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Analysis of Household Consumption of Cereals in Owerri Municipality, Imo State, Nigeria

C.S. Onyemauwa, M.A.C.A. Odii, J.I. Lemchi, C.C. Eze,
U.C. Ibekwe and C.A. Emenyonu
Department of Agric-Economics, Federal University of Technology,
P.M.B. 1526, Owerri, Nigeria

Abstract: The broad objective of the study was to carry out an analysis of household consumption of cereals in Owerri Municipality of Imo State. Data were collected with questionnaire from 12 respondents randomly selected from each of the 5 villages that make up the only autonomous community in the area, Owerri Nchi Ise autonomous community. The sampling frame was obtained from the National Population Commission. Sixty respondents in the area were sampled. Data were analyzed using descriptive statistics and ordinary least squares multiple regression technique. The results show that cereals are consumed in the area mainly in processed forms; noodles, spaghetti and macaroni were most popular with consumers in the area. The survey results show that about 16% of monthly income of an average household was spent on cereal consumption as against about 10% of monthly income spent by them on substitutes. *Garri* was identified as the major substitute consumed in the sampled households. The findings of the study show also that the price of substitutes; household size and household income were the statistically significant determinants of the quantity consumed of cereals in the area. The variables have positive coefficients, which imply that an increase in their value will result to an increase in the quantity consumed of cereals in the area and vice versa. The result shows further that the sampled households have a high marginal propensity to consume, which imply that they spent a high percentage of their income on consumption.

Key words: Determinants, household, income, consumption, cereals, substitutes

INTRODUCTION

An understanding of household consumption behaviour is important in household income and expenditure planning in Nigeria. Such information is needed to guide producers, consumers and programme planners in the country in decision making. Gwartney *et al*. (1990) saw consumption as a flow concept and defines it as household spending on consumer goods and services during the current period. Consumption is the ultimate goal in the production, improvement and supply of food crops. Food consumption is the sum of food production and food imports less food exports (EarthTrends, 2003). Food consumption occupies a central position among household consumption goods. Food demand by households in Nigeria, which has been on the increase, has not been met (Ladele and Ayoola, 1997). Cereal is one of the important food crops consumed in different households in different processed and unprocessed forms. According to Wikipedia (2006), cereal grains are grown in greater quantity worldwide than any other type of crop. Previous researchers identified some of the factors that can affect household food consumption. Akande (2002) asserted that urbanization appears to be the most important cause of the shift in consumer preferences towards rice in Nigeria; while Ojo (1991)

Corresponding Author: C.S. Onyemauwa, Department of Agric-Economics, Federal University of Technology, P.M.B. 1526, Owerri, Nigeria

remarked that income profile affects food consumption because of its inadequacy. Duncan (1992) observed that increasing women's share of income results in a higher marginal utility for household food consumption and other investments in the quality of human capital than income from other sources. Anderson *et al*. (1997) identified urbanization as one of the factors that contribute to changes in the types of food demanded. According to them, migration and population growth are significant positive determinants of household food consumption. The case of Nigeria is not likely to be different with respect to these identified factors. Studies show that with an official growth rate of 2.5% per annum, the population of Nigeria is one of the largest in the less developed countries of the world (Ojo, 1991).

Cereals are one of the major food crops grown and consumed in Nigeria. It constitutes about 43% of total calorie intake in the country (FAO, 2001). Domestic cereal output in Nigeria over the years has been less than domestic requirement and the difference has been met by importation. According to FAO (2005), cereal imports in Nigeria have trended upwards in recent years, due mainly to high urban population growth and changing consumption pattern in the country. Continuing, the report opines that domestic cereal output in Nigeria in 2004 was 21.42 million tonnes while domestic requirement was 25.10 million tonnes. The report shows also that in 2003 about 3.9 million tonnes of cereals were imported to complement local production. Akande (2002) reported that since the mid 1970s Nigeria spent over three hundred million US dollars (US$300 million) annually on rice imports alone. while the report of Anderson *et al*. (1997) reveal that the projected average availability of about 2,300 calories of food per person per day in Sub-Saharan Africa is just barely above the minimum required for a healthy and productive life. According to them, since available food is not equally distributed to all, a large proportion of the region's population is likely to have access to less food than needed. With respect to the report above, the case of Nigeria is not likely to be different. If this trend continues, Nigeria consumers may be liable to food insecurity. In addition, it may lead to negative balance of payment position of Nigeria due to huge foreign exchange spent on cereal importation in the country. A relevant study on consumption such as this is important in this regard.

