

ASSESSMENT OF CONSUMERS PREFERENCE AND WILLINGNESS TO PAY FOR LOCAL RICE IN SELECTED LOCAL GOVERNMENT AREAS OF NIGER STATE, NIGERIA

Abdullahi, A., Shuaibu, U., Jibrin, S., Muhammad, H.U., and Ahmed, I.I.

Department of Agricultural Extension and Rural Development
Federal University of Technology Minna,
Niger State, Nigeria

*Corresponding author: aabdullahi@futminna.edu.ng +2347061848379

ABSTRACT

The research work assessed consumers' preference and willingness to pay for local rice in Niger state, Nigeria. It specifically described the socioeconomic characteristics of local rice consumers in the study area. Data of 103 consumers was collected through a well-structured questionnaire. Heckman two step regression model and likert type of measurement were used to measures the collected parameter. Multi-stage sampling techniques was employed for this study, since the state is divided into three agricultural zones (zone A, B, C). The choice of local rice consumption is evident by their positive perceptions that local rice is healthy, have good taste and superior in quality than polish rice. The households' characteristics reveal that 55.3% of the respondents were 21-40years old. The mean household size was about 8 persons, 65% were married and 60.2% of the respondent had formal education. The study further revealed that more quantity of locally processed rice is demanded as compared to that of imported rice. Further findings revealed that reasonable price, taste and satisfaction were the major preference for local rice. The study reveals that grain size, market price, marital status and swelling capacity, ease of preparation affects consumers' preference and willingness to pay for local rice. The study also revealed that majority of the respondents gets their source of information about local rice from friends and neighbors and radio. It is recommended that local processors of rice should ensure the upgrading the locally processed rice as clean as the imported rice to compete favorably in domestic and potential international market.

INTRODUCTION

Rice is the seed of the grass species *Oryza sativa* (Asian rice) or *Oryza glaberrina* (African rice). Rice is the most commonly cultivated cereal throughout the world today (Okon and Ugwu, 2010). The African rice is believed to have originated from the wild rice (*O. barthii*) about 3500 years ago and was domesticated in the inland delta area of Nigeria from where it spread to other parts of Africa (Onu and Samson, 2018).

Rice accounts for over 20% of global calorie intake and has been an important food commodity for most people in Sub-Saharan Africa particularly in the West African region. In Nigeria, rice has assumed a strategic position in the food basket of rural and urban households. (Oyinbo *et al.*, 2015). It has changed from being a luxury to a necessity which consumption will continue to increase with per capita GDP growth, thus implying that its importance in the Nigerian diet as a major food item for food security will increase as economic growth continues (Onu and Samson, 2018). The position of rice as being a necessity in the households' food basket is a pointer to the growing consumer preference for rice in Nigeria (Oyinbo *et al.*, 2015). The need to increase in the pace of production and quality of local rice cannot be emphasized. Due to self-sufficiency considerations the rice industry should not be overlooked, it has the potential to produce and provide employment opportunities most especially in rural areas of the country, hence easing the socio economic pressure in the urban areas. A combination of various factors seems to have triggered the structural increase in rice consumption over the years especially with the ban in rice importation.

Rice has become a staple food in Nigeria such that every household; both the rich and the poor consumes a great quantity (Onu and Samson, 2018). With effort to achieve rice self-sufficiency in Nigeria, a rice transformation action plan was set up in 2011 under the umbrella of the Agricultural Transformation Agenda (ATA) and the target was 6.0 million metric tonnes per annum of Nigerian produced and internationally competitive milled rice by 2015 (FMARD, 2012). Emodi and Madukwe (2011) reported that households are dissatisfied with Nigerian rice bought in the market and are weary of picking stones from the Nigerian rice and having to wash it several times. Achieving self-sufficiency in rice production and consumption is not a function of only planting large hectares of land with rice neither does it end at producing millions of tonnes of paddy rice. The quality and quantity of processed Nigerian rice available in the market and having the quality desired by consumers closes the rice import gap. Considerably, previous research studies have focused on identifying the constraints to increasing domestic rice production in Nigeria (Olorunfemi, 2014; and Ekeleme *et al.* 2014). Other studies have focused on explaining the growth of rice consumption (Onu and Samson, 2018). Little or no attention has focused in investigating/researching on consumers' preference and willingness to pay for locally produced and processed rice (Sampson Kwakwa, 2013). In view of the above, the study seeks to assess consumers' preference and willingness to pay for local rice in selected local government areas of Niger state, Nigeria. To achieve this, the study seeks to achieve the following objectives: describe the socio-economic characteristics of the respondent; determine the level of consumers' preference for local rice; examine consumers' willingness to pay for local rice, examine the factors influencing consumers' preference and willingness to pay for local rice.

