



EVALUATION OF THE FOOD SECURITY STATUS OF SORGHUM FARMERS IN SABON GARI LOCAL GOVERNMENT AREA, KADUNA STATE, NIGERIA

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ABSTRACT

The study was carried out in Sabon Gari Local Government Area of Kaduna State, Nigeria, to evaluate the food security status of sorghum farmers. Purposive and random sampling techniques were used to select four villages and the 143 sorghum farmers who were interviewed using a structured questionnaire. Primary data were analyzed using descriptive statistics, food security index and logit regression analysis. Socio-economic characteristics of the sorghum farmers revealed that the mean age was 44 years, 56.6% of them falling within the dominant age range of 40-49 years; educational level and farm sizes were generally low. The food insecurity line of ₦71,240.21 was determined for the sample yielding a food insecurity index of 70.6%. The regression analysis showed a positive relationship between food security status and educational level ($r=0.474$), household income ($r=2.196$), extension contact ($r=0.182$) and amount of credit ($r=0.650$). Major constraints including pests and diseases, inadequate capital and limited access to credit were identified and recommendations aimed at checking constraints and enhancing overall food security among sorghum farmers were proffered.

Keywords: Food Security; Status; Sorghum farmers

INTRODUCTION

Sorghum (*Sorghum bicolor* L.) is the fourth most important world cereal crop following wheat, rice and maize. It is a staple food in the drier parts of Africa, China and India, and is the most widely cultivated crop in northern guinea savannah zone of Nigeria (Abba *et al.*, 2004). The crop is environmentally friendly, requires little or no fertilizers or pesticides and is biodegradable (FAO, 1995).

About 50% of the total land area devoted to cereal crops in Nigeria is occupied by sorghum; the area estimated at 6.86 million hectares extends northwards from latitude 8°N to latitude 14°N (Abba *et al.*, 2004). In 1978, the total sorghum production in Nigeria was estimated at 4.8 million tones, but has risen tremendously to about 7.0 million tonnes annually (Obilana, 2005). Consequently, Nigeria has become the largest producer in the West African sub-region accounting for about 71% of the regional total sorghum output. Globally, also, Nigeria leads in sorghum production for human consumption, having moved from its 5th position in 1995 (FAO, 1995) to the third largest producer in the world after USA and India, where more than 90% of their sorghum harvest is used for animal feed (Okpeke, 2008).

Around the world, sorghum has been used to prepare many products. Essentially, sorghum has four different areas for classifying its value added products; human food, bio-ethanol, beer and animal feed. Regarding its importance to household food security, Taylor (2003) posited that sorghum and millet are vitally important cereals for the maintenance of food security in Africa. The same notion is supported by FAO (2008) that small grains are the answer to chronic food shortages of rural communities residing in semi arid regions especially of the sub-saharan region. This is because of their high level of adaptation to African conditions (Taylor, 2003). They represent about half the total cereal production on the continent and as such are a major source of protein for the population.

Food crops make significant contributions to the food security of rural population by providing a vast array of foods that supply essential nutrients to them (Monona and Agoi, 2007). Despite the importance of sorghum in household food consumption, very little is commercially processed; it is estimated that less than 3% of sub-Saharan Africa's sorghum production is used in the formal food and feed industries (Rohrbach, 2003). Sorghum is also a very valuable industrial crop for brewing drinks as well as in the baking and confectionary industry (Debrah, 1993). According to the National Research Council (NRC, 2008), sorghum has greater potential than any other crop. However, few studies have focused on the links between specific food crops and its impact on household food security. Therefore, this research has been prompted by the need to evaluate the food security status of sorghum farmers in Sabon Gari Local Government Area of Kaduna State, Nigeria. Based on the aforementioned research problems, this study tends to: describe the socio-economic characteristics of sorghum farmers in the area of study, evaluate the food security status of the sorghum farmers, determine the factors influencing the food security status of sorghum farmers in the study area and identify the constraints affecting the food security status of sorghum farmers.

MATERIALS AND METHODS

The Study Area

Sabon Gari Local Government Area is one of the 23 LGA's in Kaduna State, Nigeria. The LGA is located in the Northern guinea savannah ecological zone between latitude 11 ° to 12 ° north and longitude 7° to 8° east of the equator and shares boundaries with Soba, Zaria, Giwa and Makarfi Local Government Areas from the East, South, West and North respectively. With an estimated population of more than 393,300 (NPC, 2015), majority of the inhabitants are Hausas, the rest being non indigenes of various ethnics extraction including foreigners.

