evidence indicates that off farm activity accounts 40 to 45% of average household income. Furthermore, off farm activity is positively correlated with income and wealth and hence it is a way out of poverty (Barrett *et al.,* 2006). Off-farm income opportunities have been reported as an important strategy for overcoming credit constraints faced by the rural households in many developing countries (e.g., De Janvry and Sadoulet, 2001). Smallholder farm households usually maintain a portfolio of income sources, with off-farm income being a major component (Barrett *et al.,* 2001). But often a clear policy strategy to promote the off-farm sector is lacking (Babatunde&Qaim, 2010). In the available literature, considerable attention has been given to the poverty implications of off-farm income in developing countries (e.g., Block and Webb, 2001; de Janvry and Sadoulet, 2001; Lanjouw*et al.,* 2001). In contrast, much less is known on off-farm income and food security nexus (Chang and Mishra, 2008). It is against this backdrop that this study examined the off-farm income on the Food Security Status of Maize Farmers in Lokoja Local Government Area, Kogi State Nigeria. The specific objectives of the Study are to;

i.   identify the socio-economic characteristic of maize farming households in the study area;
ii.   analyze the food security situation of maize farmers in the study area;
iii. determine the effect of off-farm income on the food security status of maize farmers in the study area; and,
iv.   describe coping strategies used by maize farmer to minimize food insecurity in the study area.

METHODOLOGY
Study Area
This study was carried out in Lokoja Local government area of Kogi State. Lokoja Local Government is located on Latitude 7.8023° North and Longitude 6.7333° East. Lokoja lies at the confluence of the Niger and Benue rivers and is the capital of Kogi State .While the BassaNge, Yoruba, Igala and Ebira are indigenous to the area, other ethnic groups of Nigeria, including the Igbo, Bini/Edo , Tiv, and Nupe, have recently established themselves. It covers a land area of 3,180 km² and a population of 195,261 at the 2006 census. It is bounded by the Niger in the north and east upstream from the capital until the border with Kwara State. The postal code of the area is 260. It is about 165km Southwest of Abuja as the crow flies, and 390km Northeast of Lagos by same measure. Residential districts are of varying density, and the city has various suburbs such as Felele, Adankolo, Otokiti and Ganaja. The town is situated in the tropical Wet and Dry savanna climate zone of Nigeria, and temperature remains hot all year round. Lokoja has three major market called New Market (International Market), Old Market and Kpata Market.

Sampling Procedure
This study made use of Multi- stage random sampling. The use of this procedure was informed by the fact that, multi- stage random sampling procedure allows for effective and fairly even representation of all the units within the study area. The sampling procedure was in stages, and the peculiarities of characteristics were taken into consideration at all the sampling stages for equal representation. In stage one, three wards from the local government area were randomly chosen. In stage 2, two villages in each of the wards were chosen randomly giving a total of six villages. In stage 3, twenty households in each of the five villages were randomly selected. This gives a total of one hundred and twenty sampled respondents. However, only 110 completed questionnaires were returned.

Method of Data Collection
Primary data was used for this study. The major research instrument to be used is the questionnaires. This wasappropriately moderated. The questionnaire was designed to elicit relevantinformation from the respondents. Such information includes their socio-economic characteristic, respondents' food security information, income from off-farm income and the coping strategies used by farmer to minimize the effects of food insecurity in the study area.

Food Security Measurement
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:

$$P_\alpha = \frac{1}{N} \sum_{i=1}^{Q} \left(\frac{Z - Y_i}{Z}\right)^\alpha$$

Where;

α = 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)

Y_i = individual calorie consumed (per adult equivalence) i.e. the food consumed by the ith household.

Method of Data analysis
Binary logitRegression

The logitregression model is based on the cumulative logistic distribution function. The model is specified as;

$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \text{-----------} + \beta_7 X_7 + e$

Where, Y is a dependent variable from the equation above and it represent the respondents` food security status.

