Determinants of Food Security Status of Household in Kogi State, Nigeria

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Abstract

The study analyzed determinants of food security in the study area. A simple random sampling technique was employed to take 400 sample respondents. Primary data were collected through interview schedule, focus group discussion, and key informant interviews. Binary logit regression model was employed to identify the determinants of food security status of a household. The results of the study demonstrated 47.5% of households were food secure and 52.5% of them were food insecure. Access to training, sex, and family size, and age were significant at 5%. However, the tropical livestock unit, livelihood diversification and household on-farm income were significant at 5%. Therefore, since majority of the households were food in secured, appropriate stakeholder selection to support household engagement in different income generating activities as well as providing a timely and adequate supply of agricultural technologies should be considered to improve the existing food security situation in the study area.

Keywords: Food security, household

JEL Codes:

INTRODUCTION

One of the greatest challenges facing the world in recent times is the increasing lack of access to food and the escalation of hunger and poverty (Ansari, 2013). Nigeria is the most populous country in Sub-Sahara Africa and is estimated to be approximately one-fifth of the total population in the region. A country with both human and natural endowments has the capacity to build a prosperous economy and provide for the basic needs for all its citizens. However, Nigeria is still ranked among the poorest countries in the World in terms of nourishment. Most importantly, the increasing levels of poverty and hunger has rendered most of its populace hopeless, as more than 70% of the disposable income of the poor households goes to meeting food requirements, yet not less than 31.5% of children under five years old are malnourished (UN, 2014). Available statistics demonstrate that the percentage of the Nigerian population below the hunger level increased from approximately 29% in 2000 to 35% in 2010 and 45% in 2018 respectively (Nuhudeen & shaufique,

2019), imply that this increase could be the reason why achieving the 2020 goal of 14.5% below the hunger level has not been plausible and equally possible. They observed that in virtually all the geo-political zones of the country, 40% of the households are food insecure.

Though, in Nigeria, there are a series of studies in the area of household food security. However, the majority of these studies were largely smaller populations, covering a small sample size and largely concentrated on other part of the country with little of these studies examine in Kogi State. Furthermore, regarding issues of national interest, the contribution of such studies could hardly provide the desired outcome, despite previous governments and administrations multiple attempts and a series of programs that were employed to tackle the country's food security issue. Some of these programs include Operation Feed the Nation (OFN), the Green Revolution (GR), the National Special Program on Food Security (NSPFS), FAO in Nigeria through the country programming framework (CPF) and Federal Government Intervention in the Maximizing Agricultural Revenue and key Enterprises in targeted sites (MARKETS) phase II, which is a USAID program. Based on the goals and expected results of these programs, the food issue in Nigeria in general and Kogi State in particular is now expected to have improved (Nuhudeen & Shuafique, 2019).

Conversely, available records have demonstrated that more than 14.5% of approximately 28 million people in Nigeria and 2.8 million in Kogi state, based on FAO statistics are under nourished. Moreover, this situation may be worsening considering the trend of abject poverty in the country, which was projected to be approximately 53.5% of the teeming population living below the poverty line of $ 1.9 per day, based on World Development Indicators (World Bank, 2015). Therefore, the general outcomes of these programs are still below the expected thresholds and goals. This can either be ascribed to the inability to understand the basic issues involved or the attempt to copy other strategies that function well elsewhere, regardless of the peculiarities of the country itself. It is therefore, against this background that this study is out to investigate the determinants of food security status in Kogi State, Nigeria.

Statement of the Problem

Food is essential for survival, but the question of whether there is enough food is available for the people of the world which is subject to population growth is germane for any economy. Insufficiency on food intake with better nutrients will cause food security problem, labour productivity reduce, increase in hunger, decrease in life expectancy and reduce economic growth. Food self-sufficiency will save foreign exchange that can be used to purchase other agriculture commodities that cannot be produced locally. The production and growing of such food crops is done within a country, with minimum dependency on the international market to ensure that sufficient food is available to feed the local population. These activities will encourage the

development of small-medium enterprises (SME). Meanwhile, countries with food self-reliance will determine their production needs based on the availability of food (Sekhampu, 2015).

Different factors were identified in various studies that aggravate food insecurity problem in Nigeria. These are: poor soil fertility, land shortage, occasional droughts, and degradation of farm lands, frost attack, and chronic shortage of cash income, poor farming technologies, weak extension services, high labor wastage, and poor social and infrastructural situation. The combinations of those factors have resulted in serious and growing problem of household level food insecurity in the study Area. Through time, poor and hungry populations become less flexible to stress and disasters as they rely a great deal on the natural environment and lack the capacity and the resources required recovering from disasters. In Nigeria, the seriousness of food shortage problem varies from one area to another, depending on the state of the natural resources and the extent of development of food shortage (World Bank, 2015).