The area is characterized by wood land vegetation and underlying grass species, is 686 m above sea level, and characterized by two seasons; the dry and wet seasons (Raji, 2004). The area is predominantly rural and farming is the major occupation of the people and major crops grown include maize, sorghum, cowpea, groundnut and vegetables. Also rearing of livestock (cattle, sheep, goats) and poultry is common.

Data Collection and Analysis

A combination of purposive and random sampling techniques were employed to arrive at the sample size of the study. Firstly the local government area (Sabon Gari) was

purposely selected due to the predominance of sorghum farmers in the area. Secondly, four villages in the LGA were randomly selected and also random sampling was used to select 143 sorghum farmers representing 10% of the sample frame of 1430 sorghum farmers. Primary data were collected through the administration of a structured questionnaire consisting of both open and close ended questions. Data were analyzed using descriptive statistics, food security index and logit regression analysis (having the best fit).

The food security index was determined using the formular : $FSL = MHE \times 2/3$

Where PSL = Food Security Line

MHE = Mean Household expenditure (derived from the monthly mean per adult equivalent household expenditure)

The explicit logic model is expressed as:

| | | |
|---------------------------------|---|---|
| Y | = | Food security (1 = Food secure, 0 = Food insecure) |
| X ₁ | = | age of household heads (years) |
| X ₂ | = | Educational level (years) |
| X ₃ | = | Household size (numbers) |
| X ₄ | = | Farming experience (years) |
| X ₅ | = | Farm size (hectares) |
| X ₆ | = | Amount of credit (Naira) |
| X ₇ | = | Extension contact (number of visits) |
| X ₈ | = | Membership of cooperatives |
| X ₉ | = | Household income (Naira) |
| β ₁ - β ₉ | = | Coefficients for respective variables |
| μ | = | error term |

RESULTS AND DISCUSSION

Socio-Economic Characteristics of Respondents

Socio-economic characteristics of sorghum farmers highlighted in this study include age, educational attainment, household size, farming experience, farm size, membership of cooperatives, household income, extension contact and farm credit. The distribution of respondents based on these characteristics is shown in Table 1.

Age: The result in table 1 revealed that 57% of the sorghum farmers were within the age group of 40-50 years. This implies that most of the farmers were active, strong and agile and could participate effectively in sorghum production activities. These findings agree with those of Maurice (2004) and Yusuf (2009) who in their studies found majority of the farming families falling within this age group.

Educational attainment: On education, majority of the farmers (69.2%) had no formal education. Only 5.6% of the farmers had tertiary education while 25.2% had either primary (17.5%) or secondary (7.7%) education. The findings imply that most of the farmers had low educational attainment. These findings are similar to those of Babatunde *et al.* (2007) who found low educational attainment among their respondents contributing to food insecurity.

Household Size: The average household size for the sample was 8.6; majority of them (77%) had household size of 1-10 persons. About 15% of the farmers had family size of 11-20, while 7.7% had 20-30 persons. Evidence by Awopeju (2014) indicates that household size negatively influences food security and poverty status of Nigeria rural dwellers.

Farming Experience: Regarding the farming experience of the respondents, majority (73.4%) had 1-10 years and only 11 of them (7.7%) claimed to have been in farming for 20-30 years and only 11% of them claimed to have been farming for 20-30 years.

Farm Size: Small scale production was the dominant feature among the sorghum farmers in the study area hence 92.3% of them operated on less than 5 hectares. About 5% of them cultivated 6-10 hectares, while only 4 farmers (2.8%) cultivated more than 10 hectares. These findings are in agreement with those of Omuemu *et al.* (2012) who confirmed the dominance of small farm sizes in their study and affirmed its negative influence on food security.

