Agricultural Journal 3 (3): 235-240, 2008
ISSN: 1816-9155

Cereals and Farming Households' Food Security in Kwara State, Nigeria

A. Muhammad-Lawal and O.A. Omotesho
Department of Agricultural Economics and Farm Management,
University of Ilorin, P.M.B. 1515, Ilorin, Nigeria

Abstract: This study was designed to highlight the place of cereals in farming household food security in Kwara State. A three stage random sampling technique was used to collect primary data from 74 households distributed across the study area. Analytical tools used include descriptive statistics and indices of food security. The study shows that more than 60% of the total households in the study area are food in secure. Cereals provide 34% of the farming household total calorie intake and 47% of protein supply, respectively. In view of its importance to food security, this study suggests the need for increased domestic cereal production.

Key words: Cereals, household, food security line, Kwara State, Nigeria

INTRODUCTION

In Nigeria, agriculture contributes more than 30% of the total annual GDP, employs about 68% of the labour force, accounts for over 70% of the non-oil exports and provides over 80% of the food needs of the country. Therefore, Nigerian agriculture is one of the important sectors of notable relevance in economic development and growth. This is partly because food retains its position as the basis for human existence (Adegboye, 2004).

Food is a basic necessity for the existence of man. Food in the appropriate quantities and quality is required for a healthy and productive life (Ajibola, 2000). The importance of cereals in their relationship to world food and live stock feed can hardly be over emphasized (Metcalfe and Elkins, 1980). All over the world, cereals have become the foundation of world food security. Not only do they constitute the basic food of most of mankind; they have become a tool of international politics and control and a very vital factor of economic growth (Awoyemi *et al*., 1986). Cereals constitute the primary component of major local food preparation and raw materials in the production of livestock feeds and breakfast cereals. They have also found industrial uses in the beverage, baby food, pharmaceutical and soft drink industries in Nigeria (Akande, 1999).

Cereals were the single most important source of food supply in Nigeria. In both 1985 and 1995, they accounted for almost 50% of the total food supply in grain equivalent (Olayemi, 1998). Rice, maize and sorghum constitute the major sources of energy staple food availability and affordability (Maziya-Dixon *et al*., 2004).

Nigeria has a total land area of 924, 000 km^{-2} or 98.3 million ha; 75% or 73.7 million hectares of this are considered to be suitable for cultivation. Crops occupy nearly 34% or 25 million hectares of the area devoted to cultivation. Out of this, cereals alone occupy 52% or 13 million hectares with a combined production figure of 15.303 million tonnes in 1989 (Wudiri, 1992).

Botanically, a cereal is generally defined as grass grown for its small, edible seed. Cereals are those members of the grass family, the Graminae, grown for their characteristic fruit, the caryopsis, which has been the most important source of the world's food for the last 10, 000 years (Onwueme and Sinha, 1999). There are 9 principal kinds of cereals, though, each kind may in practice include several species and each specie may be sub-divided into hundreds of modern cultivars and thousands or tens of thousands of ancients' primitive varieties or land race. These are wheat, rice, maize, barley, sorghum, the millet (including teft from Ethiopia), rye, oats and triticale (Tudge, 1988). The most important cereals grown in Nigeria are sorghum, millet, rice, maize, sugar cane and wheat (Wudiri, 1992). Oguntunde (1989) reported that maize, sorghum and millet to constitute the majority of the cereals grown in the country while rice, soft wheat and acha constitute the minor cereal grains.

The significance of cereals to modern society is clearly reflected in the importance of cereals in the diet

Corresponding Author: A. Muhammad-Lawal, Department of Agricultural Economics and Farm Management, University of Ilorin, P.M. B. 1515, Ilorin, Nigeria

throughout the world. In much of Asia and Africa, cereal products comprise 80% or more of the average diet, in central and Western Europe, as much as 50 and in the United State, between 20 and 25%. As a group, cereals are the most important cultivars in terms of area harvested, tonnage, caloric and protein contribution and dominate the agricultural system. World wide, they account for approximately 50% of total per capita calorie supply and 45% of per capita protein supply. They are the most widely adapted crop species. They can be grown under adverse conditions with at least some yield. This broad range of adaptation, the efficiency of production and the ease with which cereals can be stored make them a dependable source of food. Indeed, cereals are the dietary mainstay of man kind and as such will continue to play a key role in food production strategies for the future (Gallagher, 1984; Pierce, 1990; Onwueme and Sinha, 1999).

