Household Consumption Preference for Imported and Domestic Rice in Kaduna State, Nigeria: Implication for Rice Quality Improvement

Oyinbo O., Omolehin R.A. and Abdulsalam Z.

Department of Agricultural Economics and Rural Sociology,
Ahmadu Bello University, Zaria, Nigeria.
Email: ooyinbo@abu.edu.ng

Abstract

This research was undertaken to determine consumption preference between imported rice and locally produced rice by households in Kaduna state and the factors that influenced the households' consumption preference between the two. Primary data obtained from a sample of 310 household heads with the aid of structured questionnaire were employed in this study and the data were analysed using descriptive statistics and logit regression analysis. The results of the data analysis indicated that 75% of the sampled households' preferred imported rice to local rice and the factors that significantly influenced the households rice consumption preference are quality of rice (p<0.01), ease of preparation (p<0.1), price of rice (p<0.1), frequency of rice consumption (p<0.1) household size (p<0.1) and household income (p<0.05). Sequel to the high significance of rice quality, it is recommended that huge investment on rice value chain should be pursued. This should be with emphasis on local rice processing by government and other stakeholders in the rice subsector to ensure that the quality of locally produced rice is improved to make local rice highly competitive with foreign rice. This will encourage shift in consumer preference from imported rice to locally produced rice. It will save the nation from continual loss of foreign exchange in the importation of foreign rice to meet local demand and create job opportunities in line with the rice transformation action plan.

Keywords: Consumption, Domestic rice, Rural and Urban Households, Imported rice,

Introduction

Rice is the world's most important staple food crop consumed by more than half of the world population as represented by over 4.8 billion people in 176 countries with over 2.89 billion people in Asia, over 150.3 million people in America and over 40 million people in Africa (IRRI, 2004). Nigeria currently doubles as the largest rice producing nation in West African sub-region and the second largest importer of rice in the world. This anomaly is attributed to the inability of its local production to meet up with its demand which has been soaring at a very fast rate over the years. As noted by MARKETS (2009), Nigeria's fertile land and rich agro-climatic conditions could easily produce rice to feed the entire country and generate surplus. However, Nigeria has continued to depend on importation from countries like China and Thailand to meet the increasing demand for rice by households.

A combination of various factors seem to have triggered the structural increase in rice consumption over the years with consumption broadening across all socio-

economic classes, including the poor. Rising demand is as a result of increasing population growth and income level (GAIN, 2012). Rice has become a staple food in Nigeria such that every household; both the rich and the poor consumes a great quantity (Godwin, 2012). In a bid to achieve rice self sufficiency in line with the rice transformation plan, the Ministry of Agriculture and Rural Development have rolled out a special intervention programme on dry season paddy production plan in 2013 (Fagbemi, 2012). The dry season paddy production will take place across ten states of the federation namely; Kebbi, Zamfara, Kano, Jigawa, Sokoto, Katsina, Bauchi, Gombe and Kogi states.

Milled rice consumption has increased significantly over the years from 240 metric tonnes in 1961 to 850 metric tonnes in 1981, and 2757 metric tonnes in 1991 to 4970 metric tonnes in 2011. Local production has not been able to keep pace with the increase in rice consumption over the years which have resulted into a demand-supply gap for milled rice in Nigeria (USDA FAS, 2012). Over the years, Nigeria has relied upon the importation of rice to meet its growing demand for rice but the increased demand in recent years reflect more of increases in the demand for imported rice brands to meet the shortfalls in domestic demand and to meet consumers demand in the urban areas. The importation of rice to bridge the demand-supply gap is worth ₦365 billion (Ayanwale and Amusan, 2012). The cost of these rice imports represents a significant amount of lost earnings for the country in terms of jobs and income (Bamba *et al.*, 2010).

The Nigerian rice sector has witnessed some remarkable developments, particularly in the last ten years. Both rice production and consumption in Nigeria have vastly increased during the aforementioned period (Ojoehemon *et al.*, 2009). However, the demand for rice has continued to outstrip production given the shift in consumption preference for rice especially by urban dwellers. The growing consumption preference for rice have led to several research outcomes on rice in Nigeria but it is worth noting that there exists little empirical information on the determinants of rice consumption preference between foreign and local rice at the micro (household) level. This constitutes the gap in research that this study was designed to fill. Therefore, this study was carried out to determine consumption preference between foreign and locally produced rice, the factors influencing households' consumption preference for foreign and local rice brands and draw up relevant recommendation for enhancing household consumption preference for local rice.

Methodology
The study was carried out in Sabon Gari, Kaduna South and Soba local government areas of Kaduna state. Kaduna state lies between latitudes 10^0 21^1 and 10^0 33^1 North of the equator and longitudes 7^0 45^1 and 7^0 75^1 East of the Greenwich

meridian and has 23 local government areas. It occupies a total land mass of about 46, 053 km^2 and its population was put at 6, 066, 526 people in 2006 (NPC, 2006) and had a projected population of 6, 903, 746 people in 2012 using an annual growth rate of 3.2%. The vegetation in the state is divided into Northern Guinea savannah in the Northern part of state and Southern Guinea savannah in the Southern part of the state. The state experiences both wet and dry seasons with the wet season commencing in the month of April in the Southern part of the state and between May and June in the northern part of the state. Rainfall is heaviest in the southern part of the state and decreases northwards with mean annual rainfall varying between 942mm and 1000mm. the rainfall lasts from May to October. The dry season sets in immediately after the rainy season and is characterized by harmattan period with a temperature ranging from 18^{0}C to 26^{0}C and the heat period with a temperature that ranges from 32^{0}C to 39^{0}C.