However, Kogi State in particular and Nigeria in general, many communities depend on agricultural products as the source of food and income. But several factors and challenges face rural communities to be food in secured. This is not limited to multifaceted variability of rainfall and temperature but also factors like food availability, affordability and accessibility have hampered the livelihood of the citizens of Kogi state. While availability relates to food supply, affordability relates to food prices and accessibility relates to income have made people of Kogi Areas of Kogi state food in secured. Therefore, research in food and nutrition security attracts the attention of academicians, policymakers and practitioners around the world in large part as the consequences of food insecurity affect almost every facet of society. It is in order to address these problems that have affected the people in the study areas that engender this study. In addressing these problems, the following research question will be answered;

- What is the current level of food supply (availability) on food security in Kogi State?
- What is the current level of food prices (affordability) on food security in Kogi State?
- What is the current level of income of consumers (accessibility) on food security in Kogi State?

II LITERATURE REVIEW AND THEORETICAL FRAMEWORK

Concept of Food Security

FAO (2002) seen food security as "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." This implies that food security is a constituent part of the broader concept of nutrition security. A household can be said to be nutritionally secure if it is able to ensure a healthy life for all its members at all times. The definition of food security, established at the World Food Summit in Rome, is "food security exists when all people, at all times, have physical and

economic access to sufficient, safe and nutritious food that meets their dietary needs, and food preferences for an active and healthy life (Welay, 2017). Therefore, in an attempt to establish the factors that determine household food security, there is a need for a clear understanding of the food system itself. Food security refers to a state of being nutritionally secure and healthy (Sani & Kemaw, 2019).

Food Availability (Food Supply)

Food availability in the simplest term is the situation where food is made to exist for consumption at local levels where local individuals or households can locate their needed foods without strivings. It depicts the production and supply of varieties of foods (Doss, 2011). Food availability addresses the "supply side" of food security and is determined by the level food production, stock levels and net trade (Ogot, 2018). The choices made by consumers are directly linked to the sustainability and nutrition outcomes, which of these are also influenced by income disposed and amount and varieties of food available. In "farmers food; How push-pull technology translates the household income source to food provision and diet adequacy (Ogot, 2018).

Food Affordability (Food Prices)

Food affordability refers to the ability of individuals and households to purchase food enough nutritious food to meet their needs. It is often measured by comparing the cost of a basic food basket to a household income. Food availability is the general prices of food as compared to years past. That is say; food security is being able to afford enough food to live. According to Sani & Kemaw (2019), there are threats posed to food affordability. Threats to affordability may either be persistent or temporary. For the persistent, if the global food system is not able consistently to keep raising supply in pace with growing demand then food inflation would trend upwards, and wider problems in the economy could result in more people finding food unaffordable, irrespective of the trend in food prices (Doss, 2011).

Food Accessibility (Food Income)

Food accessibility is defined to consist of three elements. First, access relates to physical access to food, which may be difficult in some places. It also relates the allocation issues, which takes a range of firms due to varied reasons. Food accessibility results from the combination of economic endowments, physical access, and socio-cultural resources that allow the purchase or acquisition of appropriate food products for a nutritious diet (Doss, 2011). Economic accessibility means that food must be affordable. Individual should be able to afford food for an adequate diet without compromising on any other basic needs, such as school fees, medicines or rents (FAO, 2018).

Determinants of Food Security Status

According to Awoke (2021) determinants factors, which affect the food security of a household

were age, family size, monthly agricultural income, and food expenditure. In South Africa factors affecting rural household food security status were household income, family size, age, employment status, gender, and marital status (Welay, 2017). A study conducted by Welderufael (2016) revealed that factors such as family size, education, consumption, employment opportunities, asset ownership, farm inputs and farm size were significant determinants of food insecurity. In related study, age, family size, off-farm and non-farm income, access to irrigation, farm income, distance to market and access to credit affected the extent of household's food insecurity (Sani & Kemaw, 2019). According to Sani & Danladi (2019), to measure the household food access and vulnerability to shocks, food source was used as proxy indicator. Households who depend more on purchased food was vulnerable to high food prices. According to Awoke (2021), the main source of food for the farmers was own production (63.8%), purchased (17.6%), gifts from family/neighbors (0.6%) and FSP (productive safety net program/food aid) (18%) in North and Central Gondar Zones. Purchased food sources were the second-largest source of food in the study areas for the household, hence they were vulnerable to the price increase. Even though, the main sources of food were not enough (insufficient) to feed their families, the main sources of food were from farmers own production. From the various studies reviewed, there are several factors that have been revealed to be responsible for the determining household's food security status. They include: Age of household head, sex, total family size, total farmland size, tropical livestock unit (TLU), livelihood diversification (LD), on-farm income, and access to training, off-farm, oxen, type of fertilizer and weather condition.

