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Determinants of Food Security Status and Coping Strategies among Rice Farmers in Kebbi State, Nigeria

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Abstract

This study evaluated the food security status of rice farmers in Kebbi State, Nigeria. Data were generated from a sample of 120 rice farmers using multi-stage random sampling technique. Descriptive statistic, Food security index and Logistic regression models were used for the analysis. The results revealed that 36.7 % were food secured while 63.3 % were food insecure. The results revealed that the coefficient of age, gender, household size and farm size were statistically significant and positively influence food security status of rice farming households at 10%, 1%, 5%, and 1% level of probability, respectively. Based on the findings, it is recommended that government should improve on education and sensitize rice farmers regarding family planning since household size worsens the food security status of rice farming households. There is the need to increase the volume of food production as well as improve access to income generating activities that are more sustainable. Policies aimed at providing farminputsat subsidize rate will motivate farming households and also increase their productivity.

Keywords: Food Security, Rice, Farming Households, Kebbi State.

Introduction

Nigeria has 70.8 million hectares of agriculture land area with maize, cassava, guinea corn, yam beans, millet and rice being the major crops. Nigeria's rice production rose from 3.7 million metric tons in 2017 to 4.0 million metric tons in 2018. In spite of this, only 57percent of the 6.7 million metric tons of rice consumed in Nigeria annually is locally produced leading to a deficit of about 3 million metric tons, which is either imported or smuggled into the country illegally. To stimulate local production, the Government banned importation of rice in 2019. FOA, (2021).

According to Ataboh, et. al., (2014), Nigeria accounted for nearly 44% of the total rice output and 57% of the total rice producing area in West Africa and is endowed with favourable ecologies for rice cultivation.

Rice (*Oryza sativa*) is a major staple food for millions of people in West Africa and the fastest growing commodity in Nigeria's food basket (Akande, 2003). The demand for rice in Nigeria (6.3 million tons) has been increasing at a faster rateand the supply (2.3 million tons) compared withother West African countries,yetinsufficient supply chain integration remains a criticalissue (FMARD, 2017).

Literature Review

Nigeria is the leading consumer and largest producer of rice in Africa and simultaneously one of the largest rice importers in the world (FAO, 2000). Rice being an important food security crop, it is an essential cash crop for small-scale producers who commonly sell up to 80 per cent of total production and consume about 20 per cent. According to Klynveld Peat Marwick and Goerdeler (KPMG), investment in Nigeria as reported in 2019 revealed that rice generates more income for Nigerian farmers than any other cash crop. Based on the report, only about 57% of the 6.7 million metric tons of rice consumed annually is locally produced, leading to a supply deficit of about 3 million metric tons. Nigeria, with a rapid growth in population which is estimated to exceed 200 million by 2021, it is expected that the demand for rice will be sustained and increased in the foreseeable future.

Although rice production in Nigeria has boomed in recent years, there has been a considerable lag between production and demand level with imports making up the shortfall. Since the Nigerian Agricultural Policy document is for the attainment of self-sufficiency in basic food commodities with particular reference to those commodities consumed that bears a considerable share of Nigeria's foreign exchange even though has the prospect of being produced locally within the country.

A new Agricultural Promotion Policy (APP) was developed in 2016 building on success and lessons from the Agricultural Transformation Agenda (ATA) and has the following four priorities; food security, import substitution, job creation, and economic diversification. However, diversification and transformation of Nigeria's economy can only be actualized by initiating a business environment right from the farm to other stages of the value chain.

In this regard, Nigeria will aim to be more self-sufficient in the production of all cereals. Going by this policy scenario therefore, production of rice in Nigeria is bound to expand for these reasons. Rice production expansion in Nigeria is therefore bound to drastically reduce foreign exchange spending on rice importation and more importantly it could lead to the transfer of money into the hands of the very vulnerable group of the Nigerian economy.

