Product Quality and Safety

Survival of the fittest: the choice between local and imported rice consumption in Delta central agricultural zone, Delta state, Nigeria

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Abstract. This study analyzes the determinants of rice consumption preference for local or imported type in Delta State, Nigeria. The objectives of the study were to identify the socio-economic characteristics of rice consumers, ascertain the forms rice is prepared and consumed by respondents, examine the factors influencing rice consumption preference, and identify reasons for household's preference for local or imported rice consumption in the study area. Primary data were collected from households using a structured questionnaire. The multistage procedure was used to select 200 respondents for the study. Data were analyzed using descriptive statistics and multiple regressions. The result revealed that 69% of female were more involved in rice consumption preference than their male counterparts. The mean age was 42 years and the respondents can read and write. About 56.4% were married and the average household size was seven persons. The average monthly income of respondents was N22372.50 (62.84 USD). The results also show that 44% of households preferred their rice being consumed as white rice and stew. The major reasons for the choice in rice type were because of its availability, cleanliness, taste and swelling capacity. The factors that influence rice consumption pattern were gender, age, price per kg of rice, household size, educational level and income level. It is recommended that the farmers should be encouraged to process their grains in a manner that they will be clean.

Introduction

Rice (*Oryza sativa*) is a cereal which has become a staple food of considerable importance in many African countries, where its consumption preference by households has increased considerably recently (Warda, 2003) unlike in many years past when it was only eaten during festive periods such as Christmas, Easter, marriage ceremony and burial ceremonies. Rice is an essential crop in Nigeria. It is comparatively stress-free to cultivate and is planted for commercial and for subsistence consumption. In some areas down the ages, rice has been considered a luxury food for distinct occasions with the increased availability in supply. Nigeria ranks number one in both rice production and consumption in West Africa sub-region. Nigeria has an opulent antiquity of rice production and consumption, as indigenous rice species (local rice) have been cultivated in Nigeria for over 300 years (Imolehin and Wada, 2000; Akinbile, 2007). Rice has over the years developed into a major staple crop in the Nigerian diet, with a demand profile cutting across all regions. A variety of other factors have also contributed to this increased demand including rapid urbanization, acceleration in the population growth rate, increase in per capita income, and variations in family occupational structures (Akpokodje et al., 2001; Nwanze et al., 2006).

According to Odularu (2010) in his view opined that a Nigerian consumes 24.8kg of rice per year representing 9% of the total calories intake. Due to its increasing contribution, the demand for rice has been increasing at a faster rate than domestic production.

There are several varieties of rice grown in Nigeria such as 17A 150, WAB 189, Nerica and Ofada OS6. Rice is grown in paddy or upland fields subject on the prerequisite of the particular variety. With the increase of the farm size of rice, there has been a stable upsurge in rice production and consumption.

Over the years, the country has continued to depend on importation of rice to meet the domestic demand. Available studies (Boris, 2004; Emodi and Madukwe, 2011) revealed that Nigeria is the largest importer of rice in the world. As demand for rice has risen in Nigeria, it is clear that production has failed to keep pace while the gap has been bridged by growing imports. Rising consumer preference for rice has increased demand at a faster rate than population growth. Consumption preference of local rice continued to decline as most of them considered imported rice due to its cleanliness, swelling capacity, taste, availability, grain shape, quick cooking potential unlike the local rice. According to Lancon et al. (2003), the heavy custom duty on imported rice did not stop its persistence importation and consumption.

Emodi and Madukwe (2011) asserted that households are dissatisfied with the buying of local rice from the market and the process of removal of stones and the number of times to wash it clean before cooking for consumption. As a response to the prevailing rice supply deficit situation, successive governments have been motivated to introduce initiatives designed to promote domestic rice production in order to displace rice imports and achieve self-sufficiency, either through import restrictions and/or via investments to improve product output and quality. This was expected to widen home market for the na-

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tion's local rice production yet its demand has continued to be low. Thus preference for imported rice has robbed the nation of important foreign exchange earnings, negatively affecting local rice production and employment as well as robbing farmers of valued income necessary for improved standard of living. In spite of the efforts made by governments, the patronage of imported rice remains higher than that of locally produced rice. It is therefore worthwhile to carry out this study to unveil the circumstances surrounding the scenario.