There are several uses of cereals in the Nigerian economy, the domestic production of most of them has however lagged behind demand especially since late 1970's when Nigeria had to resort to major imports of grains notably maize, rice and wheat to shore up grain availability (Akande, 1999). Aggregate cereal demand and supply balances for African countries, assuming a continuation of present trends in economic, agricultural and population growth, however, show an increase in the required cereal imports by 2020 from 9-27 million metric tons. Given the likely difficulties in mobilizing the necessary resources to finance imports and the for the local availability of food, this scenario would unavoidably lead to a deterioration of the food security situation in Africa (International Food Policy Research Institute, 1995).

Objectives of the study: The main objective of this study is to examine the place of cereals in farming household food security.

The specific objectives are:

- To determine the extent and magnitude of farming household food security in the study area.
- To examine the importance of cereals to farming household food security in the study area.
- To make appropriate recommendations based on the research findings.

MATERIALS AND METHODS

Area of study: This study was conducted in Kwara State of Nigeria Kwara State with a total of 16 Local Government Areas has a population of 1, 566, 469 and a total land size of 3682500 ha (NPC, 1991; FOS, 1995). Kwara State is located between latitudes 7°45 and 9°30 and longitude 2°30 and 6°25'E. The topography is mainly plain to slightly gentle rolling lands. The annual rainfall ranges between 1000 and 1500 mm. Average temperature ranges between 30 and 35°C. It also has an estimated figure of 203, 833 farm families with the majority living in rural areas.

Kwara State is divided into 4 zones by the Kwara State Agricultural Development Project (KWADP) in consonance with ecological characteristics, cultural practices and project's administrative convenience (KWADP, 1996). The zones are as follows:

Zone A: Baruteen and Kaima Local Government Areas.
Zone B: Edu and Patigi Local Government Areas.
Zone C: Asa, Ilorin East, Ilorin South, Ilorin West and Moro Local Government areas.
Zone D: Ekiti, Ifelodun, Irepodun, Offa, Oyun, Isin and Oke-Ero Local Government Areas.

The population for this study comprise of all farming households in Kwara State. A 3-stage random sampling technique was used in selecting the sample for this study. The first stage involved a random selection of zone C out of the 4 agricultural zones in Kwara State. Stage 2 involved a random selection of nine villages in each of the 5 local government areas that make up the zone. Out of the 45 villages selected responses from only 30 were found useful for this analysis. The third stage involved a random selection of 3 households in each of the selected villages. Out of the 135 households selected for this study, only 74 supplied complete data that could be analyzed.

The data used in this study were obtained from both the primary and secondary sources. The main instrument used for collecting primary data in this study was a well-structured questionnaire.

The secondary sources of data used for this study include annual reports and articles whether published and unpublished.

Methods of data analysis: To measure household food security, a food security index was constructed. This involved 2 steps: identification and aggregation. Identification is the process of defining a minimum level of nutrition necessary to maintain healthy living-the food security line for the population under study, below which households are classified as food-insecure. Aggregation on the other hand derived food security statistics for the households (Makinde, 2000).

The nutrients content of both produced and purchased food items are used to estimate both calorie and protein availability to the household.

For the purpose of this study, a daily recommended level of 2470 kcal and 65 g of protein per capita per day defines the food security line.

Food security index:

$$Z = \frac{\text{Household's daily per capita calorie or protein availability (A)}}{\text{Household's daily per capita calorie or protein requirement (I)}}$$

For the purpose of this study, a household is defined as a group of people living together and eating from the same pot.

Based on z, several food security measures are calculated; the shortfall/surplus index, p is given as:

$$p = \frac{1}{M}\sum_{j=1}^{m} Gj$$

where, Gj = (Xj-I)/I is the deficiency (or surplus faced by household j, Xj is the average daily calorie or protein available to the jth household while M is the number of households that are food secure (for surplus index) or food insecure (for shortfall index). It measures at the aggregate level, the extent to which households are below or above the food security line. In implementing food security policies and programmes, the values of the index could be monitored over time and compared among different groups of the population.