Previous studies on cereals were focused on its economics of production and marketing as well as the agronomic aspects of the crops (Maji *et al*., 2003; Okoronkwo, 2003; Owa *et al*., 2003; Alechenu and Ogunwolu, 2004; Adeyemo *et al*., 2004; Ajoku, 2003). No previous study in the state has analyzed cereal consumption and its determinants among different households in Owerri municipality, which is the centre of the state capital. This is a cause for serious concern to agricultural programme planners, policy makers and other stakeholders in the state. The result of this study may provide a good reference material in this regard. The specific objectives of the study are to describe the socio-economic characteristics of cereal consumers identified for the study and their relationship with cereal consumption, identify the cereals available in the study area and the quantity consumed of them in the area, identify the factors that affect the consumption of the sampled cereals and estimate the marginal propensity to consume cereals in the area.

MATERIALS AND METHODS

Study Area

The study was conducted in Owerri Municipal Local Government Area (LGA) of Imo state, Nigeria. The choice of Owerri Municipality for this study was purposive due to its cosmopolitan nature. This is the only LGA in the state that has only one town, Owerri Municipal town and one autonomous community, Owerri Nchi Ise. The LGA has 5 villages namely Ama Awom, Umu Odu, Umu Onyeche, Umu Ororonjo and Umu Oyima. All these villages are urbanized with high percentage of non-indigens. Owerri Municipality is bounded by Mbaitoli LGA to the North, Owerri North LGA to the West, Owerri West LGA to the South and Aboh-Mbaise LGA to the East

(IMLSUP, 1991). Owerri Municipal has a population of 937,042 people (NPC, 2006). The LGA has one large central market, the Eke Ukwu market. This is a daily market and destination point of most agro and agro-based products within and outside the state.

Sampling Procedure

The choice of Owerri Municipality for the study was purposive; moreover, the researcher has spent greater part of his life in the area. This, coupled with the cosmopolitan nature of Owerri Municipal, eliminated language barrier that could have erupted between the researcher and the respondents. The inclusion of respondents in all the five villages that make up the Municipality was purposive too. This was to obtain a comprehensive data upon which relevant generalizations and inferences could be drawn. From the five selected villages, list of households compiled by the National Population Commission were used to draw samples. From this list, random samples of twelve households were selected from each of the five villages. Sixty consumption households were, therefore, used for the study.

Data Collection

The collection of data used for this study lasted for five months, from March to August 2007. Primary data were used for the study. Questionnaire was used as the data collection instrument during each visit to the households. Women provided most of the information. Data were collected on the socio-economic characteristics of the consumption households. The data include the sex and age of respondents, their household size, occupation and level of education attained (measured by the number of years spent in school). Data collected on household consumption pattern include the type of cereals consumed, the quantity and form in which the cereals are consumed and the prices of cereals consumed. Data were equally collected on the type, quantity and prices of substitutes consumed by the households during the survey period. Relevant data on the factors that affect household cereal consumption as well as the proportion of household income spent on cereals and non-cereals, respectively were collected too.

Statistical Analysis

Data were analyzed using simple descriptive and quantitative techniques as they affect the various specific objectives. Measures of central tendency such as mean, mode, frequency distribution, percentages and tabulation were used to analyze objectives 1 and 2. Ordinary Least Squares Multiple Regression (OLSMR) technique was used to achieve objective 3 while objective 4 was analyzed from the result of OLSMR technique. Within the context of this study, a cereal consumption model is stated implicitly thus;

$$Q = f(X_1, X_2, X_3, X_4, X_5, X_6, e)$$

Where:

Q = Mean quantity consumed of cereals (kg)
X_1 = Mean price of cereals consumed (N)
X_2 = Mean price of substitutes (N)
X_3 = Mean household size (No. of persons)
X_4 = Mean household income (N)
X_5 = Form of cereals consumed (processed = 1; unprocessed = 0)
X_6 = Age structure of household (aged = 1; young = 0)
e = Disturbance term

Note: aged is = 21 years old
young is <21 years old

Four functional forms namely, linear form, semi-logarithmic form, double logarithmic form and exponential form, were fitted into the consumption function specified above. The form that satisfies some statistical, economic and econometric criteria was chosen as the lead equation and used for analysis (Olayemi, 1998).

RESULTS AND DISCUSSION

Socio-economic Characteristics of the Respondents

The result of Table 1 shows that 71.67% of the respondents were female while 28.33% of them were male. The greater percentage of women relative to men respondents as shown in Table 1 is because most of the men approached for responses referred the researcher to their wives when they learnt that the subject matter was household consumption. This is a confirmation to a general belief that food matters in the area are affairs of women.