The information regarding the factors affecting rice consumption preference would be helpful to the government for adopting appropriate policy in respect of price and income changes. It is, however, against this backdrop that an investigation of the determinants of rice consumption preference becomes necessary. The information generated by this study will add to the existing stock of information generated by other studies (Akinbile, 2007; Emodi and Madukwe, 2011) in the area of consumption analysis. However, these studies addressed socioeconomic characteristics on rice consumption in different locations in Nigeria with no particular reference to preference for local or imported rice type; none of such studies has been done in Delta State. Consumer behavior determines patronage of products directly. This study in conceptualized based on consumer behavior analysis, with regards to preferences and the why of the preferences *vis* a *vis* the perceived qualities. Thus, this study attempts to bridge this research gap. This study is, therefore, articulated to examine the choice preference between local and foreign rice. The specific objectives were to: identify the socio-economic characteristics of rice consumers, ascertain the forms rice is prepared and consumed by respondents, examine the factors influencing rice consumption preference, and identify reasons for household's preference for local or imported rice consumption in the study area.

Hypothesis
Ho: The selected socioeconomic factors do not significantly influence rice consumption preference among consumers.

Material and methods

The study was carried out in Delta Central Agricultural Zone of Delta State, Nigeria. It has 10 local government areas (LGAs). It is under rainforest and fresh water swamp forest vegetation cover. The major source of livelihood of the people is agriculture (farming); in a mixed cropping system. Cultivated crops include cassava, yam, okra, garden egg, cocoyam, maize, rice, potato and leafy and fruit vegetable crops. The population for this study includes those households that consume rice, whether the local or the imported rice types.

Multistage sampling technique was used for the study. The first stage comprised the purposive selection of five local government areas namely; Ethiope West, Ethiope East, Ughelli North, Okpe and Udu. Stage two involved the random selection of two communities from each of the five LGAs. This made the studied communities to be ten. At Stage three, 20 households' respondents were randomly selected. Thus, a total of 200 re-

spondents form the sample frame. Primary data were collected with the administration of questionnaire and interview schedule. The questionnaire was administered to the respondents with reasonable level of formal education, while the structured interview schedule was used to obtain responses from the respondents with little or no formal education. The collected were treated to the use of descriptive statistics such as frequency, counts, percentages mean and logit model. The determinants of household's rice consumption pattern are estimated using logit regression model since it provides results which can be more easily interpreted in terms of odds ratios. The model ensures that the probability lies in the interval of 0 and 1. The regression form of the model is as follows:

$Con = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + e$, Where:

Con = dichotomous response variable such that (con= 1 if household consumed imported rice and otherwise = 0);

β_0 = constant;
$\beta_1 \ldots \beta_7$ = the coefficient of explanatory variables;
X_1 = Gender (dummy, male =1, otherwise = 0);
X_2 = Age (years);
X_3 = Price of substitute (₦);
X_4 = Price per kilogramme of rice (₦);
X_5 = Household size (number of persons);
X_6 = Level of education (years);
X_7 = Income (₦);
E = error term.

The justification for the use of the variables captured
Gender: Observation has showed that women eat more of rice than the men. Then these women believe in quality.

Age of consumer: The older people may prefer locally made food because they do not believe in the use of chemical fertilizers because of their conservative nature. They believe that every imported rice is produced using chemical fertilizers. While the younger people belong to the group of innovators who believed in modernity.

Price of substitute: Price of substitute of rice means the price of either of the two will affect the preference for either of the two.

Price of rice: when the price of imported rice is expensive people tend to shift to the consumption of local rice. Similarly, if the price of local rice is high, it will discourage people of patronage thereby going for the imported rice for consumption based on quality and other distinctive qualities that local rice lacks.

Household size: The larger the household size, the greater the tendency for them to patronage local rice for consumption which is far cheaper than the imported rice and vice versa.

Level of education: The higher the education level of the consumer, the more they tend to go for imported rice without considering cost, but good quality. On the other hand, the less educated will rather go for cheaper one to acquire quantity, not quality.

Income: The wealthy people tend to patronize more imported rice for consumption than the poor who rather prefer the local rice that is very much cheaper.

Results and discussion

Socio Economic Characteristics of Respondents

The result as presented in Table 1 shows that the majority (35.5%) of the household rice consumers fell within the age bracket of 41-50 years. This was closely followed by 27.5% of the respondents that fell between the age bracket of 31-40 years, 18.5% of them range between 21-30 years. About 12.5% and 6% were between the age distribution of 51-60 years and above 60 years, respectively. The mean age of the respondents was 42 years. This implies that the majority of the respondents were within the economically productive age. These substantiate the finding of Emodi and Madukwe (2011) on rice consumption. The result of marital status of household rice consumers indicated that 56.2% of the re-spondents were married and 32.5% of the respondents were single, while 7.5% and 3.5% were divorced and widow/er, respectively. The result showed the preponderance of married consumers. This result is in consonance with the findings of Ogundele (2014). The result on gender shows that 69.0% constituted female respondents, while 31.0% of the respondents were male. The result shows that the female has the highest population of rice consumers in the study area. This result disagreed with Okeke et al. (2015) findings that the majority of households (52.50%) that consume rice were headed by a male in Benue State and Ojogho and Erhabor (2011) similarly reported 89.2% males in urban Edo, Delta and Lagos States in Nigeria and further supported these findings that there was higher rice consumption in rural Delta among female-headed households in their study.