X_1=Age of the household head(in years),

X_2=Household size of the household head(in numbers),

X_3=Years spent in school by the household head(in years),

X_4=Farming experiences of the household head(in years),

X_5= Farm size measures (in hectares),

X_6=Membership of Cooperative society which is measured as dummy (1=yes, 0=otherwise)

X_7=Off-farm income (measured Naira)

$\beta_1 - \beta_6$=Coefficient

β_0 =Constant

RESULT AND DISCUSSION

Socio-economic Characteristics of the study samples

Table 1: Socioeconomics Characteristics of Respondents

Socio-Economics Characteristics	Frequency	Percentage
Sex		
Male	80	72.73
Female	30	27.27
Total	**110**	**100.00**
Marital Status		
Single	3	2.27
Married	100	90.91
Divorced	5	4.55
Widowed	2	1.82
Total	**110**	**100.00**
Age		
21-30	3	2.73
31-40	13	11.82
41-50	32	29.09
51-60	34	30.91
>60	28	25.45
Total	**110**	**100.0**
Household size		
1-5	46	41.82
6-10	42	38.18
11-15	18	16.36
16-20	4	3.64
Total	**110**	**100.00**
Education Qualification		
No formal Education	14	10.00
Primary Sch. Certificate	42	37.27
Secondary Sch. Certificate	35	35.45
Tertiary Education	19	17.27
Total	**110**	**100.00**
Farming Experience		
1-10	21	19.09
11-20	44	40.00

>20	45	40.91
Total	**110**	**100.00**
Farm Size (Hectares)		
0.1-3	**53**	**48.18**
3.1-6	**57**	**51.82**
Total	**110**	**100.00**
Membership of Association		
Yes	57	51.82
No	53	48.18
Total	**110**	**100.00**

Source: Field Survey, 2018

Result on Table 1 showed the distribution of respondents based on gender, the result revealed that majority (72.73%) of the respondents were males, while (27.27%) of the respondents were females. This result is not unconnected with the cultural and traditional inclinations that confers household headship to males and most importantly the responsibility of sustaining the household economy. Most (90.91%) of the respondents were married, while 4.55% were divorced, 2.27% were single and only 1.82% was widowed. This suggests that married individuals dominate in the study area. This agrees with the result of Gordon and Craig, (2001) that marital status influences the level of participation in farming and non-farm economic activities as family labour would be available for such operations.The study revealed that most 30.91% of the farmers were within the age range of 51-60 years, 29.09% are within 41-50 years, 25.45% were above 60 years, the respondents have an average age of 37 years. This implies that farmers in the study area were still young. The implication of this result is that there is likelihood of high productivity among farmers since majority of the farmers is less than 50 years of age which shows that they are strong, active and flexible to farming activities. This finding is in agreement with that of a study carried out by Ibekwe*et al.,* (2012) who stated that majority (91%) of the farmers were within the active working age.

The result also showed the distribution of farmers by household size. Majority (41.82%) of the farmers had a household size that ranged from 1-5 persons, 38.18% had household size that ranged from 6-10 persons, 16.36% had household size that ranged from 11-15 while, and 3.64% had household size that ranged between 16-20 persons. The average household size was 7 persons implying that there is appreciable number of family labour supply to accomplish various farm operations. According to the report of Oladele (2011), there is a positive and significant relationship between the household size and farmers 'efficiency in production. However, the absolute number of persons in a certain family cannot be used to justify the potential for productive farm work.

The result in Table 1 showed that most(37.27%) of the farmers had primary education, 35.45% had secondary education, 17.27% had tertiary education, while about 10% of the farmers had no formal education. This finding is in line with result from a study carried out by Amaza (2000), where he reported that education has a positive and significant impact on farmers' productivity.

Result showed that 40.91% of the respondents had farming experience that ranged from 21 years and above, 40.0% had farming experience that ranged from 11-20, while 19.09% had farming experience that ranged from 1-10 years. The mean farming experience for farmer is 10 years. This depicts good signal for high productivity. The more experienced the farmer is, the more his ability to make good farm decision. Majority (51.82%) of the respondents belong to cooperative society while 48.18% do not belong to cooperative society. This implies that majority of the respondents are members of cooperative society. This according to Amaza*et al.* (2008) can be closely linked to the beneficial effects of membership of association in terms of production and other welfare enhancing services.