The climate of the state favours the production of crops such as rice, maize, beans, guinea corn, millet, cotton, yam, carrot, sugarcane, tomatoes, pepper, onions, garden egg plant, lettuce, amaranthus and tobacco. The state is also known for rearing of livestock such as poultry, sheep, goat, cattle and pig.

Sampling procedure and sample size

A multistage sampling technique was employed to select the households for the study. The first stage involved a random selection of Sabon Gari, Kaduna South and Soba local government areas out of 23 local government areas in the state. The 3 local government areas were randomly selected using a random number generator. The second stage involved the random selection of two districts from each of the selected local government areas. The districts are Muchia and Hanwa in Sabon Gari local government area, Kurmin Mashi and Kakuri in Kaduna South local government area, Yakassai and Rahama in Soba local government area. The third stage involved the random selection of 5% of the households in the selected districts to give a sample size of 310 pooled from Muchia (48), Hanwa (56), Kurmin Mashi (52), Kakuri (56), Yakassai (54) and Rahama (44).

Primary data on household food consumption and expenditure patterns was used in this study. The primary data were elicited using well structured questionnaires from heads of household who consulted with their household members on the households food budgetary planning and purchase. Data were collected on the demographic characteristics of households such as sex, age and educational level of household heads, household size, household income, number of household income earners. Data were also collected on the households rice consumption with respect to the type, frequency, quantity, price and expenditure on rice consumed by the households during the sample

period. Similarly, data on the quantities, prices and expenditure on other food items consumed by the households were collected.

This study employed descriptive and inferential statistics in the analysis of data. The descriptive statistics involved the use of mean, frequency counts and percentages and the inferential statistics involved the use of logit regression.

The logit regression model assumes that the probability of households' consumption preference for imported rice brand (P_i) is expressed as:

$$P_i = \frac{1}{1 + e^{-z_i}}$$

The probability of households' consumption preference for locally produced rice brand $(1 - P_i)$ is expressed as:

$$1 - P_i = \frac{1}{1 + e^{z_i}}$$

P_i ranges between zero and one and it is non linearly related to Z_i. Z_i is the stimulus index which ranges from minus infinity to plus infinity and it is expressed as:

$$Z_i = \ln\left(\frac{P_i}{1 - P_i}\right) = \beta_o + \beta_1 X_1 + \beta_2 X_2 + \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots + \beta_{11} X_{11} + u$$

To obtain the value of Z_i, the likelihood of observing the sample will be formed by introducing a dichotomous response variable. The explicit logit model is expressed as:

$$Y = \beta_o + \beta_1 X_1 + \beta_2 X_2 + \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots + \beta_{11} X_{11} + u$$

Definition of Variables

Y = dichotomous response variable (1 for households consumption preference for imported rice and 0 for households consumption preference for locally produced rice)

X_1 = Age of household head (years)

X_2 = educational level of household head (number of years of schooling)

X_3 = household size

X_4 = household income (₦/month)

X_5 = frequency of monthly rice consumption

X_6 = food expenditure (₦/month)

X_7 = non-food expenditure (₦/month)

X_8 = price (dummy: 1 if household regards price as a factor for consumption preference between locally produced rice brand and imported rice brand and 0 otherwise)

X_9 = taste (dummy: 1 if household regards taste as a factor for consumption preference between locally produced rice brand and imported rice brand and 0 otherwise)

X_{10} = quality (dummy: 1 if household regards quality as a factor for consumption preference between locally produced rice brand and imported rice brand and 0 otherwise)

X_{11} = ease of preparation (dummy: 1 if household regards ease of preparation as a factor for consumption preference between locally produced rice brand and imported rice brand and 0 otherwise)

$\beta_1 - \beta_{11}$ = coefficients of stimulus variables

β_0 = constant term

u = error term

Results and Discussion
Determination of households' consumption preference for foreign and local rice

From the result in Table 1, majority of the households in Sabon Gari (85%), Kaduna South (83%) and Soba (53%) local governments preferred consuming foreign rice to local rice types. From the pooled sample of households, a larger proportion (75%) preferred consuming foreign rice brands to local rice brands. However, local rice consumption had considerable preference among households (25%) and this is in line with Adeyeye (2012) who opined that though the market for imported and locally produced rice in Nigeria appears segmented, consumption of locally produced rice is as well on the increase as that of imported rice.

Factors influencing households' consumption preference for foreign and local rice

The maximum likelihood estimates of the parameters of the logistic regression of the factors influencing consumer preference for foreign and local rice brands are presented in Table 2. The log-likelihood statistic of -32.76064, which tests the joint significance of the independent variables included in the model, is significant at the 1% level. The overall percentage households' rice consumption preference for foreign and local rice correctly predicted seems good at 83%, when compared with the 100% predictions of a perfect model.

