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Influence of Consumers' Socio-Economic Characteristics on Rice Consumption in South East Nigeria

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Abstract: This study was designed to analyze the influence of socio economic attributes of rice consumers on rice consumption in Southeast Nigeria. Eighty (80) rice consumers were purposively selected from four purposively selected states in Southeast Nigeria. Information was collected using questionnaire and interview schedule. The data analysis was done using descriptive statistics and four functional forms of multiple regression models. Findings indicated that women and youths were more involved in rice consumption than their male counterparts. It was also observed that sex, age, marital status, education and household size were statistically significant in influencing consumers' decision to consume rice in the study area. The need to consider women and youth's nutritional requirements by rice researchers, farmers and relevant authorities involved in making rice innovation policies as well as motivating farmers with credit/fertilizer subsidy and extension access were recommended.

Key words: Socio economic characteristics % Consumers % Rice consumption % Southeast Nigeria

INTRODUCTION

Rice has become part of the everyday diet of many in Nigeria and indeed a major source of calories for the urban poor [1]. The World Bank projected that from 2010, the poorest income class of urban households in Nigeria may obtain not less than 33 percent of their cereal-based calories from rice annually (United States Department of Agriculture and Foreign Agricultural Service, USDA FAS, 2003). This is due to the changing consumer preferences and rapidly increasing population. In 2002, Nigeria accounted for nearly 44 % of the total rice output and 57 % of the total rice producing area in West Africa [2]. Rice yields are however low even by West African standards. Paradoxically Nigeria is also the largest importer of rice in the world. The annual demand for rice in the country is estimated at 5 million tons, while production level is 3 million tons of milled rice resulting in a deficit of 2 million tons. Over the years the country had resorted to imports to bridge this deficit. For instance in 1999, the value of rice imports was US$259 million and this increased to US$655 million in 2001 and US$756 in 2002. Between 1990 and 2002, Nigeria imported 5,132,616 tons of rice valued at US$1,883,553 million. In 2002 alone, the country imported 1.882 million tons of rice [3, 4].

In a capitalist economy the level and rate of *consumer spending* greatly affects that of *business investment*, which in turn affects the level of *employment* and the *general prosperity*. Given the importance of this concept (consumer spending) with respect to prosperity and employment generation which are analogous to the Millennium Development Goals (MDGs) of reducing poverty and hunger by half by 2015, especially in a country like Nigeria where unemployment, poverty and food insecurity are on the increase, there could be no better time to analyze food consumer spending determinants than now. The objective of reducing poverty and hunger among the poor economies in the Millennium Development Goals (MDG) may not be achieved if the impediments to a rising domestic investment and employment creation are still evident in the socio-economic environment [5]. Moreover, the patterns of consumer purchase determine the kinds and quantities of goods produced. In the case of rice for instance, quality

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and quantity of rice consumed can influence the level of innovation in rice production system since classical economists theorized that demand creates its own supply. Economists held that wealth is produced in order to be consumed and as there can be no consumption without production, the great processes of production and consumption are correlated to each other [6]. Thus a clear understanding of factors that influence rice consumption level can produce useful signals to rice producers (farmers and marketers) and researchers on how to make more innovative decisions on the product offer based on the findings about the consumers' attributes and attitudes towards the commodity offered. Such innovations can improve agricultural output and food security in Nigerian households.

Unfortunately, the performance of the agricultural sector continues to be relatively disappointing in Nigeria [7]. According to Agwu *et al*., this poor performance of agriculture and its attendant food insecurity could be due to poor value of traditional agricultural science and technology investments such as research and extension, which, although necessary, are not sufficient to enable increase in rice production in the country. Probably a careful analysis of the demand side of rice crops could offer better opportunities for making new policies that can lead to increased supply of this staple crop's production systems in Nigeria. The foregoing assertion is corroborated by Manyong *et al*. [8] been growing at a very low rate. They noted that less than half of the country's cultivable agricultural land is under cultivation; and smallholder and traditional farmers who use rudimentary production techniques, with resultant low yields, cultivate most of the land. These smallholder farmers are constrained by many problems including those of poor access to modern inputs and credit, poor infrastructure, inadequate access to markets, land and environmental degradation and inadequate research and extension services.

Even though it seems rice has assumed a prominent role in the consumption patterns of majority of Nigerians [9] problems still bedevil its supply. A major problem with the domestic output of rice in Nigeria is the poor operational techniques of processors which often had low production [10]. Given the foregoing scenario it will be a timely and rewarding exercise to investigate into the possible determinants of rice consumption in this important geo-political region of Nigeria. This is more so as consumers' demands could be important signals that can shape the focus and direction of innovation processes.