The result in Table 1 revealed that majority (51.82%) of the farmers had between 3.1-6.0 hectares of the same farmland while 48.18% of the farmers had (0.1-3.0). The average farm size of the respondents was 3.6 hectares. This implied that farmers in the study area were mostly small scale farmers.

Finally, the result revealed that most (65.55%) of the farmers had no extension contact in the last 12 months, and (35.45%) had access to extension visit. This implies that majority of the farmers in the study area do not have access to extension contacts which is one of the main source of information on improved farm practices because the ultimate aim of extension services is to enhance farmers' ability to efficiently utilize resources through the adoption of new and improved methods used in production activities.

Food Security Status of Maize Farmers

Result of food security status of maize farmers in the study area was presented in Table 2.

Table 2: Food Security Status of Maize Farmers

Estimates	Food Secure	Food insecure
Food secure	(51) 46.4%	(59) 53.6%
Average daily calorie intake (kcal)	2,450.44	950.85
Maximum daily calorie intake (kcal)	5,200.50	1,550.10
Minimum daily calorie intake (kcal)	1, 300.65	159.20
Surplus/shortfall index	0.68	-0.36 (36%)
Food insecurity severity		0.13 (13%)

Source: Field Survey, 2018.

Effect of Off-Farm Income on the Food Security Status of Maize Farmers

Table 3: Effect of Off-Farm Income on the Food Security Status of Maize Farmers			
variables	Coefficient	Std. error	P>|z|
Age	-2.0675	0.4807439	0.000[***]
Household size	-3.6785	1.194492	0.002[***]
Year spent in school	0.12478	0.7561803	0.870
Farming experience	1.2465	0.6570886	0.058[*]
Farm size	-1.0944	1.200887	0.362
Cooperative society	0.7669	0.9836815	0.436
Off farm income	1.1649	0.236946	0.003[***]
Constant	7.9833	2.785349	0.004[***]
Number of Obs.	**= 110**		
LR Chi^2 (7)	**= 113.58**		
Prob> Chi^2	**= 0.0000**		
Pseudo R^2	**= 0.7477**		
Log Likelihood	**= - 19.165927**		
Source: Field Survey, 2018. * and * = 1% and 10% level of significant**			

From Table 2, the quantity of every food item consumed by the households in the 7 days period was estimated. The quantities were converted to gram and the calorie content estimated using nutrient composition table of commonly eaten foods in Nigeria (Oguntona and Akinyele, 1995). A household whose daily per capita calorie intake is up to 2260kcal was regarded as food secure and those below 2260kcal were regarded as food insecure households.Based on the recommended daily calories intake of 2260kcal, the headcount ratios showed that 46.4% of the households were food secure and 53.6% of the households were food insecure. The food security profile also revealed that the food secure households had calorie surplus of 68% and food insecurity gap of 36%, the result showed food insecure household fell short of the recommended calorie intake by 36 percent. The result revealed food insecurity severity of 13% among the food insecure households. The finding of this result agrees with the report of Olayiwola (2013) who reported in a related study that, 52% of smallholders' farmers were food secured. Similarly,

Solomon *et al.* (2005) who reported that, there is high incidence of food insecurity in rural Nigeria.

Effect of Off-Farm Income on the Food Security Status of Maize Farmers

An estimate of the binary logistic regression of the effect of off-farm income on the food security status of maize farmers in the study area is presented in Table 3

The result of the analysis shows that the Chi square of the regression is 113.58 found to be statistically significant at 1% level. The model has a high negative Log likelihood of 19.165927; describing a model displaying a good fit, this shows that the explanatory variables in the estimated logit model significantly explained the likelihood of a respondent being food secure. The result showed that Pseudo R^2 is 0.7477 indicating a fit of 74.8%.

The coefficient of age (-2.0675) was negative and significant at 1% level of probability. This suggests that, the lower the age of the household head, the better the food security situation as there may be more options of making food available from both agricultural and non-farm opportunities.