The Table 1 shows that the modal class of the age of the respondents is 43-48 years and 31.68% of the respondents belong to this category while 23.33% representing 14 respondents belong to the 49-54 age class. On the aggregate, about 55% of the respondents were between 43-54 years of age as against 13.33% of them who are between the ages of 25-36 years. The result shows that greater percentage of the respondents were in their middle-age class. This is an active age class in terms of energy and nutrient requirement. Cereals have a lot to do in this regard. They are likely, therefore, to consume significant quantities of cereals in their households. The results on the household size (number of persons) of the sampled households is presented in Table 1. The results shows that 36.67% of the respondents have a household size of 4-6 persons while 41.67% of them have 7-9 persons in their households. The Table 1 shows that about 78% of the respondents, on the aggregate, have between 4 and 9 persons in their households. On mean basis, the respondents have 6 persons per household.

Comparing the age of the respondents (parents) and that of their household size, it could be deduced that majority of the children of the respondents are still in their tender age. People in this age class are believed to consume greater quantities of cereals than any other type of food. Accordingly, a significant percentage of their household income is likely to be spent on cereals. One of the major factors that may affect decision making of individuals with respect to the type and quality of food they eat is their level of education attainment. This is consistent with the findings of Behrman and Wolfe (1984) who observed that education was not only an important policy instrument but is also a crucial variable in studies of food demand, the exclusion of which will bias income response upwards. Based on this, data were obtained on the level of education attained (as measured by the number of years spent in school) by the respondents. The Table 1 shows that 3.33% of the respondents spent

Table 1: Socio-economic features of the respondents

Variables		Frequency	Percentage
Gender	Male	17	71.67
	Female	43	28.33
Age (years)	25-30	3	5.00
	31-36	5	8.33
	37-42	11	18.33
	43-48	19	31.67
	49-54	14	23.33
	55-60	8	13.33
Household size (years)	1-3	9	15.00
	4-6	25	41.67
	7-9	22	36.67
	10-12	4	6.67
Level of education (years)	1-6	2	3.33
	7-12	16	26.67
	13-18	29	48.33
	19-24	13	21.67

Table 2: Household consumption of cereals by respondents

Food items	Mean Qty consumed (kg)	Amount (₦)	Percentage of monthly income
Rice	16.98	2037	3.71
Maize	15.00	3375	6.14
Noodles plus others	10.08	3600	6.55
Total	42.06	9012	16.55

between 1-6 years to acquire formal education, 26.67% of them spent 7-12 years in school, 48.33% of them spent 13-18 years in school while 21.67% of them spent 19-24 years to obtain formal education. The result shows that 75% of the respondents, on the aggregate, spent 7-18 years to obtain formal education. This is an indication of a well-educated class of people. This positive response towards education attainment may be due to the large number of schools in the municipality. This category of people are more likely to take the nutritional requirement of their household seriously and make useful decisions about household consumption.

Household Consumption of Cereals by Respondents

Data were collected on the type and quantity of cereals consumed by the sampled households. The amount and percentage of household income devoted to cereal consumption in the households were also estimated. The Table 2 shows that the sampled households consumed an average of 16.98 kg (71.32 cigarette cups) of rice, 15.00 kg of maize and maize-based products and 10.08 kg of noodles plus others (spaghetti, macaroni, etc) per month during the period of survey (210 cigarette cups of rice was found to be equivalent to 1bag of rice). Table 2 shows also that an average household spent ₦ 2037, ₦ 3375 and ₦ 3600 on rice, maize and noodles (plus spaghetti and macaroni), respectively during the month. This expenditure on rice, maize and noodles (plus others) constitute 3.71, 6.14 and 6.55%, respectively of household monthly income. The results show also that 42.06 kg of cereals and cereal-based products worth ₦ 9012 were consumed by an average household during the month while 16.40% of household monthly income was spent on the foodstuff.

The field survey result show that about 87% of the sampled households consume one form of cereal or the other at least once a day. This is an indication that cereals have become an important component of household diet in recent time. In the past, some cereals, especially rice, were eaten only during festive periods such as Christmas and Easter celebrations or on Sundays for the upper and middle class households in the area.