Thus food security and poverty alleviation may be the direct benefits of rice production expansion in Nigeria. (Ataborhand Umeh, 2016)

Food and Agriculture Organization (FAO) (2004) defined Food Security as 'food that is available to feed everyone at all times, and this supports the fact that they have means of access to it; and that it is nutritionally adequate in terms of quantity, quality and variety that is acceptable within the given culture'. On the other hand, food insecurity is the absence of food security that is caused due to lack of any of these situations at different levels – for example, at the household, regional and national levels. Severe food insecurity is when food intakes are unceasingly insufficient to meet the daily dietary energy supplies thus, leading to a most severe stage described as 'hunger'. Due to food insecurity, at a global scale, the number of undernourished people have increased over the years (FAO, 2010).

The challenges of food insecurity and hunger worldwide and in developing countries like Nigeria in particular have continued to receive attention from experts and governments. (Abdullahiet al., 2016). Food security is a dynamic idea that has undergone significant transformation in its conceptual lifetime. Perhaps the most significant of these transformations is the shift from an initial view of food security as a product of reliable food supply to the growing contemporary emphasis on food, such as rice production as a single input in diffuse local livelihood strategies (Davies, 2009).

Statement of the Research Problem

The problem of food security entails various elements in different countries such as lack of available food product, lack of technical ability to distribute the food, problem of food availability, affordability and accessibility through conventional food channels hence, on the national level, the per capita growth of production of major food in Nigeria has not been sufficient to satisfy the demand of an increasing population as the demand for rice in Nigeria is 6.3 million tons which is insufficient supply chain integration remains an issue (FMARD 2017).

Despite an increase in the production of rice over the years, supply has still not met up with demand.

This is calling for a concerted effort in order to bridge the gap. In the last administration these gaps were often filled through importation in which that is driving the country's foreign exchange resulting in serious economic effects. Therefore, in a bid to fill the gap in recent years the current administration came up with the Anchor Borrowers programme (ABP), ban on importation of rice and other Agricultural commodities. In spite of these measures the country is not sufficient in terms of rice production. This is due to the changing consumer preferences and rapidly increasing population. FAO (2000), reported that as more family income rises in Nigeria because there have been a shift in the consumption pattern from roots and tuber crops in favour of rice. This is one of the likely reasons why rice that was once reserved for ceremonial occasions, has grown in importance as a daily intake for most homes delicacies (Oniah, et al., 2008).

In order to ensure increase in production of rice so as to meet up with the growing demand, there is need to look in the direction of food security status of the rice farmers. If the food security status of the farmer is not assessed and dependable policies set towards deepening their social status, the drive towards food security in the state and the country at large can be counterproductive. If the individual rice farmers are not food secured, it means that the quest for food security at the national level can hardly be attained. Thus, the need to assess the food security situation of the average farmer to see if he/she is producing enough not to talk about even having excess to dispose for income International Rice Research Institute (IRRI) (2014).

If an empirical investigation is conducted on the food security status of the average farmer, documented results obtained are likely to suggest policy direction on the way forward. The prospective farmers are likely to benefit from the result of such investigation that is aimed at providing recommendation on coping strategies.

It is based on this backdrop that this study hope to provide answers to the following research questions.

What are the socio-economic characteristics of the rice farmers?

Are the rice farmers food secured?

What are the determinants of food security status of the rice farmers?

What are the coping strategies adopted by the rice farmers to mitigate the incidence of food insecurity?

Theoretical framework

In analyzing food security, there is need to differentiate between national food security and household food security. While national food security deals with the adequacy of the supply of food. The household food security theory includes, in its concept, the dimension of food accessibility of the households and the individuals within the household. This accessibility to food, according to Frankenberger and McCaston (1998), is called entitlement. Following closely the idea of Sen's Food Entitlement theory, Frankenberger and McCaston (1998) defined entitlement as the set of income and resource bundles over which a household can secure its livelihood. Securing this livelihood ensures that the whole set of well-being of the household is put into consideration and not just its food needs. The need for nutrition security came into being with the realization that although availability and accessibility of food are essential, they are not the only factors that determine good nutrition within the households.

