Food Security in Rural Farming Households of Kogi State, Nigeria

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Author's contribution

The sole author designed, analyzed and interpreted and prepared the manuscript.

Original Research Article

ABSTRACT

The study assessed the determinants of food security among rural farming households in the Kogi State of Nigeria. This study was conducted in Kogi state which is located in central Nigeria. The principal analytical strategy adopted for this study involves the construction of a Food Security Index to ascertain the food security status of the respondents. The study found that a number of variables including membership of co-operative societies, access to extension agent, and access to credit and farm size had positive and significant effects on food security in the study area. The fact that a lower proportion of respondents belonged to cooperatives or had access to extension agents despite both having positive reinforcing effects on food security, calls for the intensification of extension activities in the area as well as the sensitisation of the farmers to the benefits of membership of cooperative societies. The positive effects of education also task the authorities to invest in formal and informal education for farmers through regular school attendance by younger farmers or through evening classes, adult literacy and distance learning programmes for older farmers. Similarly, access to credit through formal financial institutions should be further liberalized and constraints associated with collateral requirements should be alleviated for smallholder farmers, while the various credit intervention schemes of Nigeria's financial regulator should be expanded to benefit more farmers.

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1. INTRODUCTION

There is a variety of perspectives on food security in the mainstream literature. Some of the several reflections on the concept include [1] which defines food insecurity as the 'consequences of inadequate consumption of nutritious food." Food security is defined as "access by all people at all times to enough food for an active healthy life" [2] It describes a situation when "all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary food preferences for an active and healthy life"[3]. Food security is a composite of availability, access and utilization [4,5]. This broadening of the concept extends the definition beyond current or prevailing nutritional status by introducing vulnerabilities associated with potential changes in the future [5].

Evidently, food security as a concept has undergone significant refinement and modifications over several decades. For much of the 1950s, food availability in the households and markets was the predominant issue. Subsequently, accessibility considerations anchored on real incomes and purchasing power took primacy in the 1970s. This developed to concerns about utilization which is conditioned by amenities such as health care, water, education and environmental issues. Recently, the emphasis has shifted to the impact of ecological factors on securing sustainable food systems [6].

Malnutrition especially child malnutrition and food shortages are real concerns in Nigeria as in many countries in Sub-saharan Africa and the associated disease prevalence imposes burden on the health system. Nigeria has sub-optimal calorie intake of 1730 Kcal per day compared with the recommended per capita calories of 2500 – 3400 Kcal [3] and ranks 84 out of 119 countries in the 2017 Global Hunger Index. Nigeria food import bill has also been colossal, reaching N6.6 trillion (USD22 billion) in 2016 and exceeding the country's 2016 national budget of N6.06 trillion, while approximately 7 percent of foreign exchange was utilized on food importation in 2015. With Nigeria's population projected to reach 450 million by 2050 [7] the danger of widespread hunger looms if food production and imports failed to keep pace with population growth.

Policy and programmatic interventions to tackle food insecurity require an understanding of factors driving the phenomenon and their implications for social welfare. The bulk of evidence has tended to emphasize the role of financial resources or income in the evolution of global patterns of food security and hunger albeit with mixed results [8]. It has however been found that many low-income households are food secure [9]. This hinges on household decisions on the proportion of income to commit to food as well as their relative prices and availability [8]. Thus, income-based measures are not necessarily the exclusive or main drivers of food insecurity and hunger [10]

A strand of the literature has explored the impact of socioeconomic and demographic factors on food insecurity. In general, the corpus of research established that single, widowed, young or uneducated persons and households with high child dependency would likely face food insecurity [11]. Indeed, [12] reports that single parenthood, number of young children, and incomes levels below the federal poverty line, heightens the risk of food insecurity among black or Hispanic households in the United States.

The main objective of this research, therefore, was to determine food security among rural farming households of Kogi State, Nigeria, The specific objective was to: (1) assess socioeconomic and demographic characteristics of rural farming households in the study area and (2) identify factors driving food security in the study area.