Household Consumption of Substitutes by Respondents

Data were collected also on the consumption of non-cereals referred here to as substitutes. This was to make useful comparisons and to facilitate discussion. The data were on the quantity of substitutes consumed, the amount spent on substitutes and the percentage of monthly household income spent on substitutes. The Table 3 shows that an average household in the area consumed 24 kg of *garri*, 4 kg of beans, 2 kg of yam, 3.5 kg of potato and 4.8 kg of plantain per month during the period. ₦ 1400 was spent on *garri*, ₦ 700 on beans, ₦ 800 on yam, N1 100 on potato while ₦ 1700 was spent on plantain. The percentage of household income spent on substitutes were 2.55% on *garri*, 1.27% on beans, 1.45% on yam, 2.00% on potato while 3.09% was spent on plantain. The result shows also that a total of 38.30 kg of substitutes worth ₦ 5700 were consumed while 10.36% of monthly income was spent in the consumption of substitutes by the households during the period. It could be observed from Table 2 and 3 that the respondents consumed more quantity of cereals and devoted higher percentage of their monthly income on cereals relative to substitutes. This is an indication that cereals have become popular among households in the area in recent time.

Table 3: Household consumption of substitutes by respondents

Food items	Mean Qty consumed (kg)	Amount (₦)	Percentage of monthly income
Garri	24.0	1400	2.55
Beans	4.0	700	1.27
Yam	2.0	800	1.45
Potato	3.5	1100	2.00
Plantain	4.8	1700	3.09
Total	38.3	5700	10.36

Table 4: Multiple regression results on determinants of household cereal consumption of the respondents

Functional form	Constant	X_1	X_2	X_3	X_4	X_5	X_6	R^2	F-ratio
Linear	-394.31	-0.003	0.004	107.37	0.002	179.69	-224.49	0.60	13.36
	(-1.11)	(-2.26)	(2.18)**	(3.08)*	(5.81)*	(1.01)	(-1.16)		
Exponential	4.83	-2.44	5.48	0.10	3.36	0.23	-0.36	0.58	12.21
	(8.51)*	(-1.35)***	(1.90)**	(1.71)**	(5.43)*	(0.81)	(-1.17)		
Semi log	-6883.06	-164.88	155.27	749.81	536.71	229.02	-93.48	0.75	26.19
	(-9.88)*	(-1.95)**	(2.68)*	(3.74)*	(5.72)*	(1.61)**	(-0.61)		
Double log	-4.99	-0.07	0.17	0.63	0.75	0.33	-0.14	0.77	29.28
	(-4.79)*	(-0.53)	(1.99)**	(2.10)**	(5.33)*	(1.55)***	(-0.63)		

Statistical Results on Determinants of Cereal Consumption in Owerri Municipality

The result of a multiple regression obtained by regressing six determinants of cereal consumption on the quantity consumed of cereals in the area is shown in Table 4. The six independent variables are price of cereals consumed (X_1), price of substitutes (X_2), household size (X_3), household income (X_4), form or state of cereals mostly consumed (X_5) and age structure of the households (X_6). The result of Table 4 shows that the Double-log (Cobb-Douglas) functional form of the regression results produced the lead equation having satisfied the necessary economic, statistical and econometric criteria (Olayemi, 1998).

The Double-log form in Table 4 show that the price of substitutes of cereals, household size, household income and the form of cereals consumed were the variables found to be significant at difference levels of percentage. The variables are the determinants of cereal consumption in the area during the period. Table 4 show also that all the significant variables have positive coefficients. This implies that an increase in their magnitude will lead to an increase in the quantity consumed of cereals by an average household in the area other factors held constant. The coefficient of multiple determination (R^2) was 0.77. This indicates that the independent variables included in the model were able to explain about 77% of the variation in the quantity consumed of cereals in the area.

Test of Hypothesis

In this section, the hypothesis that the marginal propensity to consume (MPC) cereals is not equal to 1(MPC # 1) is tested. The hypothesis is stated thus,

H_O : MPC # 1 (i.e., households do not spend all their income on consumption)
H_a : MPC = 1 (i.e., households spend all their income on consumption)

Decision Rule

If MPC # 1, accept the null hypothesis (H_O), otherwise reject
If MPC = 1, accept the alternative hypothesis (H_a), otherwise reject it

According to Olayemi (1998), in a consumption function the marginal propensity to consume is given by the regression coefficient (b_i). Based on the above, the MPC as derived from the regression coefficient of household income in Table 4 is 0.75.

Since MPC # 1, we accept the null hypothesis that the sampled households do not spend all their disposable income on consumption. The value of 0.75 recorded for MPC implies that the households spend about 75% of their disposable income on consumption. According to the absolute income theory cited by Obasi (2000), an average sampled household is of a low-income class. This is because low-income households, according to the theory, spend large portion of their income on consumption.

In conclusion, this study has shown that the quantity consumed of cereals in the area mainly depend on the price of substitutes, on household size and on household income. Noodles, spaghetti and macaroni were the major cereals consumed in the area. The households were found to have a high marginal propensity to consume (0.75). In other words, an average household in the area have a low marginal propensity to save (0.25). This will likely affect their investment in cost-saving processing technology.

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