Materials and Methods

Study Area and Location

The study was carried out in Kebbi State, Nigeria. Kebbi State is located in the north-western part of Nigeria and occupies a land area of about 36,229 square kilometers with a population of about 381,000 in 2021 based upon projections from (NPC, 2006). The State lies between latitudes 10° 05' and 13° 27'N of the equator and between longitudes 3° 35' and 6° 03'W of the Greenwich. The climate of the study area is Sudan savannah with two main distinct seasons: the wet and dry season. The vegetation in the state consists largely of a great expanse of arable land and rich fertile soil with crops like sorghum, millet, maize, cowpea, yam, cassava, sweet potato, rice, vegetables and fruits. Cash crops grown include soybeans, wheat, ginger, sugarcane, tobacco and gum-Arabic. The state has high potential for livestock rearing especially goats, pigs, sheep and poultry. Kebbi State is essentially agrarian with about 80 percent of the population living in the rural areas and more than 90% of the rural population engaged in farming.

Data Collection

The research data was collected from primary and secondary sources. Primary data for this study was collected from the farming households through the use of a well-structured questionnaire that was pre-tested by the researchers and trained enumerators from the Ministry of Agriculture. Secondary data was sourced through Kebbi State Agricultural Development Programme, consultation of textbooks, journals, internet resource materials and other related research project.

Sampling Procedure and Sample Size

A multi-stage random sampling technique was employed in selecting a sample of rice farmers. Kebbi State was divided into four according to Kebbi State Agricultural Development Project (ADP) zones, namely Argungu, Bunza, Yauri and Zuru Zones. In the first stage, a purposive selection of three leading (ADP) zones with the highest preponderance of rice farmers was selected. Secondly, two Local Government Areas (LGAs) were purposively selected from each zone giving a total of six LGAs in the study. Thirdly, two villages were randomly selected giving a total of twelve villages and from each village ten rice farmers were randomly using snowball technique thus, giving a total of 120 rice farmers as sample size.

Analytical Technique

Descriptive statistics such as frequency and percentages, Food security index and Logistic regression models were used for the study.

Model Specification

Food Security Index Model

Food security index was used to achieve objective (2), where the farming households were classified into food secure and food insecure households, using the food security index. The food security index formula is given by:

$$F_i = \frac{\text{Per capita food expenditure for the } i\text{th household}}{2/3 \text{ mean per capita food expenditure of all households}} \dots \dots \dots (1)$$

Where F_i = Food security index

When $F_i \geq 1$ = Food secure i th household

$F_i < 1$ = Food insecure i th household.

A food secured household is therefore that whose per capita monthly food expenditure fell above or is equal to two third of the mean per capita food expenditure. On the other hand, a food insecure household is that whose per capita food expenditure fell below two-third of the mean monthly per capita food expenditure adopted by (Omonona et al., 2007).

Logistic Regression Model

Logistic prediction equation was specified as:

$$Z = b_0 + b_1 X_1 + b_2 X_2 + \dots + b_k X_k + U \dots \dots \dots (2)$$

Where Z = Logit for food security = Logit (p)

b_0 = Constant

$b_1 \dots b_k$ = the regression coefficients which interpret the effect of X on Z

X = independent variables

P = probability of presence of characteristic of interest

u = error term

In the logistic regression analysis, the independent variables are as follows;

X_1 = age of household head (years)

X_2 = gender of household head ($D=1$ for male; $D=2$ for female)

X_3 = marital status

X_4 = educational status of household head ($D=1$ for educated; $D=2$ otherwise)

X_5 = household size (number of household members)

X_6 = farm size (hectare)

X_7 = household head access to credit facilities ($D=1$ for access; $D=0$ for no access)

X_8 = extension contact (number of contacts)

To ascertain the perceived coping strategies employed by rice farming households in mitigating the effects of household food insecurity, a five-point Likert-type scale was used. The response options assigned was as follows: "Strongly Agree", "Disagree", "Agreed", "Strongly Disagree" and "Undecided". Values assigned to these options were 5, 4, 3, 2 and 1 respectively. These values were then added and obtained 15, which was further divided by 5 and obtained 3, which was regarded as the mean score. Strategy (ies) with mean scores greater than or equal to 3 were regarded as "effective" while strategies with mean score lower than 3 were regarded as not effective.