EMPIRICAL REVIEW

Several studies related to food security status were reviewed for the purpose of establishing clearer understanding of the subject matter.

Welay (2017) while investigating on the impact of food security package loan on food insecure household's income in Northern Nigeria, identified factors that affect the food security of household, were age, family size, monthly agricultural income, and food expenditure. All these factors were positively related to food security. While household income, employment status, gender and marital status was not significant to food security. A study conducted by Sani & Kremaw (2019) titled "analysis of household food insecurity and its coping mechanisms in Western Nigeria using probit model revealed that factors such as family size, education, consumption, employment opportunities, asset ownership, farm inputs and farm size were significant determinants of food insecurity. Age, family size, off-farm and non-farm income, access to irrigation, farm income, distance to market and access to credit affected the extent of household's food insecurity. The findings of Echebiri (2017) using multinomial logit model also demonstrated that the food security

status of the rural households was influenced by years of education, credit access, farm size, monthly income, age and family size. Access to agricultural extension services, off-farm income, and number of oxen, total land size and safety net participation were determinants of household food insecurity status.

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THEORETICAL FRAMEWORK

For the purpose of this study, among all the theories reviewed, the study adopts the Climate Theory of Food Security. This theory explains food insecurity as caused by climate phenomena. It was developed by Cox in 1980's. Cox related this theory with the concept of "famine belief" in which he directly links climate condition to food insecurity. This theory argued that in the national or local level, climate linked phenomena such as drought; floods and other are major causing food insecurity (Cox, 1981). The proponents of this theory further argued that food scarcity occurs when the availability of food is less than the food necessity of the population. The primary developers of this approach were Adam Smith (1776) and Thomas Malthus (1883) who argued that famines are primary caused by a sudden decline in food availability. They consider natural drivers as the main causes of food insecurity and analyses their influence on harvest failures and advances in prices. They are supply oriented. In 2004, agriculture directly contributed to about 14% of global anthropogenic greenhouse gas emissions, according to the Intergovernmental Panel on Climate Change (IPCC, 2007). Agriculture is particularly vulnerable to climate change. Projections to 2050 suggest both an increase in global mean temperatures and increased weather variability, with implications for the type and distribution of agriculture production worldwide to enhance food security (Sani & Danladi 2019).

III METHODOLOGY

The study employed qualitative methodology in sourcing, collecting and analyzing the data collected for this study. The study employed the use of questionnaire as the instrument of data collection and Taro Yamane sampling technique to determine the sample size from the population. The estimation of the logit model was carried out by utilizing the Maximum Likelihood (ML)

estimation technique through Statistical Package for Social Sciences (SPSS) software to run the regression. The justification for using ML method is that it gives parameter estimates that are asymptotically efficient, consistent and normal and the analogue of the regression Z-test can be applied. Moreover, the Logit model is a nonlinear model which is suitable for estimates using ML estimation technique.

MODEL SPECIFICATION

The model for this study is adopted from the work of Wodim, Kefale, Genenew, & Belete (2022) which utilizes the logit regression model which belongs to the families of qualitative (binary choice) response model where the dependent variables takes on dummy values of 0 and 1 with 0 indicating absence of an attribute or a factor while 1 implies presence of such attribute/factor. The explanatory variables in the Logit model could be exclusively qualitative or quantitative, or a mixture of both (Gujarati, 2009). The Logit model for the study is specified as follows;

$(P_i)/(1-P_i)=$

$\beta_0+\beta_1AHH_i+\beta_2SEX_i+\beta_3TFMS_i+\beta_4TFS_i+\beta_5TLU_i+\beta_6LD_i+\beta_7ONFI_i+\beta_8ACCT_i+\beta_9OFF_i+\beta_{10}OX_i+U_t$

….....(1)

Where; (Pi)/(1-Pi) is the dependent variable which is the probability that a given household is food secured or not (simply denoted as L_i); i represents number of households; the independent variables (AHH, SEX, TFMS, TFS, TLU, LD, ONFI, ACCT, OFF and OX) are quantitative variables; β_0, β_1, β_2, β_3, β_4, β_5, β_6, β_7, β_8, β_9 and β_{10} are the parameters of the model to be estimated; and U_t is the error term; Where

L; P = 1 if the households is food secured; P=0; if otherwise, AHH; Age of the household head SEX; Sex, TFMS; Total family size, TFS; Total farmland size, TLU; Tropical livestock unit, LD; Livelihood diversification, ONFI; On-farm income, ACCT; Access to training, OFF; Off-farm OX; Oxen.