Table 1: Distribution of sorghum farmers based on socioeconomic characteristics

| Characteristics | Frequency (N = 143) | Percentage (%) |
|----------------------------|------------------------|----------------|
| Age (years) | | |
| 20-29 | 13 | 9.1 |
| 30-39 | 43 | 30.1 |
| 40-49 | 81 | 56.6 |
| 50-59 | 6 | 4.2 |
| Mean | 44 | |
| Educational level | | |
| No formal education | 99 | 69.2 |
| Primary education | 25 | 17.5 |
| Secondary education | 11 | 7.7 |
| Tertiary education | 8 | 5.6 |
| Household size (numbers) | | |
| 1-10 | 110 | 77.0 |
| 11-20 | 22 | 15.3 |
| 21-30 | 11 | 7.7 |
| Mean household size | 8.6 | |
| Farming experience (years) | | |
| 1-10 | 105 | 73.4 |
| 11-20 | 28 | 19.6 |
| 21-30 | 10 | 7.0 |
| Mean farming experience | 8.9 | |
| Farm size (hectares) | | |
| 1-5 | 132 | 92.3 |
| 6-10 | 7 | 4.9 |
| >10 | 4 | 2.8 |
| Mean farm size | 3.4 | |

Source: Field survey (2015)

Access to Credit: Results indicated that as high as 92.8% of the farmers had no access to formal credit and had to rely on their meager savings. Conversely, only 7.2% of the farmers had access to formal credit. This was considered very dismal and could pose serious limitations to sorghum production as was affirmed by Babatunde *et al.* (2007) in their study among farming households in Katsina State.

Cooperative Membership: Regarding membership of cooperatives, 25.9% of the sorghum farmers did not participate in cooperative activities. Of the 74.1% who participated, majority (53.8%) had been in cooperative union for 1-5 years, 18% for 5-10 years and only 2.1% for 10-15 years. While commending their mass participation in cooperative activities, many did not seem to know much due to limited experience.

Extension Contact: A sizeable proportion of sorghum farmers in the sample (84.6%) had no contact with extension workers while only 15.4% had the opportunity to benefit from extension visits. This was considered very low and a potential limitation to increased sorghum production and enhancing food security. This position was supported by Anyanwu (2005) who in his study affirmed the vital importance of extension contact in increasing farm production and productivity.

Food Security Status of Sorghum Farmers

To determine the food security line for the sample, the study measured the well being of the sorghum farmers by their consumption expenditure and by their household size. That is, the food security line was calculated from the monthly mean per adult equivalent household expenditure (MAHE), and was expected to meet the monthly basic requirements (food and non-food) of an adult in the study area.

The expenditure per adult was derived by dividing each household expenditure on monthly basis by the adult equivalent. All this was summed up to give a total expenditure value of ₦15,205,000. The food security line value was derived by using two-thirds ($\frac{2}{3}$) of the mean household expenditure thus:

$$FSL = MHE \times \frac{2}{3}$$

Where FSL = food security line, MHE = Mean household equivalent

$$FSL = \frac{₦15,205,000}{143} \times \frac{2}{3}$$

$$= ₦106,328.67 \times \frac{2}{3}$$

$$= ₦71,240.21$$

Based on the established food security line of ₦71,240.21 for this sample, 101 households, representing 70.6% of the respondents fell under the food security line and were considered food insecure. On the other hand, 42 households representing 29.4% of the sample had household expenditure higher than ₦71,240.21 and were adjudged food secure. Details of the food security indices are shown in Table 2.

Table 2: Summary of food security indices for sorghum farmers in the area of study

| Food security status | Food Security Indices | | |
|--------------------------|-----------------------|------------|------------------------------------|
| | No of households | Percentage | Food insecurity gap (Sample index) |
| Food secure household | 42 | 29.4 | 0.13 |
| Food insecure households | 101 | 70.6 | 0.28 |
| Total | 143 | 100 | - |

Source: Field Survey (2015); Note: Recommended per capita daily calorie – 2260 Kcal

The result in Table 2 indicates that only 29.4% of the sorghum farming households was considered food secure with food insecurity gap of 0.13. Conversely, 70.6% were

considered food insecure with a food insecurity gap of 0.28. In summary, sorghum farmers in the area of study could be adjudged as food insecure considering the percentage that fell under the food security line. These findings are in agreement with those of Omuemu *et al.* (2012) in Edo State, Nigeria where over 62% of the respondents were considered food insecure.

Determinants of Food Security Status of Sorghum Farmers

To determine the major determinants of food security status of farming households sampled, their socio-economic characteristics were regressed against their food security indices yielding varying coefficients as shown in table 3.