Results and Discussion

Socio-Economic Characteristics of Rice Farmers

Table 1 revealed the summary statistics of socio-economic characteristics of rice farmers in the study area. The results revealed the mean value for age as 41 years. This is in consonance with the study by Atabohet al., (2014) as majority of the rice farmers are young people who are strong and full of energy to make meaningful impact in agricultural production.

Results also revealed that majority of the rice farmers (84.2%) were male and 82.5% were married suggesting that rice farming in the study area was dominated by the male folk. The dominance of male over the female could be because of the tedious nature of farm operations, cultural and religious background of most farming communities (Adegoke 2020).

The results further shows that rice farmers in the study area had one form of Education or the other with Arabic education constituting 31.7%, Adult education 15.0%, Primary education 19.2%, Secondary 16.7% and Post Secondary 17.5%. This shows that the literacy level of the rice farmers may possibly encourage them to accept agricultural innovations, which in turn could increase crop production and food security. This result is similar to the findings of Adegoke (2020) who described that education allows the farmers cope with difficulties associated with technology adoption.

Results in Table 1 further reveal that rice farming Household Size had an average of 5 persons per household in the study area. In a farming household, large household at times leads to high family labour supply.

Majority of the rice farmers in the study area had an average Farm Size of 2 hectare of land, suggesting that the farmers were small farm holders. Awoyemi (2009) reported that small scale farming household combined resources well, they can be technically efficient because they are able to manage their farms well, leading to increase in productivity and this in turn leads to food security. Results of the study in Table 1 also shows that majority (53.8%) of the rice farmers had no access to credit in whatever form.

Table 1: Distribution of Socio-Economic Characteristics of Rice Farmers

Variables	Frequency	Percent
Age		
20-29	14	11.7
30-39	39	32.5
40-49	43	35.8
50 and above	24	20.0
Gender		
Male	101	84.2
Female	19	15.8
Marital status		
Married	99	82.5
Divorced	9	7.5
Single	10	8.3
Widow	2	1.7
Educational Status		
Arabic	38	31.7
Adult	18	15.0
Primary	23	19.2
Secondary	20	16.7
Post-Secondary	21	17.5
Farm Size		
Less than 3	95	79.2
4-6	19	15.8
7-10	4	3.3
11 and above	2	1.7
Household Size		
1-3	27	22.5
4-6	48	40
7-9	21	18.4
10 and above	18	15.8
Access to Credit		
Yes	55	46.2
No	64	53.8

Source: Field survey 2021

Food Security Status of Rice Farmers

Food security status of rice farming households in the study area is presented in Table 2. The results revealed that 36.7 % were food secured while 63.3 % were food insecure. This implies that the number of the food insecure households (63.3%) is greater than food secure households (36.7%).

To be food in secure means the mean per capita food expenditure was below N52, 681.44 while households whose mean per capita food expenditure equals or greater than N52, 681.44 were food secure. The findings suggests that rice farmers in the study area were food insecure.

Table 2: The Food Security Index for the Rice Farmers

Variable	Number of Rice Farmer	%	Head Count Ratio
2/3 Mean per capita food expenditure is N 52,681.44			
Food Secure	44	36.7	0.37
Food Insecure	76	63.3	0.63
Total	120	100	

Source: Field survey 2021

Determinants of Food Security among Rice Farmers

To determine the food security status of rice farming households, socioeconomic characteristics of households heads were regressed on their food security status and results presented in Table 3.