Purpose of the Study:

- Examine the socio-economic characteristics of rice consumers in the study area;
- Ascertain the personal characteristics of consumers that influence rice consumption.

MATERIALS AND METHODS

The study was carried out in the South East agro-ecological zone of Nigeria. The study population constituted all consumers (non producers of rice) in four (Abia, Anambra, Ebonyi and Enugu) states of the Southeast agro-ecological zone of Nigeria.

The sample size for the study comprised 10 percent (10%) of population of four purposively selected households of consumers (non producers of rice) (20) from each state for the study. This gave a total sample size of eighty (80) respondents for the study. Eighty (80) copies of questionnaire were properly completed and used in the analysis.

Primary data was obtained through questionnaire and interview schedules for literate and illiterate respondents respectively. Descriptive statistics consisting of frequencies, percentage and mean scores were used for analysis of the first objective while objective 2 was realized with multiple regression analysis models. The implicit form of the model is given by

$$Y = f(X_{1,} X_{2,} X_{3,} X_{4,} X_{5,}) + e.$$

The four explicit forms of the model tried are specified as follows:

$Y = \$_0 + \$_1X_1 + \$_2 X_2 + \$_3 X_3 + \$_4 X_4 + \$_5 X_5 + e$ … Linear Function.

$Y = \$_0 + \$_1 InX_1 + \$_2 InX_2 + \$_3 InX_3 + \$_4 InX_4 + \$_5 InX_5 + e$ … Semi-Log Function

$lnY = \$_0 + \$_1 InX_1 + \$_2 InX_2 + \$_3 InX_3 + \$_4 InX_4 + \$_5 InX_4 + e$ … DoubleLog Function.

$lnY = \$_0 + \$_1X_1 + \$_2 X_2 + \$_3 X_3 + \$_4 X_4 + \$_5 X_5 + e$ … Exponential Function.

Where

Y = Level of rice consumption per household per month (in Kgs/month)

X_1 = Sex (Dummy: male = 1, female = 0)

X_2 = Age (years)

X_3 = Marital status (married = 1, divorced = 2, single = 3, separated = 4).

X_4 = Educational level (formal education=1, primary school level=2, secondary school uncompleted=3, secondary school completed=4, vocational teacher school completed=5, tertiary education (OND=6, HND=7, NCE=8, B.A=9, B.Sc=9), (higher degree (M.sc=10, PhD=11)

X_5 = Household size (1-3 persons=1, 4-6 persons=2, 7- 9 persons=3)

e = Stochastic error term

b_0 = Intercept of the model

b_1 to b_5 = Slope coefficients of the respective variables.

ln = Exponential log to base e of the respective variable.

The regression model selected for this analysis was based on its performance with respect to its relative R-Square estimate, F-ratio and number of significant variables in the model whose coefficients signs agreed with economic theory. In the exponential log function coefficients of slopes estimated represent mean of the percentage change in the dependent variable with respect to the independent variable of the model. However, the mean of an explanatory dummy variable (assuming 1 or 0) is the decimal proportion of those who said "yes": ex. if 65% said yes then the mean is 0.65.

RESULTS AND DISCUSSION

Socio-Economic Characteristics of Consumers: Results in Table 1 show that a greater proportion (70.0%) of rice consumers studied were females. This finding may not be unconnected with high female involvement in the household work. Gender wise, rice purchase is dominated by female consumers [11]. It has been reported that women are at the centre-stage in household food consumption; It is the women's duty in most African households to take decisions on the types of food that are made available and the forms in which they are prepared for consumption by members of the household [12].

About 48.0 percent of rice consumers were 40-49 years age range while 35.0 percent of them were within the age range of 30-39 years. The results also reveal that 17.0% of them were within 20-29 years. The mean age of rice consumers was 37 years. This indicates that consumers are active and to meet their daily energy requirements, energy given food such as rice is needed. This is in consonance with Juliano, [13] who asserted that labouring adults require milled rice to meet the daily carbohydrate and protein needs for sustenance.

It was also indicated in the table that majority (82.5%) of the consumers were married while the remaining 17.5 percent were single. Cooking remains the exclusive responsibility of women that are married and the preferred food is rice [14]. Rice availability and prevalence has become major determinants of the welfare of the African consumers [15].