The Head count ratio (H) is defined as:

$$H = \frac{m}{N}$$

Where,

m = The number of the food-insecure members of the sample population.

N = Sample population.

Basic descriptive statistics was employed to highlight the importance of cereals to food security. This was through the determination of the percentage contribution of cereals to household food production, food availability, food demand and nutrient intake.

RESULTS AND DISCUSSION

Following the identification and aggregation procedures outlined in the methodology for this study the results on the extent and magnitude of farming household food security in the study area are as shown in Table 1.

Table 1: Indices of farming household food security

	Households		
	Food-secure	Food-insecur	All
Percentage household	37.84	62.16	100
Mean household size (adjusted)	5.77	7.48	6.84
S.D	3.29	3.38	3.43
Household daily calorie requirement (kcal)	14253.66	18482.01	16882.12
Household daily calorie Availability (kcal)	30485.70	16525.64	21812.83
Household daily per capita calorie availability (kcal)	5282.83	2208.54	3190.67
Household daily protein requirement (g)	375.10	486.37	444.27
Household daily protein availability (g)	581.00	274.61	389.78
Household daily per capita protein availability (g)	100.68	36.7	57.14
Food security index (z):			
Mean energy	2.30	0.89	1.42
S.D	0.9	0.36	0.92
Mean protein	1.72	0.55	0.995
S.D	0.88	0.19	0.80
Headcount ratio (H)	0.32	0.68	
Shortfall/surplus index (p)			
Energy	1.3	0.115	
Protein	0.74	0.46	

Source: Field Survey, 2003

Daily per capita calorie and protein availability was estimated by dividing the estimated daily calorie or protein supply to the household by the household size adjusted for adult equivalence using the equivalent male adult scale weights in Appendix I. Household protein or calorie availability was estimated using food nutrient composition in Appendix II.

Food security indices for both protein and calorie; headcount ratio and the shortfall index have been summarized in Table 1 separately for households that are food secure and those that are food-insecure. The reason for using multiple indices is to provide a basis for examining the extent of food insecurity among farming households from different perspectives.

As shown in Table 1, even though the aggregate household daily calorie availability exceeded the minimum requirement, the study area could still be classified as food insecure because the daily protein availability per capita was less than minimum requirement. Nonetheless, 38% of the households are food-secure with an average daily per capita calorie and protein supply of 5282.83 kcal and 100.68 g, respectively.

The headcount ratio shows that 32% of the individuals in the study area were food-secure and 68% were food-insecure. This shows that more than 2/3 of the study area were subsisting on less than daily per capita calorie and protein requirement.

The shortfall/surplus index (P) which measures the extent of deviation from the food security line shows that while those that are food secure exceeded the minimum daily per capita calorie and protein requirement by 130 and 74%, respectively, the food-insecure households fell short of the minimum daily per capita calorie and protein requirement by 11.50 and 46%, respectively.

The place of cereals in farming household food security

Household food crop production: The importance of cereal to farming household food crop production is highlighted as in Table 2.

As shown in Table 2, cereals constitute 33.33% of an average household food crop production per annum cereals here include mainly maize, sorghum and millet. They next to cassava which constitutes more than 1/3 of the average farming household food crops production.

Household food availability: Cereals were the single most important food crops in Nigeria (Olayemi, 1998).

Table 3 shows the contribution of cereals to farming household food availability.

Table 3 shows that cereals which comprise rice, maize, sorghum and millet constitute about 34% of the total food availability from both household own food production and household food purchases. They ranked next to yam and cassava both of which account for about 60% of the available food. Cereals, cassava and yam must therefore, be accorded necessary consideration in any effort at enhancing food security in the study area.

Household food demand: The contribution of cereals to farming household food demand is as presented in Table 4.