Table 1. Socio–economic characteristics of respondents (n=200)

Variable	Frequency	Percentage, %	Mean/Mode
Age			
21-30	37	18,5	
31-40	55	27.5	
41-50	71	35.5	42 years
51-60	25	12.5	
Above 60	12	6.0	
Marital status			
Single	65	32.5	
Married	113	56.5	Married
Divorced	15	7.5	
Widow/widower	7	3.5	
Gender			
Male	62	31.0	
Female	138	69.0	Female
Level of education			
No formal education	33	16.5	
Primary education	49	24.5	Secondary education
Secondary	73	36.5	
Tertiary	28	14.0	
Others	17	8.5	
Household size			
1-5	70	35.0	
6-10	108	54.0	7 persons
11-15	21	10.5	
Above 15	1	0.5	
Monthly income			
10000 - 20000	111	55.5	
21000 - 30000	53	26.5	₦22372.50
31000 - 40000	21	10.5	
41000 - 50000	12	6.0	
51 000- 60000	3	1.5	

*1 N= 0.0028 USD

The result on level of education of household rice consumers showed that 36.5% acquired secondary education, 24.5% obtained primary education, 16.5% acquired non-formal education, 14% had tertiary education and 8.5% had other form of education implying that primary education was the most prominent level of education attained by the respondents, meaning that the majority can read and write. The implication is that the educated people would rather prefer imported rice.

The result indicated that the majority the respondents (54.0%) had household size of 6-10 persons. This was followed by 35.0% that had 1-5 persons. Only 11% of the respondents had above 10 persons. This implies that the family size is large and this will propel them to make choice to consume either local or imported rice to minimize cost. The mean household size was 7 persons. The result showed that the majority of households rice consumers (55.5%) had monthly income of between ₦10000 - ₦20000 (28.09-56.18 USD) and followed next by 26.5% that had monthly income of ₦21000 - ₦30000

(58.99-84.27 USD). About 10.5% of them had monthly income of ₦31000 - ₦40000 (87.08-112.36 USD), 6% had monthly income of ₦41000 - ₦50000 (115.17-140.45 USD) while only 1.5% of the respondents had ₦51000 - ₦60000 (143.26-168.54 USD). The average monthly income was ₦22372.50 per households. This implies that their monthly income can contribute to high consumption preference of local or imported rice since consumption is a function of disposable income.

Forms of rice prepared and consumed by respondents
The result in Table 2 shows that the majority of respondents (44%) cook and consume it as white rice and stew, followed by 18.5% of respondents that cook it as jollof rice, 14.5% as banga rice, 10.5% as fried rice, while the least was tuwo 3%. This is probably because the majority of the respondents in the study area preferred rice.

Table 2. Forms rice consumed by respondents

Forms	Frequency	Percentage, %
White rice and stew	88	44
Fried rice	21	10.5
Banga rice	29	14.5
Coconut rice	19	9.5
Tuwo rice	6	3.0
Jollof rice	37	18.5

Factors influencing the household rice consumption preference in the study area
The result of factors influencing rice consumption preference as presented is shown in Table 3 was achieved with logit model.

Table 3. Factors influencing rice consumption pattern

Variable	B	S.E.	Wald	Sig.	Exp (B)
Gender	-1.253	0.637	3.873	0.049**	0.286
Age	0.055	0.021	7.107	0.008**	1.057
POSUB	0.066	0.113	0.339	0.560	1.068
Price	0.000	0.000	11.614	0.001**	1.000
Household size	0.000	0.000	8.317	0.004**	1.000
Education	0.632	0.295	4.579	0.032**	1.881
Income	0.000	0.000	5.886	0.015**	1.000
Constant	-3.566	1.582	5.081	0.024**	0.028
-2 Log likelihood	143.753				
Cox & Snell R Square	0.235				
Nagelkerke R Square	0.375				

** = Significant at 5%

Gender: The coefficient of gender was negative and significant at 5% probability level. This implies that any unit increase in the gender of respondents would lead to corresponding increase in the choice of consuming either local or imported rice.

Age: The coefficient of age was positive and significant at 5% probability level. This means that any unit increase in the age of respondents would lead to corresponding increase in the choice of consuming local rice. Observations showed that the youths eat more of imported rice than local rice.