About 33.0 percent of consumers completed their tertiary (Ordinary National Diploma (OND), Higher National Diploma (HND), first degree (B.Sc, B.A) education, 31.0 percent of consumers had higher (M.Sc, Ph.D) degree while 20.0 percent and 16.0 percent of them completed vocational technical school and primary school respectively. The findings showed that consumers were literate and can assess the quality of improved rice varieties consumed and are probably in a more convenient financial position to buy rice than some of their illiterate counterparts. This also implies that consumers, as end users of rice produce could influence the quality of rice produced through their demands/preference. Consumers' demands could be important signals that can shape the focus and direction of innovation processes.

Data in Table 1 reveal that about 35 percent of consumers were 7-9 persons in a household, 27.5 percent of them were 10-12 persons in a household, 23.8% of them were 4-6 persons in a household while 13.7 percent of consumers were 1-3 persons. The mean was 5 persons. Households are characterized by high number of members with high dependency ratio in Nigeria; rice can support more people and their capacity to participate in rice innovation will vary significantly across the innovation system [16].

Entries in Table 1 show that majority (65.0 percent) of the rice consumers preferred foreign rice. There are main factors determining the level of rice consumption of any group at any time: milling quality; cooking, eating and processing quality; nutritive quality; and specific standards for cleanliness, soundness and purity [17]. This indicates that quality differential between local and imported rice seems an important consideration in the decision making process. According to Lancon, *et al*. [11] the inability of the local rice to match the quality of imported rice is the major constraints that affect the development of Nigerian rice sector.

Table 1: Distribution of respondents according to personal and socio-economic characteristics

Characteristics	Frequency (n=80)	Consumers (%)	Mean 0
Sex			
Male	24	30.0	
Female	56	70.0	
Age (years)			
20-29 years	14	17.0	37 years
30-39years	28	35.0	
40-49 years	38	48.0	
Marital status			
Married	66	82.5	
Single	14	17.5	
Educational level			
Primary School completed	13	16.0	20.0
Vocational Technical school completed		16	
Tertiary education (OND, NCE, HND, first degree)	26	33.0	
Household size			
1-3 persons	11	13.7	5 persons
4-6 persons	19	23.8	
7-9 persons	28	35.0	
10-12 persons	22	27.5	
Type of rice preferred			
Local	28	35.0	
Foreign	52	65.0	
Quantity of rice consumed			
10 kg	29	36.0	40kg
50kg	25	31.0	
100 kg	14	18.0	
150kg	12	15.0	
Complain on quality (colour, size, taste and stones) of rice bought.			
Yes	54	67.5	
No	26	32.5	
Rice mill visits			
Yes	68	85.0	
No	12	15.0	

Source: Field Survey, 2010

The mean rice consumed was 40kg. The findings show that majority of respondents (36 percent) consumed 10kg of rice monthly while 31 percent of them consumed 50kg bag of rice. About 18.0 percent and 15 percent of them consumed 100kg and 150kg of rice respectively. These findings corroborate the observation of Akande and Akpokodje [9] who noticed that rice has assumed a prominent role in the consumption patterns of majority of Nigerians. Rice for table use is easy to prepare. Its soft texture pleases the palate and the stomach. As a human food, rice continues to gain popularity in many parts of the world where other coarse cereals, such as maize, sorghum and millet, or tubers and roots like potatoes, yams and cassava have traditionally dominated [18].

Entries in Table 1 show that majority (67.5 percent) of the consumers complained of the quality (colour, size, taste and stones) of local rice bought in the market. This implies that consumers are dissatisfied with local rice bought in the market and are wary of picking stones from local rice and having to wash it several times [19].

Data in Table 1 indicated that a greater proportion (85 percent) of consumers visited rice mill. There were more consumers that visited rice mills, probably because they buy at cheaper price in the mill. Rice mill visits provide a perfect opportunity for consumers to use most of their senses to appreciate technologies in rice production and make wide choice of the quality of rice they want. The visits translate into increased chances of

Table 2: Multiple regression analysis of consumers' socio economic influence on rice

Variable	Exponential Function
Constant	0.517 (2.108)
Sex	0.087 (2.703)*
Age	0.135 (3.603)*
Marital Status	0.207 (2.394)*
House hold size	0.029 (3.679)*
Education	0.025 (3.514)*
R^2	0.470
F- value	13.118*
N	80

Dependent Variable = monthly consumption of rice in kg

NB: "*" = significant at 5% level, values in parenthesis are t ratios

Source: Author's Econometric estimation of field data (2010) using SPSS computer package

the consumers learning new technologies in rice innovation system. Advantage of rice mill visit includes the chance to track charges and being able to modify suggestions for individual mills [20].