APRIORI EXPECTATION

β_1, β_2, β_3, β_7, β_8, β_9 and $\beta_{10} > 0$; β_4, β_5 and $\beta_6 < 0$

4.0 REGRESSION OF THE RESULTS

This section deals with the analysis of the logistic regression results and the percentage of household food security status using Statistical Package for Social Sciences (SPSS) version 20. Below is the summary of the results.

Table 1 Household food security status

Food security status	Frequency	Percentage
Food secure	190	47.5
Food insecure	210	52.5
Total	400	100.0

Source; Author's Computation

4.1 Food Security Status

The result of the study revealed that 190 (47.5%) of households were food secured while 210 (62%) of them were food insecure implied that the majority of households were food insecure (Table 2). The finding of FAO (2017) also corroborate that more than half (52.5%) of the rural population was food insecure. Besides, a study investigated by Umar, Huseyi, Behiye & Mohammed (2021) demonstrated that more than half (53.62%) of a household were food insecure. Similarly, households with more than half (67%) were unable to meet their daily food energy requirement (Echebiri, 2017). However, Ogot (2018) found that 35.8% of the respondent households were food insecure, which is less than food secured households. Sani & Danladi (2019) also revealed that the majority (71.6%) of rural households were food insecure.

4.2 Determinants of household food security status

A binary logit model was employed to identify the determinants of the food security status of the household. The dependent variable is household food security that takes a value equal to 1 if the household is unable to meet its minimum calorie requirements, 0 otherwise. The summary of the logistic regression model is presented below;

Table 2 Determinants of food security status of the household

Variables	Coefficient	Standard Error	p-value	Odd-ratio
Age	0.08**	0.04	0.021	1.08
Sex	0.86	0.32	0.72	2.88
Total family size	-0.162*	0.09	0.031	0.72
Total farm land size	-0.62**	0.31	0.000	0.48
TLU	-0.56***	0.08	0.000	0.47
LD	-4.55***	1.83	0.000	0.006
On-farm income	0.00***	0.00	0.03	1.00
Access to training	0.66*	0.33	0.004	1.69
Off-farm income	1.08**	0.41	0.000	2.80
Oxen	0.67**	0.32	0.02	1.68

N=400
Chi-square=40.31***
-2 Log likelihood=295.209
Cox & Snell R Square = 0.58
Nagelkerke R Square = 0.67
Note; *, ** and *** refers to significance at 10%, 5% and 1% probability level respectively
Source; Author's Computation, using SPSS 12

Age of household head; The result shows that the age of household head had a positive impact on food security status of household and significant at 5%. This indicates that the older the household head, the higher the probability that the household would be food secure. A unit increase in the age of the household head will increase the probability of the household to be food secured by 1.08 (odd-ratio). This could be attributed to the fact that the productivity of old household heads will increase, as they get older and older. Since as age of the household head increase will increase the

experience of households in agricultural production. Therefore, older people are more likely to have more farming experience and more output resulting in their families have a better probability of being food secure. This result also corroborate with the findings of Wondim, Kefale, Genenew & Belete (2022). Conversely, to these results, older households may face the challenge of declining productivity and efficiency hence result in less probability to be food secured (Echebiri, 2017).

Sex; The of the household head had a positive relationship with food security status of the households. In particular, the male head had a positive impact on household food security. It was significant at 10% probability level. The male-headed household had better food security than a female-headed household. A unit increase in a male household will increase the probability of household food security by 2.88 (odd-ratio) with other variables being constant. The female head households, who were the main income earner, faces various challenges such as shortage of time, shortage of technologies that suit the physical condition and lack of freedom to move outside the community to perform different activities. They were also responsible for maintaining the reproductive role rather than a productive role to earn their income (Wondim, Kefale, Genenew & Belete (2022).

Total family size; this is the number of the family who shared commonly every aspect. The result revealed that the total number of the family has negatively related to household food security status since it is statistically insignificant at 10% probability level. The negative sign implies that the probability of food security decrease with an increase in family size. This means that a unit increase in the number of family size will decrease the food security status of the household if all other variables are held constant. Farmers having more families may be faced with difficulty feeding their families. So, the existence of large number of family size in the household affects their wealth and tends to be food insecure as compared to households with small family size.