2. MATERIALS AND METHODS

This study was conducted in Kogi state which is located in central Nigeria on coordinates 7°30′N 6°42′E. It has a population of 3,314,043 according to the 2006 census and occupies a total area of 29,833 km^2 (11,519 sq mi). The state is bordered by the Federal Capital Territory (Nigeria) to the north, Nasarawa State to the north east, Benue State to the east, Enugu State to the south east, Anambra State to the south, Edo State to the south west, Ondo State to the west, Ekiti State to the west, Kwara State to the north west and Niger State to the north. The state is basically an agrarian one producing commodities such as coffee, cocoa, palm oil, cashews, groundnuts, maize, cassava, yam, rice and melon.

One of the Local Government Areas (LGA) in Kogi State., *Ogori-Magongo* was purposively selected for this study in the first of a three-stage sampling procedure. The community is located at coordinates 7°29′N 6°13′E, with headquarters at Akpafa. The LGA is populated by the *Ogoris* and *Magongos*. It occupies an area of 79 km² (31 sq mi) and has a population of 39,622 based on the 2006 census. The second stage is the random selection of two wards each in the Ogori (Eni and Okesi) and Magongo (Obatigben and Obinoyen) axes of the LGA. Thus, primary data was collected with the use of a structured questionnaire for socioeconomic and demographic information and for food and non-food expenditures. The final stage is the random selection of two hundred and four farming households from the four wards.

The principal analytical strategy adopted for this study involves the construction of a Food Security Index to ascertain the food security status of the respondents. This draws on [13] weighted poverty index which is one of the conventional approaches to assessing food security in a number of studies including [14] and [15] This approach defines the food security line as two-thirds of the mean per capita monthly food expenditure of all households. Households whose per capita monthly food budget equal or exceed this threshold are considered food secure while those whose per capita monthly food bill falls below this food security line are deemed food insecure. Additional to this framework, other analytical tools employed are descriptive statistics, a probit model .and significant coefficient.

Following [16], the FGT index is given as:

$$Z_\alpha = \frac{1}{N}\sum_{t=1}^{q} \frac{p - Rl}{p} \quad \alpha \geq 0 \tag{1}$$

Where

Ri = per capita household food spending (l = 1, 2,……..q);
p = Food security line;
N= Total population;
q= number of food secure households;
p_α = weighted food security index, α ≥0

A Probit regression model with a bivariate dependent variable which takes value 1 for food secure households and 0 otherwise was estimated. The model is specified as follows:

$$Y = \beta X_i + \varepsilon_i \tag{2}$$

where ε - N (0, 1). Then Y can be observed as an indicator for whether this latent variable is positive:

Y = (food secure=1, food insecure=0);
X = Vector of explanatory variables;
β = Coefficients;
εi = Random error;

The explanatory variables are:

X1 = Age of the farmer (years);
X2 = Gender of farmer (male=1, female=0);
X_3 = Membership of cooperative (yes =1, otherwise 0)
X4= Household size (number);
X5= Years of schooling of farmer (years);
X6 = Farming experience (years);
X7 = Farm size (hectares);
X8 = Access to extension agent (yes = 1, otherwise 0);
X_9 = Access to credit (yes = 1, otherwise 0);
X_{10} = household income (naira)
X_{12} = child dependency ratio (number)

3. RESULTS AND DISCUSSION

3.1 Socioeconomic and Demographic Characteristic of the Respondents

Age of respondents: Table 1 shows that most (48.33%) of the respondents were aged between 31 – 40years, while 24.71% were aged 41 – 50. This suggests a middle age workforce as only 6.2% were young (20-30 years) and 20.83% could be considered old (above 60 years). In general, this comprises mostly an active workforce with capacity to engage in jobs to earn income to feed their households.

Gender of the respondents: Majority (85.20%) of the respondents were male, while 14.80% were female. This is expected as most societies in Nigeria have a patriarchal household formation, being predominantly headed by males.

Educational level: Most (59.61%) of the respondents did not have any formal education. Surprisingly, 24.26% had tertiary education, suggesting a sample that is sharply divided between the non-educated and the highly educated. The dominance of non-literate headed households does not bode well for food security

in terms of knowledge and decisions on dietary choices, although the substantial very literate household heads could diffuse their presumed superior knowledge of improved farm practices and nutritional issues to other members of the community.

Farm experience: A significant proportion (about 44.2%) of the sampled household heads had farming experience of between 10-19 years, while over 50% had farming experience of 20 years and above. This indicates an experienced farming population. With considerable farming experience, the respondents would have acquired significant skills on-farm practices including innovative strategies to raise farm production which would impact on food security in the households.