Price per kg of rice: The coefficient of price of rice was positive and highly statistically significant at 5% level. This means that increase in price of bag of rice will lead to the same increase in the choice of rice to consume to minimize consumption expenditure by the respondents. It is expected that the relatively low income class would most prefer to choose local to imported rice which is highly expensive based on some characteristics features lacking in local rice.

Household size: The coefficient of household size of rice consumers was positive and significant at 5%. It implies that a unit increase in household size will lead to a corresponding increase in consumption of either local or imported rice by respondents. The size of household to a large extent influences the type of rice to consume by household members. Larger households tend to consume more of local rice that is cheaper than imported. This is in agreement with Bamidele et al. (2010) finding that large households tend to consume more rice than small households

and incurring higher income expenditure than small households.

Education of respondents: The coefficient of education was positive and significant at 5% level. This implies that increase in education will lead to a corresponding increase in consumption choice of either local or imported rice. Education has the tendency to influence one choice of the type of rice to consume. Those with some level of education would definitely prefer the imported rice type to local based on higher quality.

Income: The coefficient of income was positive and significant at 5% probability level. This means an increase in income level of respondents will lead to similar increase in the decision to consume either local or imported rice. It is expected that people with larger income would tend to prefer the imported rice as opposed to those with small capital. This is most probably to survive without thinking of quality.

Types of rice consumed by respondents
The result as presented in Table 4 revealed that majority of the respondents (48.0%) consumed imported rice type. This was closely followed by 44.5% of the respondents that consume a combination of the local and imported rice type. Only 7.5% of the respondents consumed local rice type. This is probably because the imported rice type is of a higher quality and grade. This finding supports Lancon et al. (2003) that the inability of the local rice to match the quality of imported rice is the major constraint that affects the development of the Nigerian rice sector.

Table 4. Types of rice consumed by respondents

Type of rice	Frequency	Percentage, %
Local	15	7.5
Imported	96	48.0
Combined	89	44.5

Reasons for consumer's preference for local or imported rice

The result as presented in Table 5 shows that respondents preferred the rice either local or imported because of the following characteristics such as cleanliness, tastes, shape of grain cooking time, good aroma, rate of breakage, stickiness after cooking, swelling capacity, colour and availability. Majority of respondents (85%) considered availability of rice in the market for quick purchase. The other factors were cleanliness (80%), taste (75%), swelling capacity (74.5%) and colour (68.5%), respectively. This implies that it would be unexpected to consume rice that is not free of stones and other debris. The attribute of swelling capacity is a choice determinant because rice that swells more satisfies a larger number of consumers in terms of variety for a given weight of rice because of its potential volume increase. This result is congruent with Lancon et al. (2003). However, the result indicates that taste (97.5%), good aroma (79.5), rate of breakage (55.5%), cooking ability (49.0%) and stickiness after cooking (46.0%) were the important attributes that tend to favour local rice consumption. This result is in agreement with Emodi and Madukwe (2011) that quality differential between local and imported rice is an important consideration in the decision making process.

Table 5. Reasons for consumer's preference of local and imported rice

Variable	Imported	Local
Tastes	150 (75.0)	195 (97.5)
Shapes of grains	66 (33.0)	34 (17.0)
Cooking ability	128 (64.0)	98 (49.0)
Good aroma	118 (59.0)	159 (79.5)
Rate of breakage	131 (65.5)	111 (55.5)
Stickiness after cooking	81 (40.5)	92 (46.0)
Swelling capacity	149 (74.5)	59 (29.5)
Colour	137 (68.5)	65 (32.5)
Cleanliness	161 (80.5	44 (22.0)
Availability	170 (85.0)	78 (39.0)

**Multiple responses. Figures in parentheses are percentages

Conclusion

The following major findings were made: the majority of rice consumers (69.0%) were females; the average age of the respondents was 42 years; the mean household size was seven persons; the average monthly income per consumer household was ₦22372.50 (62.84 USD); the logit regression result indicated that gender, age, price of rice, household size, education and income level influence rice consumption choice of either local or imported rice; most of the consumers preferred imported rice over local rice, because the imported rice has better qualities characteristics such as shape of the grains, cooking ability, low rate of breakage of grains, high swelling capacity, colour, cleanliness and availability; the few consumers that preferred local rice did so because of taste and good aroma. Arising from the study, the following recommendations are made: (i) the farmers should be encouraged to process their grains in a manner that they will be clean; (ii) breakage of grains should be minimized; (iii) local rice should be made available by expanding on production and establishment of storage facilities; (iv) the rice breeder of cereals research institute Badegi should be encouraged to breed the rice varieties that will have high cooking ability and good shape coupled with enhanced swelling capacity; (v) the price of local rice should be made readily lower to encourage patronage and consumption.

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