Table 3: Determinants of food security status among Sorghum farming households

| Variable | Coefficients | Std. Error | T-value |
|------------------------|--------------|------------|---------|
| Constant | 23.935 | 25.600 | 0.933 |
| Age | -0.474 | 0.274 | -1.729 |
| Educational status | -26.335 | 25.640 | -1.027 |
| Household size | 0.452 | 1.105 | 0.409 |
| Farm size | 0.1850 | 0.392 | 0.497 |
| Extension contact | 0.182 | 0.417 | 0.436 |
| Cooperative membership | 0.149 | 0.306 | 0.487 |
| Farm credit | 0.650 | 0.286 | 2.273** |
| Household income | 2.196 | 1.159 | 1.895* |

Source: Survey data (2015); Note: * - significant at 10% ** - significant at 5%; $R^2 = 0.751$; R^2 adjusted = 0.623

The result of the regression analysis in table 3 indicated that seven variables, excluding age, were relevant in significantly influencing the food security status of farming households in the study area.

The coefficient of educational level was statistically significant at 10% implying that the higher the educational level of the household head, the more food secure (or less food insecure) the household tends to be. Similarly, the coefficient of household income was found to have positive influence of food security status. The variable had the expected sign and statistically significant at 10% suggesting that the higher the household income, the greater the probability of being food secure. This result is consistent with Babatunde *et al.* (2007) and Arene and Anyaeju (2010) who found positive and significant relationship between household income and food security in their respective studies.

The coefficient of access to credit was found to have positive influence in food security of farming households thus meeting a prior expectation. This implied that households that had access to credit had greater chance of being food secure compared to those who did not, all things being equal. This is in agreement with the findings of Pappoe (2011) who found that access to credit improved the food security status of farming households among bio-fuel producers in Central Region of Ghana.

Another variable of significant importance in influencing food security status of sorghum farmers was extension contact. The high proportion of the study sample (84.6%) who had limited extension contact obviously contributed to the poor food security status of the sorghum farmers. This position agrees with the findings of Anyanwu (2005) and

Okuneye (2002) who found poor extension contact contributing to food insecurity in their findings.

Constraints to Food Security among Sorghum Producers

The farmers were asked to indicate the constraints they faced in sorghum production which impinged on their food security status. The constraints are shown in table 4, ranked in order of severity.

Table 4: Production constraints faced by sorghum farmers

| Constraints | Frequency | Percentage | Rank |
|--|-----------|------------|-----------------|
| High cost of inputs, especially labour | 98 | 20.5 | 3 rd |
| Lack/inadequate capital | 107 | 22.4 | 2 nd |
| Pest and diseases | 74 | 15.5 | 5 th |
| Untimely availability of input | 112 | 23.4 | 1 st |
| Limited access to farm credit | 87 | 18.2 | 4 th |
| Total | 478* | 100 | - |

Source: Field survey (20); Note: *multiple response

The results in table 4 showed that untimely availability of inputs, inadequate capital and high cost of inputs ranked 1st, 2nd and 3rd respectively representing 23.4%, 22.4% and 20.5% of the sorghum farmers. Limited access to farm credit ranked 4th, while the incidence of pest and diseases ranked 5th. Evidently, the 2nd, 3rd and 4th constraints are related, having to do with financing sorghum farming activities. The issue of poor funding, especially as it relates to limited access to credit, is a major constraint to increased sorghum production since credit is a strong factor needed to acquire or develop any enterprises. This is in agreement with Omonona and Agoi (2007) and Sanusi *et al.*, (2006) who opined that poor access to credit, storage and marketing facilities, production inputs are important factors causing food insecurity in Nigeria.

CONCLUSION

It could be concluded that sorghum farmers in the study area were food insecure. This followed the analysis of the data generated which established a food security line of ₦71,240.21 for the sample, yielding a food insecurity index of 70.6%. In other words, only 29.4% of the sorghum farmers in the study sample were adjudged to be food secure. Given the position of sorghum as an important staple food in the country, any attempt at increasing its production will be a veritable step towards the resolution of food insecurity in Nigeria.

Farm inputs should be made available on time to enable farmers plant early and carry out requisite operations to ensure high yield. Adequate provision of credit to enable farmers purchase inputs and pay for services. Deploying more extension workers to help

fight against pest and disease infestation as well as advising farmers on improved sorghum production technologies.

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