Household size: A considerable (46.03%) of the respondents had household sizes of 3 to 6 persons while 34.36% had 7 to10 person households. This indicates a relatively large household size. The implication of this finding is that on one hand, the households may be faced with a high dependency ratio which reduces food portions available per person thereby undermining food security. On the other hand, the extra hands in the households may provide supplemental labour at the farm and therefore help to boost farm output. Thus, the net effect of the interaction of these two forces determines the households' food security status.

Monthly income: A great proportion (44.22%) of the respondents earns **N**100, 000 – N149, 999.00 monthly as income. This represents substantial cash inflow to the household in a month and this could influence food security in a positive way. Depending on the responsibilities of the household head, it may also afford incremental savings which could be invested in profitable ventures to augment family income.

Farm size: Over 60% of the respondents cultivated farm sizes of between 1 and 2.99 ha, while 26.6% had farm sizes of 3 ha and above. This indicates mostly small size farms. These small farms have a constraining effect on food production as it hardly rises above subsistence, which may weaken household food security status.

Access to credit: A vast majority (72.5%) of the respondents did not have access to credit, suggesting restricted access to loans for farming purposes. The high illiteracy among the sampled population coupled with a perceived lack of collateral securities constitutes inhibiting factors in securing loans. Again, non-access to credit would have a dampening effect on food production and threaten food security.

Membership of cooperative societies: Cooperative membership is quite high as 45.64% of the respondents indicated that they were members of cooperative societies, although over 54% do not belong to such society. Membership of cooperative societies confers certain benefits such as access to subsidized inputs which could stimulate greater food production and consequently impact positively on the households' food security.

Use of extension agents: The majority (65.74%) of the respondents had no access to extension agents during the farming season. The implication of this is that these farming communities may not have been exposed to knowledge about improved inputs and modern production techniques in the course of the season. This would invariably spur productivity losses, lessening production and jeopardising food security.

3.2 Determinants of Food Security among Farming Households in Kogi State

The result of the probit regression reported in Table 2 shows that all the regressors were significant determinants of the variation in food security status of households in the selected farming households at either 1% or 5% level of significance. Specifically, variables such as sex, age, level of education, farming experience, co-operative membership, access to extension agents, household size, access to credit, income and farm size were positively signed and significant while the child dependency variable was negatively and significantly correlated with food security.

The positive and significant coefficient on the gender variable indicates that the male-headed households had a higher probability of achieving food security relative to the female-headed households. This is likely because the male gender is not overly burdened by household chores and child-raising duties which is traditionally the purview of women and which affords time for the former to engage in more income earning ventures.

The positive and significant coefficient on the age variable suggests that as household heads

advance in age, the probability of achieving food security improves. This is plausibly because aging is associated with the longer stay in productive occupation and possibly the accumulation of considerable experience and income to meet the dietary needs of the household.

The positive association between education and the probability of becoming food secure is intuitive as higher levels of education improve the household heads' knowledge of food production and nutritional issues and enlighten them on the right dietary decisions which ultimately impacts on their food security situation.

Table 1. Socioeconomic and demographic factors influencing food security among farming households in Kogi State

Variables	Frequency	Percent
Gender		
Female	30.2	14.80
Male	173.8	85.20
Age		
20 – 30	12.5	6.13
31 – 40	98.6	48.33
41 – 50	50.4	24.71
Above 60	42.5	20.83
Educational status		
No formal Education	121.6	59.61
Primary Education	20.2	9.90
Secondary Education	12.7	6.23
Tertiary Education	49.5	24.26
Farming experience		
<10	11.9	5.83
10 – 19	90.2	44.22
20 – 29	49.3	24.17
Above 30	52.6	25.78
Cooperative membership		
Members	93.1	45.64
Non-Members	110.9	54.36
Use of extension agents		
access	69.9	34.26
No access	134.1	65.74
Households size		
< 3	18.3	8.97
3 – 6	93.9	46.03
7 – 10	70.1	34.36
Above 10	21.7	10.64
Access to credit		
Access	56.1	27.50
No access	147.9	72.50
Monthly income		
Less than 50,000.00	13.5	6.62
50,000 – 99,999.00	29.5	14.46
100,000 – 149,999.00	90.2	44.22
150,000 – 199,999.00	40.2	19.71
200,000.00 and above	30.6	15.00
Farm size		
<1ha	29.6	14.51
1 – 1.99	75	36.76
2 – 2.99	54.3	26.62
3 and above	45.1	22.11
Total	**204**	**100.00**