Effects of Personal Characteristics of Rice Consumers on Their Monthly Consumption Level: Four functional forms of regression model viz: linear, semi-log, double log and exponential equations were tried. See Table 2. However, the exponential log was chosen as the lead equation based on its conformity with some econometric and statistical criteria such as higher R^2, number of significant t-ratios the explanatory variables. The R^2 for the exponential log was 0.470 which means that 47 percent of the variation in the level of monthly rice consumption was explained by the independent variables included in the exponential regression model. The implication of the exponential log's R^2 recorded above is that about half (53%) of the variation in the level of monthly rice consumption in the area were equally accounted for by some other variables not included in the model. The estimated F ratio of this model was 13.118, a value that was significant at 5 percent, 6 and 14 degrees of freedom.

All the independent variables have slope coefficients whose signs were all positive indicating that as these socio-economic variables increased, the rate of change in rice consumption also appreciated. The slope coefficient of sex was 0.087 while that of age was 0.185. The meaning of these estimates are that for every unit change in gender of the consumer there was an 8.7 percent increase in the rate of change of rice consumption in the households studied; and for every unit change in age of the respective consumers recorded there was an appreciation of 18.5 percent in the rate of change in level of rice consumption in the study area. These two variables' slope coefficients were significant at 5 percent alpha level. The results also indicated that a unit change in the marital status (e.g. from "single" to "married") would increase the rate of rice consumption in the household by 20.7 percent. This corroborates the assertion that "cooking remains the exclusive responsibility of women that are married and the preferred food is rice" [14].

As for household size, its unit increase results in about 20 percent change in consumption level of rice. For instance, a family size five becoming six, should increase rice consumption by a figure around 20 percent. This is not surprising as household size increase means more individuals to feed and thus the tendency to ask for more rice to feed the additional members of such household will no doubt increase rate of change in rice consumption. The findings also agree with Reardon, Berdegue and Escobe [16] who indicated that households were characterized by high number of members with high dependency ratio in Nigeria; and that rice could support more people even as their capacities to participate in rice innovation will vary significantly across the innovation system.

Education had a slope coefficient estimate of 0.025, implying that about 2.5 percent increase in rate of change of rice consumption was witnessed by any unit change in the educational status of the household heads in the sample survey. This conforms to our earlier discussion of the results of our descriptive statistics where we noted that the findings showed that consumers were literate and could assess the quality of improved rice varieties consumed and are probably in a more convenient financial position to buy rice than some of their illiterate counterparts. In Nigeria it appeared that more educated people who have better welfare patronized rice more than their illiterate poor counterparts. This is in agreement with CGIAR [15] who asserted that rice availability and prevalence has become major determinants of the welfare of the African consumers. All the variables' slope coefficients estimated were statistically significant at 5 percent alpha level with high t ratios ranging from 2.703 to 3.679.

CONCLUSION

The study was able to describe the socioeconomic attributes of the rice consumers in South East agro-ecological zone of Nigeria. It was indicated that rice consumption, especially demand or purchase, was dominated by women who constituted 70 percent in the study area. The implication of this is that the actual purchase of rice is done mostly by women in this agro-

cological zone. Thus any innovation in rice production systems at the research and farm levels must consider the peculiar tastes of women who are the major decision makers in the households especially with respect to what quality and quantity of rice to purchase at homes in every month. The women need to be consulted before meaningful innovations in rice production can be scaled up. It was also discovered that most rice consumers sampled were in their youthful age. Thus innovation on rice production can take advantage of this knowledge to design rice products that will meet the peculiar high calorie and protein requirements as well as tastes of these young individuals. In terms of advertising and packaging of rice products, they have to be done to appeal to the younger age groups. The fact that household size increase influences rice consumption, demand by such households call for policies that will boost rice production using efficient technologies so that increase in population being witnessed in the country will not result in increased imports to meet the rising demand pull from households' population growth. The positive influence of education on rice consumption leaves a window of opportunity for rice policy makers to target the educated class of Nigerians especially civil servants for encouragement in adopting rice irrigation farming and use of improved rice varieties from research stations in Nigeria especially with the aid of agricultural extension agents. If the above innovative steps are applied in combination with incentives such as credit and fertilizer subsidy, improved agricultural extension services, the adoption of more innovative rice production systems will be enhanced and the problem of food insecurity and poverty will become a thing of the past among a larger percentage of the Nigerian farmers.

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