Table 3: Determinants of Food Security Status of Rice Farmers

Variable	Coefficient	Standard Error	T. Value
Constant	6.034	0.542	11.132***
Age	0.121	0.059	1.749*
Gender	0.123	0.046	2.656***
Marital Status	0.0575	0.051	3.741
Household Size	0.135	0.056	2.399**
Farm Size	0.123	0.146	2.716***
Education Status	-0.0523	0.0279	-1.919*
Extension Contact	0.0069	0.0152	0.456
Access to Credit	0.194	0.519	3.741

***p<0.001, **p < 0.05, *p < 0.10

Source Field survey 2021

Results in Table 3 revealed that five out of eight variables considered were found to significantly influence food security status of the rice farmers in the study area. The variables that have a significant relationship with the probability of food security were age, gender, household size, farm size and education status at 10%, 1%, 5%, 1% and 10%, respectively. The results revealed that the coefficient of age (0.121), gender (0.123), household size (0.135) and farm size (0.123) were statistically significant at 10%, 1%, 5%, and 1% with a positive influence on food security status of rice farming households. This implies that, if one of the variables is increased by one unit, the probability of households being food secure increases by 12.1%, 12.3%, 13.5% and 12.1%, respectively. This indicates that the more increase in the variables, the higher is the probability that households would be food secure. While the coefficient of educational status (-0.0523) of the rice farmers was statistically significant at 10% and had a negative influence on the food security status of the rice farmers. This implies that education had an indirect relationship with food security status thus suggesting that the lower the educational level of the household, the less they are food secured. This is not as expected, because the level of education should positively influence their food security status. This result implies that rice farming household who have household heads with relatively better education are more likely to be food secure than those headed by uneducated household heads.

Coping Strategies Adopted by the Rice Farmers

The food coping strategies employed by the farming households to mitigate against food insecurity were ranked based on their mean score. Buying from the market has a mean score of (M = 3.68) and was ranked first, Sale of livestock/ household assets (M=3.40) was ranked second, Mother limiting their own food intake in order to ensure that their children get enough to eat (M=3.18) was ranked third, Eating less preferred foods (M = 3.11) was ranked forth and Reduction in quality and quantity of food consumed (M = 3.00) was ranked fifth. These were regarded as effective food coping strategies adopted by the rice farmers in the study area. These strategies were used in order to reduce food consumption and to also cope with the current food crises.

Table 4: Mean Score of Coping Strategies to Mitigate the Effect of Food Insecurity in the Study Area

Coping Strategy	Mean	Ranks	Decision
(a) Buying from the market	3.68	1st	Effective
(b) Eating less preferred foods	3.11	4th	Effective
(c) Borrowing money or food from friends/relatives	2.92	8th	Not Effective
(d) Mother limiting their own food intake in order to ensure that their children get enough to eat	3.18	3rd	Effective
(e) Reduction in quality and quantity of food consumed	3.00	5th	Effective
(f) Begging for food on streets/neighborhood	2.18	10th	Not Effective
(g) Send out children for paid jobs/ work for food	2.99	6th	Not Effective
(h) Sale of livestock/household assets	3.40	2nd	Effective
(i) Increased reliance on wild food like hunting/scavenging	2.93	7th	Not Effective
(j) Skipping one or two meals per day	2.55	9th	Not Effective
(l) Parents abandoning children to secure food for themselves	1.89	11th	Not Effective

Conclusion And Recommendations

Based on the findings of the study, 63.3% of the rice farmers were food insecure while 36.7% were food secure suggesting that majority of the farmers were food insecure since the result revealed that the farmers expenditure is still above the current national new minimum wage obtained in Nigeria. The most commonly used coping strategies by the rice farmers buying from the market, sale of livestock/household assets, mother limiting their own food intake in order to ensure that their children get enough to eat, eating less preferred foods and reduction in quality and quantity of food consumed.

It is recommended that policies should be geared towards providing farming inputs at subsidized rate in order to enhance the productivity of the farmers.

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