Table 2: Annual Farming household food crop production

Crop	Grain equivalent (kg)	Percentage
Maize	975.78	21.76
Sorghum	517.28	11.53
Millet	1.918	0.04
Yam	798.76	17.81
Cassava	2009.22	44.80
Cowpea	134.53	3.00
Groundnut	47.37	1.06
Soyabean	0.126	0.003
Total	4484.98	100.000

Source: Field survey, 2003

Table 3: Annual average farming household food availability

Food item	Grain equivalent (kg)	Percentage
Maize	398.22	18.01
Sorghum	237.65	10.75
Rice	110.82	5.01
Millet	1.48	0.07
Yam	319.86	14.46
Cassava	845.65	38.24
Gari	45.30	2.05
Cassava flour	95.55	4.32
Yam flour	28.03	1.27
Cowpea	76.50	3.46
Groundnut	5.40	0.244
Soyabean	0.116	0.005
Beef	39.63	1.79
Fish	7.128	0.322
Egg	0.202	0.009
	2211.536	100.000

Source: Field Survey, 2003

Table 4: Annual average farming household food dfemand

Food items	Grain equivalent (kg)	Percentage
Rice	100.37	27.95
Maize	15	4.18
Sorghum	14.77	4.11
Gari	45.99	12.81
Cassava flour	95.52	26.60
Yam	0.60	0.17
Yam flour	27.72	7.72
Cowpea	12.18	3.39
Beef	39.63	11.04
Fish	7.128	1.99
Egg	0.202	0.06
	359.11	100.000

Source: Field survey, 2003

Table 5: Estimated average daily household calorie and protein availability

Food item	Estimated daily calorie supply (kcal)	Percentage of total calorie supply (%)	Estimated daily protein supply (g)	Percentage of total protein supply (%)
Maize	3927.62	18.01	98.19	25.19
Sorghum	2343.95	10.75	66.97	17.18
Rice	1093.04	5.01	18.74	4.81
Millet	15.59	0.07	0.42	0.11
Cassava	8340.69	38.24	55.61	14.27
Yam	3154.85	14.46	57.36	14.72
Yam flour	276.50	1.27	3.46	0.89
Cassava flour	942.51	4.32	5.54	1.42
Gari	446.81	2.05	2.63	0.68
Soyabean	1.24	0.006	0.10	0.03
Cowpea	754.55	3.46	48.02	12.32
Groundnut	53.22	0.24	2.23	0.57
Beef	390.95	1.79	25.59	6.57
Fish	70.31	0.32	4.69	1.20
Egg	1.99	0.01	0.23	0.06
Total	21812.82	100.00	389.78	100.00

Source: Household available food analysis, 2003 using food nutrient composition adapted from Appendix II

Table 4 shows that cereals constitute more than 1/3 of the average household's food purchases in grain equivalent. As such increase in the prices of cereals especially rice could pose serious threat to food security in the study area. The largest proportion of rice consumed by the household is imported from South-East Asia and America this in itself is a serious threat to food security in Nigeria at large, since domestic rice production is almost comatose.

Contribution of cereals to nutrient intake: Cereals constitute about 44% of calorie the average household per capita calorie intake and the most important source of protein in Nigeria (Olayemi, 1998). The contribution of cereal to daily household calorie and protein availability is presented in Table 5. As shown in Table 5, cereals constitute a major source of calorie and protein availability in the study area. They constitute 33.84% of the daily household total daily calorie supply which is next only to yam, cassava and their products which account for about 60% of the household total daily calorie supply. They also supply about half of the total farming household protein supply in the study area. As such, the importance of cereals to food security cannot be over emphasized.

Appendix I: Equivalent male adult scale weights to determine adjusted household size

Age category	Male	Female
Under 1yrs	0.00	0.00
1–4.9yrs	0.25	0.20
5–9.9yrs	0.60	0.50
10–14.9yrs	0.75	0.75
15–59.9yrs	1.00	0.90
60 and Above	0.80	0.65

Adopted from Falusi, AO. (1985): Socio economic factors influencing food nutrient consumption of urban and rural households. A case study of Ondo State of Nigeria. Nigerian Journal of Nutritional Sciences. 6 (2): 52.

Appendix II: Nutrient composition

Food items	Energy (Kcal kg^{-1})	Proteins (g)
Maize	3600	90
Rice	3500	60
Millet and sorghum	3500	100
Cowpea.	3300	210
Ground nut	5500	230
Soyabean	4000	330
Cassava, fresh	1500	10
Cassava flour	3400	20
Yam, fresh	1100	20
Yam flour	3200	40
Beef	2250	147.29
Fish	1320	87.98
Egg	938	110

Adopted from Deville de Goyet, C., J. Seaman and U. Geifer, The management of nutritional emergencies in large populations. WHO Geneva, 1978, p: 88.