The coefficient of household size (-3.6785) was negative and significant at 1% level of probability. This implies that food security increases with decrease in household size, in other word, large households are more likely to be food insecure than smaller households size. This result is similar to the findings of Idrisa*et al.,* (2008) who observed that the

larger the household size, the greater the responsibilities, especially, in a situation where many of the household members do not generate any income but only depend on the household head. Off-farm income (1.1649) has a positive coefficient and was significant at 1% level of probability. This implies that the respondents` food security status increases with increase in their off-farm income, suggesting the higher the household off-farm income, the higher the probability that the household would be food secure. This is because increased off-farm income would increase the household income, thereby improving food security.

The coefficient of farming experience (1.2465) was positive and significant at 10% level of probability. This implies that the higher the farming experience of household head, the higher the probability that the household would be food secure. Farming experience is an important factor determining both the productivity and the production level in farming.

Coping Strategy Employed by Households in Cushioning the Effects of Household Food Insecurity

Table 4: Coping Strategy Employed to Reduce the Effect of Household Food Insecurity

COPING STRATEGIES	VE	E	NE	MS
Eating foods that are less preferred	48	48	14	2.30*
Reduction in quality and quantity of food consumed.	41	43	26	2.13*
Borrowing food from friend and relative.	26	24	60	1.69 NE
Mothers limiting their own food intake in order to ensure that their Children get enough to eat	47	40	20	2.19*
Skipping one or two meals per day	66	28	16	2.20*
Buying food on credit	62	29	19	2.14*
Diversion of money meant for other purposes to buy food	41	48	21	2.45*
Engaging in off-farm jobs to increase household income e.g. trading, driving, civil service etc.	67	2	16	2.23*
Mortgaging and selling of asset	27	33	50	1.09 NE
Begging for food on streets.	47	8	55	1.92 NE
Short-term alteration in crop and livestock production pattern.	16	28	66	1.55 NE
Engaging in criminal practices like prostitution and theft	29	33	48	1.80 NE
Parents abandoning children to fend for themselves.	17	48	45	1.65 NE
Reducing the number of people eating in the household.	31	17	62	1.72 NE

Source: Field Survey, 2018. * = Effective, NE = Not effective VE = Very effective, E = effective, NE = Not effective, MS = Mean score

Result in Table 4 revealed the coping strategies employed by respondents in other to cushion the effects of food insecurity in the study area. The following were rated as effective strategies to cope with food insecurity; diversion of money meant for other purposes to buy food (mean score = 2.45), eating foods that are less preferred (mean score = 2.30), engaging in off-farm jobs to increase household income e.g. trading, driving, civil service etc. (mean score = 2.23), skipping one or two meals per day (mean score = 2.20), mothers limiting their own food intake in order to ensure that their children get enough to eat (mean score = 2.19), buying food on credit (mean score = 2.14) and reduction in quality and quantity of food consumed (mean score = 2.13). This shows that respondents change their consumption pattern that is (dietary adjustment) in the face of inadequate access to food as reported by Adebayo (2012).Other coping strategies that were not effective include; Begging for food on streets (mean score = 1.92), Engaging in criminal practices like prostitution and theft (mean score = 1.80), Reducing the number of people eating in the household (mean score = 1.72), Borrowing food from friend and relative (mean score = 1.69), Parents abandoning children to fend for themselves (mean score = 1.65), Short-term alteration in crop and livestock production pattern (1.55) and Mortgaging and selling of asset (mean score = 1.09) among others. In line with the views of Quaye (2008) and Adekoya (2009), households in the study area employed both protecting consumption and modifying consumption.

CONCLUSION
The study has shown that majority of the households in the study area were food insecure during the period of this survey. Specifically, food security status in the study area is influenced by age, household size and off-farm income. The study therefore concludes that off-farm income has strong relationship with food security. The study therefore recommends that, rural households should be educated on the need to also venture in off-farm activities as a means of diversifying their source of income. This will enhance more incomes for the households with good implication for household food security.

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