Table 2. Determinants of food security among farming households in Kogi State

Variable	Coefficient	Std error	t-statistic
Constant	0.48**	0.21	2.06
Gender of farmer	0.36***	0.09	3.77
Age of the farmer (household head)	0.61***	0.11	5.00
Years of schooling of farmer	0.14***	0.05	2.55
Farming experience	0.85**	0.36	2.12
Membership of cooperative	0.22***	0.05	3.71
Access to extension agent	0.73***	0.25	2.60
Household size	-0.47***	0.13	-3.29
Household income	0.21***	-0.44	4.16
Membership of cooperatives	0.22***	0.05	3.71
Child dependency ratio	-0.0002***	0.00	-3.37
Access to credit	0.59***	0.13	4.20
Log-likelihood = -67.5674			
Pseudo R2 = 0.4372			
Prob> Chi2 = 0.0000			

*Note: *** = significant at 1% ** = significant at 5%*

As expected, longer years of farming experience increases the prospect of food security. In general, greater farming experience would likely be accompanied by greater food production hence the positive relation between farming experience and household's food security.

The direct and significant correlation between membership of cooperative society and probability of attaining food security conforms to expectation indicating that belonging to cooperative is a positive force towards food security. This works through the benefits that accrued from such membership including better access to credit support, input subsidization and mechanization.

There is also a positive association between extension education and likelihood of realizing food security. This is via the knowledge and skills impacted through extension education on farming practices including the adoption of improved varieties of seeds and application of other inputs as well as technological innovation among others which have a direct bearing on farm output and by extension, on the probability of achieving food security in the farming households

The negative coefficient on the household size variable is consistent with foreknowledge. Higher household size exerts pressure on the household food budget and in the absence of expanded income generating capacity, or supplemental earnings coming from other members of the household, food security would be undermined.

The coefficient on the access to credit variable is also correctly signed and significant. Greater access to credit would empower farming communities with extra funds which they utilise to expand their farm enterprises or alternatively invest in other income-generating enterprises. The additional financial resources that arise from either or both activities would raise aggregate income and effective demand in the household, thereby raising the prospect of food security.

Intuitively, there is a direct relationship between household income and household food security. The positive and significant coefficient on this variable confirms this expectation. The implication of this finding is that the higher household income, by improving access to food and its better affordability, raises the probability that the household would be food secure. This finding is corroborated by [17,18]

The coefficient on farm size variable has the hypothesized positive sign and significant. The size of household farmland holding correlates positively with the likelihood of generating more food produces from this asset. Thus, if farm size is large, barring any unforeseen negative occurrence, the output of the farm would also be high, predisposing the household to reaching a food secure state. This does not negate the probability that greater production can emanate from smaller farm with greater efficiency and improved farm practices.

The coefficient on child dependency ratio is correctly signed and significant, indicating that

higher child dependency in the household diminishes the probability of attaining food security. This is because the more the child dependants within the household, the higher the possibility of reduced food rations and the poorer the nutritional status of the household.

4. CONCLUSION

The study assessed the determinants of food security among rural farming households in Kogi State of Nigeria and found that a number of variables including sex, age, level of education, farming experience, household size, income, membership of co-operative societies, access to extension agent, and access to credit and farm size had positive and significant effects on food security in the study area. The fact that a lower proportion of respondents belonged to cooperatives or had access to extension agents despite both having positive reinforcing effects on food security, calls for the intensification of extension activities in the area as well as the sensitisation of the farmers to the benefits of membership of cooperative societies. The positive effects of education also task the authorities to invest in formal and informal education for farmers through regular school attendance by younger farmers or through evening classes, adult literacy and distance learning programmes for older farmers. Similarly, access to credit through formal financial institutions should be further liberalized and constraints associated with collateral requirements should be alleviated for smallholder farmers, while the various credit intervention schemes of Nigeria's financial regulator should be expanded to benefit more farmers.

COMPETING INTERESTS

Author has declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
http://www.sciencedomain.org/review-history/24032