METHODOLOGY

This study was conducted in Lapai, Bosso and Wushishi Local Government Areas of Niger State, Nigeria. Niger State was created out of the former North Western State and became a fully autonomous State on 3rd February, 1976, with headquarter at Minna. Niger State is in the North-central part of Nigeria and lies between longitude 3^o 30¹ and 7^o 20¹ East of the Greenwich Meridian and latitude 8^o 20¹ and 11^o 30¹ North of the equator (Niger State Bureau of statistics (NSBS), 2013). The State presently comprises of 25 Local Government Areas (LGAs) and it is made up of three major ethnic groups which are the Nupe, Gbagyi and Hausa. However, the total inhabitants in the State are over 3,954,772 people (National Population Commission of Nigeria (NPCN), 2016) from 2006 population census. But, going by the annual population growth rate of 3.5 percent in Nigeria, the population of Niger State was projected to be 5,556,200 people (NPCN, 2016) in the year 2016. Niger State shares common boundaries to the North with Zamfara State, to the North-East with Kaduna State, and to the South-East with the Federal Capital Territory (FCT). It also shares an international boundary with the Benin Republic at Babanna in Borgu Local Government Area of the state (National Bureau of statistics, 2016). The land area is about 76,363 square kilometers at a density of 72.76/square kilometer (NBS, 2016), with varying physical features like hills, lowland, rivers and luxuriant vegetation; vastly Northern Guinea Savannah while the fringe Southern Guinea Savannah is found in the Southern part of the State.

In order to obtain a sample size for this study, multistage sampling technique was adopted to select respondents for the study. The first stage involved random selection of three (3) LGAS, namely; Bosso, Lapai and Wushishi. While the second stage involved the random selection of two villages from each of the selected LGAs. The third stage was the use of Yamane formula to select sample size from sample frame. Yamane's formula is mathematically expressed as: $n = \frac{N}{1 + N(e)^2}$ Where; n = sample size, N = finite population, e = level of precision at 0.05 probability, 1 = constant. Hence, a total of 103 local rice consumers were considered as respondents for the study.

Data were collected using a structured questionnaire complimented with interview schedule and analyzed using frequency distribution, percentages, mean and heckman two step regression analysis. A 4-point Likert rating scale of Very high preference (VHP) = 4, High preference (HP) = 3, Very low preference (VLP) = 2, Low preference (LP) = 1 was used to determine the level of consumers' preference for local rice. A mean of 2.5 was obtained by adding $(4+3+2+1=11/4=2.5)$. Thus the following decision was concluded;

Mean score ≥ 2.5 will be adjudged preferred

Mean score < 2.5 will be adjudged not preferred. Heckman two step regression analysis was used to determine factors influencing consumers' preference and willingness to pay for local rice which was specified as follows: The implicit form of the model used was stated as:

Implicit form; $Y_1, Y_2 = f(X_1, X_2, X_3, X_4, X_5, X_6, X_7, X_8, X_9, X_{10}, X_{11}, X_{12}, X_{13}, X_{14}, e)$

Explicit form; $Y_1, Y_2 = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \dots + \beta_{14} X_{14} + e$, Where:

Y_1 = consumers' preference score for local rice

Y_2 = Consumers' willing to pay for local rice (willing = 1, otherwise = 0)

$X_1 - X_{14}$ = Independent variables. Where: X_1 = age (years), X_2 = educational level (years), X_3 = sex (male = 1; otherwise = 0), X_4 = marital status (married = 1; otherwise = 0), X_5 = market price, X_6 = aroma, X_7 = satisfaction, X_8 = grain quality, X_9 = grain colour, X_{10} = ease of preparation, X_{11} = stickiness, X_{12} = monthly income, X_{13} = grain size, X_{14} = swelling capacity and e = error term which accounts for those variables not included in the model.

RESULTS AND DISCUSSION

Socio-economic Characteristics of the respondents

Age: In table 4.1 the result shows that (55.3%) of the respondent fall within the age of 20-40 while (35.9%) falls within the age of 40-60. The mean age of respondents was 36 years. The average age of the respondents indicates that most of the respondents are within the working age group, likely to have some disposable income for household expenditure. This also 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, 1985 who asserted that labouring adults require milled rice to meet the daily carbohydrate and protein needs for sustenance in Niger State of Nigeria.

Gender: Results in Table 4.1 shows that greater proportions (63.1%) of respondents were females 'whiles (36.9%) were males. This finding may not be surprising with high female participation in the household work in traditional African household. Gender wise, rice purchase is dominated by female consumers. In a traditional Nigeria household, women (females) are responsible for purchasing and preparing of food (Assibey-Mensah, 1998).

Marital status: Table 4.1 indicated that (65%) of the respondents in the study area were married while (19.4%), (10.6%) and (4.8%) were single, divorce and widowed respectively. This finding implies that majority of respondents in the study area were married, indicating family responsibilities that will force consumers to minimize cost by going for local rice. This finding concur with Ajayi and Ajiboye (2020) who reported that most of the rice consumers in Niger State of Nigeria were married.

Household Size: Table 4.1 revealed that 43.7% of the respondents had household size between 6-10 persons while 40.9% had household size less than 5 persons. The mean household size of the respondents in the study area was 8 persons. This indicates, normally the larger the household the bigger the quantity of rice consumed as opposed to smaller ones.