CONCLUSION AND RECOMMENDATIONS

This study shows that in spite of the abundant calorie availability in the study area, the area of study could be classified as food-insecure in view of the fact that the average protein availability to the area is less than the minimum per capita requirement.

At household level, the study shows that the majority of the households are subsisting on less than the minimum required calorie and protein per capita per day.

On the place of cereals in farming household food security, the study shows that cereals constitute 33% of the average household food crop production; 34% of the total food availability; more than 1/3 of the average household food purchases; 33.84 and 47.29% of the average farming household calorie and protein supply in the study area, respectively.

The study shows that cereals play a significant role in food security in the study area and that any variation in cereals production and supply to the area has a major effect on farming household food security in the study area.

Farmers should be encouraged to increase their cereals production by providing appropriate incentives and security to risks in production. This is in view of the role of cereals in agricultural production and household food consumption.

Apart from ensuring a food security, increased cereals production especially domestic rice production will provide more employment opportunities for the unemployed citizens long term in the country. This is in view of the importance of cereals especially rice in household food demand.

Farmers should be encouraged to increase their food crop production. This is necessary for increased per capita food availability that is a necessary condition for food security.

REFERENCES

Adegboye, R.O. and Land, 2004. Agriculture and Food Security in Nigeria. Faculty Lecture Delivered at the Faculty of Agriculture, University of Ilorin.

Ajibola, O., 2000. Institutional Analysis of the National Food storage Programme Research report 23 Development Policy Centre, Ibadan.

Akande, S.O., 1999. Agro-Ecological Competitiveness in the Production of Food Grains in Nigeria. Poverty Alleviation and Food Security in Nigeria. Fabiyi, Y.L. and E.O. Idowu (Eds.). Nig. Assoc. Agric. Econ., pp: 207-215.

Awoyemi, O., K.A. Ayotade, J. Fajemisin, C.E. Ago and O. Adenola, 1986. Meeting the Challenge of cereal self-sufficiency in Nigeria with Special Reference to Rice, Maize and Sorghum. Proceedings of the 4th Joint National Accelerated Food Production Project/ National Agricultural Development Committee Workshop Adenola O.A, B.A. Okobaroh and I.O. Fatoba (Eds.). Held at the National Cereal Research Institute, Moor Plantation, Ibadan. National Rice/ maize Centre (NAFPP). Moor Plantation, Ibadan, pp:13-14.

Gallagher, J.E., 1984. Cereal Production Butterworth and Co. Ltd.

International Food Policy Research Institute, 1995. A 2020 Vision for Food, Agriculture and the Environment in Sub-Saharan Africa. Badiane, O. and C.L. Delgado (Eds.). Food, Agriculture and the Environment Discussion Paper 4. International Food Policy Research Institute.

Wudiri, B. B., 1992. Recent Development in Cereal Production in Nigeria. Lawani, M.S. and T. Babaleye (Eds.). IITA, Ibadan pp: 13-15.

Kwara State Agricultural Development Project (KWADP), Agronomic Survey Report for the year, 1996.

Makinde, O.K., 2000. Determinants of food security in bauchi area of Northern Guinea Savanna of Nigeria. Unpublished Ph.D. Thesis, University of Ibadan.

Maziya-Dixon, B., I.O. Akinyele, E.B. Oguntona, S. Nokoe, R.A. Sanusi and E. Harris, 2004. Nigeria Food Consumption and Nutrition Survey 2001-2003 Summary. IITA, Ibadan.

Metcalfe, S.D. and D.M. Elkins, 1980. Crop Production: Principles and practices Macmillan Publishing Co. Inc. New York, Collier Macmillan Publisher, London.

Olayemi, J.K., 1989. Food security in Nigeria. Research Report No 2. Development Policy Centre, Ibadan.

Oguntunde, A.O., 1989. Traditional Convention Foods from Major Nigerian Cereal Grains Nig. Food J., 7: 59-61.

Onwueme, I.C. and T.D. Sinha, 1999. Field crop Production in Tropical Africa Technical Centre for Agriculture and Rural Cooperation (CTA).

Piece, T. J., 1990. The Food Resource. Longman Group UK Ltd., John Wiley and SonsInc New York.

Tudge, C., 1988. Food Crops For The Future Basil Blackwell Ltd., Oxford U.K.