Rice quality (cleanliness, whiteness, shape and breakage of grain) was positively related to the households' consumption preference probability for foreign and local rice and was significant at 5% probability level. The odd ratio of 3.5282 indicates that a unit increase in the households' income will increase the probability of households' rice consumption in favour of foreign rice preference by a magnitude of 3.5282. This finding is consistent with that of Bamidele *et al*. (2010) that households preferred imported rice to local rice, because the imported rice is of a higher quality and grade (it has a better taste, it is polished, not broken and is free of stones and other debris). Kassali *et al*. (2010) also noted that the main reason imported rice is preferred as a result of its good quality as presumed by consumers. Also, Bamba *et al*. (2010) noted

that consumers in large urban centres have a marked preference for high-quality imported rice. The significance of rice quality as a factor that favours foreign rice consumption implies that an improvement of the quality of local rice to attain the high quality desired by households would stimulate local rice consumption preference by households. This will stem the loss of earnings in the importation of foreign rice to bridge demand-supply gap and create opportunities for employment. Increasing production of higher quality rice will reduce imports and strengthen food security (Bamba *et al.*, 2010)

Household size was found to be negative and significant at 10% probability level with an odd ratio of 0.7277 which implies that a unit increase in the size of the households would decrease the probability of households' foreign rice consumption preference by a factor of 0.7277. Household income was positively related to the households' probability for foreign and local rice consumption preference and was significant at 5% probability level. The odd ratio of 1.1800 indicates that a unit increase in the households' income will increase the probability of households' rice consumption in favour of foreign rice preference by a magnitude of 1.1800. A plausible explanation for this is that as the income of households increases, their purchasing power also tend to increase. The households' frequency of rice consumption was found to be negative and significant at 1% probability level with an odd ratio of 0.9344 which suggests that increase in the frequency of rice consumption will decrease the probability of households' foreign rice consumption preference. Price of rice was negative and significant at 1% probability level with an odd ratio of 0.0920, which implies that a unit increase in the price of rice will decrease the probability of households' rice consumption in favour of foreign rice preference by a magnitude of 0.0920. This implies that as the prices of foreign rice increases, households tend to reduce their consumption of foreign rice by resorting to consumption of low priced local rice or other food items as substitute for foreign rice. This finding lends credence to that of Odusina (2008) who found out that the high price of imported rice is discouraging its consumption. Ease of rice preparation was found to be positive and significant at 10% probability level with an odd ratio of 3.0836.

Conclusion

This study determined the consumption preference for foreign and local rice by households in Kaduna state as well as the factors that influenced their consumption preference using primary data elicited from structured questionnaire administered to heads of households. Respondents preferred consuming foreign rice brands to local rice brands. Factors that significantly influenced the households consumption preference for foreign and local rice included quality of rice (p<0.1), ease of preparation (p<0.1), price of rice (p<0.01), frequency of rice consumption (p<0.1) household size (p<0.1) and

household income (p<0.05). The high significance of rice quality in influencing the household's consumption preference for foreign and local rice corroborated the findings of other researchers. Based on this finding, it is recommended that huge investment on rice value chain with emphasis on local rice processing should be pursued by government and other stakeholders in the rice subsector to ensure that the quality of locally produced rice is improved to make local rice highly competitive with foreign rice and thereby encourage shift in consumer preference from imported rice to locally produced rice.

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Table 1: Result of consumer preference for foreign and local rice brands

Rice Brand	Frequency	Percentage
Sabon Gari		
Foreign Rice	85	82
Local Rice	19	18
Total	104	
Kaduna South		
Foreign Rice	83	77
Local Rice	25	23
Total	108	
Soba		
Foreign Rice	53	54
Local Rice	45	46
Total	98	
Pooled Sample		
Foreign Rice	232	75
Local Rice	78	25
Total	310	100

Table 2: Logit regression estimates of factors influencing consumer preference for foreign and local rice brands

Variable	Coefficient	Standard Error	t-value	Exp.(β)
Intercept	5.1894	2.3426	2.2152	179.3609
Quality	1.2608†††	0.7322	1.721	3.528
Age	0.0033	0.0289	0.1142	1.0033
Education	-0.0535	0.0567	-0.9436	0.9471
Household size	-0.3178†††	0.1745	-1.8212	0.7277
Household income	0.1655††	0.0759	2.1805	1.1800
Rice consumption	-0.0678†††	0.0373	-1.8177	0.9344
Food expenditure	0.1235	0.2765	0.4467	1.1315
Non food expenditure	-0.0109	0.1166	-0.0935	0.9892
Price	-2.3862†	0.9104	-2.6210	0.0920
Taste	-0.5092	0.6642	-0.7666	0.6010
Ease of preparation	1.1261†††	0.6534	1.7234	3.0836
log likelihood	-32.76064†			
Correct predictions	83%			
McFadden Pseudo R-squared	55.2%			

NB: Single, double and triple daggers (†) indicate statistical significance at 1, 5, and 10% levels respectively.