Total farmland size; The size of the land measured in the hector/hectare that households possess is negative in relation with the household's food security status at a 5% significance level. The negative sign indicates that household who own larger size farmland is more likely to be food insecure than those with relatively smaller farmland size. The result of the study demonstrated that as the land size holding increases by one more hector, the probability of being food secure decreases by 0.48 (odd-ratio) while other things held constant.

Tropical livestock unit (TLU); Household ownership of livestock has a negative relationship with food security status at a 1% significance level. Having more livestock is likely to be food insecure than those who have fewer livestock numbers. Based on the finding, the probability of being food secured decreases by 0.47 (odd-ratio) if the household owned one more additional livestock while other held constant. In the study area, livestock production and rearing is traditional with poor

management. Therefore, farmers focused on quantity rather than the quality of livestock less food security status.

Livelihood diversification (LD); The results shows that the households who decide not to diversify their livelihood were a negative association with the household food security status. It was significant at a 1% significance level. This means that a unit decrease in the diversification of their livelihood food insecurity will increase by 0.006 (odd-ratio), holding all other things constant. Data obtained from focus group discussions and key informants demonstrated that livelihood diversification is one of the risk-minimizing strategies. Therefore, farmers who failed to diversify their livelihood are risk-takers and less food secure.

On-farm income; The result implies that the household's on-farm income has positive relationship with food security status and was significant at 1% probability level. This demonstrated that the higher the household on farm income, the higher is the probability that the household would be food secured. A unit increase in the on-farm income will increase the probability of the household being food secure by 1.00 (odd-ratio) while other things were constant. If farmers have more on-farm income, they are better food secured than the farmer who has less farm income. The finding is consistent with (Wondim, Kefale, Genenew & Belete, 2022).

Access to training; Access to training was found to be positively related to household food security status though it is significant at a 10% significant level. This result demonstrated that access to training has been positive and an increase in access to training will increase the household's food security status by 1.88 (odd-ratio) while other things being constant. The result implies that access to training may help much to improve the food security status of households. A farmer, who has better access to training, has better awareness about improved technologies and has an opportunity to improve their food security status. Sani & Danladi (2019) also confirmed that training has a positive association with the food security of the household.

Off-farm income; In this study, off-farm income refers to the income generated from natural resource products and daily labourer on other farming activities such as rent land, charcoal selling, wood and wood product selling. Involvements in off-farm activity have a positive association with the household's food security status. It is significant at the 5% probability level. The positive coefficient of off-farm activity implies that a unit increase in off-farm activity engagement will increase the food security status of the household by 2.80 (odd-ratio) with other variables be held constant. As confirmed by focus group discussion, farmers who involve off-farm activity in addition to farming have better food security status than a farmer who did not participate in the off-farm activity. As usual, farming activity may not perform throughout the year, hence, participation in an off-farm activity in free time i.e not peak time of farming is important to improve the food security

status of the household. This finding is consistent with ((Wondim, Kefale, Genenew & Belete (2022).

Oxen; This refers to the number of domestic animals a given household possessed. It is statistically significant at a 5% significance level and positively related to food security status. Hence, as unit increases in oxen number will increase the food security status of the household by 1.68 (odd-ratio). Farming is a major source of livelihood for rural communities in the study areas. Therefore, oxen were used to plow for feeding their family. This means a farmer who has oxen is better food secure than a farmer who has no oxen. The finding of the study corroborate with findings of Sani & Kemau (2019).

5.0 Conclusion and Recommendations

Food insecurity is considered a serious constraint in the study area. The finding revealed that the majority of the household feeding practice and the living standard were decreasing. Since majority of the households were food in secured, food security strategy should be designed which increases food supply, food access and food strengthening emergency responses. The food security status of the household was determined by different socioeconomic factors. The binary logit model was used to identify those socioeconomic factors. They were affecting the food security status of the household either positively or negatively at different significance levels. Based on the conclusion made, appropriate stakeholder selection and strengthening linkage is an important strategy to improve the existing food security situation of the household in the study areas. In addition, those variables that affect households should be considered for the improvement of the living standard of the community in Kogi State. Stakeholders should design strategies to improve farmer's livelihood diversification and on-farm and non-farm activities engagement. To this end, farmers who live in remote areas of the study area were food insecure due to a lack of accessibility to improved agricultural technologies and transport. Therefore, special attention should be given those farmers to give a timely and adequate supply of agricultural technologies for sufficient productivity.

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