Formal Education: Table 4.1 showed that 60.2% of the respondents had formal education. This implies that most of the respondents were literate. Access to formal education can improve the skill and knowledge of consumers on income generation that will grant them access to prefer local rice varieties. Also, the mean years spent in formal education was 6.6 years. This indicates very low literacy level among the rice consumers and this could negatively affect their preference.

Table 4.1: Socio-economic characteristics of the respondent (n=103)

Variables	Frequency	Percentage	Mean
Age(years)			
Less than 20years	6	5.8	36
21-40years	57	55.3	
41-60years	37	35.9	
Above 60years	3	2.9	
Gender			
Male	38	36.9	
Female	65	63.1	
Marital status			
Married	67	65.0	
Widowed	5	4.8	
Divorced	11	10.6	
Single	20	19.4	
Household size			
5 people and below	42	40.9	8
6-10	45	43.7	
11-15	6	5.9	
Above 15	10	9.7	
Formal Education			
Yes	62	60.2	
No	41	39.8	
No. of years spent			
No formal	41	39.8	7
1-6years	27	26.2	
6-12years	23	22.0	
Above 12years	13	12.0	

Source: Field survey,2021

Consumer Preference for Local Rice.

Table 4.2 revealed that respondents in the study area respondents had preference in all the statements; reasonable price (\bar{X} =3.35) and taste (\bar{X} =3.35) both ranked 1st, showing reduction of local rice compared to foreign was the major reason they preferred it. Also, the locally made rice is believed to have a good taste than foreign rice. Satisfaction (\bar{X} =3.28) and consistence in quality (\bar{X} =3.19) were ranked 3rd and 4th respectively, signifying that majority of the respondent derived satisfaction with local rice and the quality is not adulterated. This finding agreed with Iweka and Ederewhevbe (2018) who reported consumers' local rice preference in in South East of Nigeria were majorly attributed to taste, satisfaction and reduction in price.

Olorunfemi (2018) reported that taste, good aroma, price, and absence of foreign material were the major criteria for the purchase of local rice in Ekiti State. Other findings showed that storage durability (\bar{X} =3.17), quality in relation to taste (\bar{X} =3.16), ease of preparation (\bar{X} =3.13), swollenness (\bar{X} =3.12), product safety to health (\bar{X} =3.03), size of grain (\bar{X} =2.97), aroma (\bar{X} =2.73), texture (\bar{X} =2.73), cohesion after cooking (\bar{X} =2.65), appearance (\bar{X} =2.69), cohesion after grain (\bar{X} =2.65), colour (\bar{X} =2.64), convenience of package (\bar{X} =2.62) and branding (2.44) ranked 6th, 7th, 8th, 9th, 10th, 11th, 12th, 13th, 14th, 15th, 16th and 17th according to ranking. Ajayi and Ajiboye (2020) reported that good texture, colour, appearance and swollenness were the considering stated by rice consumer in Niger State of Nigeria.

Summarily, the study revealed that 81% of the respondent has high preference for local rice while 19% have low preference for local rice with the average mean of 3.1. This implies that majority of the respondents in the study area prefer local rice to foreign rice.

Consumers' Willingness to Pay for Local Rice.

Result in Table 4.3 above revealed that majority of the respondent were willing to pay for local rice even if the prices were higher or had to go far distance in search of it. However, Majority were unwilling to pay for local rice if its' not certified, due to the fear of consuming contaminated food. This is in agreement with the findings of Uchenna and Llyod (2017) who revealed that WTP for imported rice was higher in Urban areas compared to rural areas.

Table 4.2.1: Consumer preference for local rice

characteristics of local rice	Very high preference	High preference	Low preference	Very low preference	Mean	Rank
Reasonable price	52(50.5)	41(39.8)	4(3.9)	6(5.8)	3.35	1 st
Taste	51(49.5)	41(39.8)	7(6.8)	4(3.9)	3.35	2 nd
Satisfaction	41(39.8)	53(51.5)	6(5.8)	3(2.9)	3.28	3 rd
Consistency in quality	40(38.8)	50(48.5)	6(5.8)	7(6.8)	3.19	4 th
Storage durability	42(40.8)	44(42.7)	10(9.7)	7(6.8)	3.17	5 th
Quality in relation to price	33(32.0)	60(58.3)	3(2.9)	7(6.3)	3.16	6 th
Ease of preparation	36(35.0)	50(48.5)	11(10.7)	6(5.8)	3.13	7 th
Swollenness	44(42.7)	41(39.8)	4(3.9)	14(13.6)	3.12	8 th

Source: Field survey, 2021.

Table 4.2.2: Summary of consumers' preference for local rice.

Preference level	Frequency	Percentage	Mean of mean
High preference	83	81	3.1
Low preference	20	19	

Source: field survey,2021

Table 4.3: Consumer Willingness to pay for local rice

Willingness Questions	Willingness score	Willing=1, not Willing=0
Willing to pay more for local rice	97	1
Willing to go far distance in search for local rice	85	1
Willing to pay more for local rice if others rice taste better	93	1
Willing to buy the improved local rice if they are more available	94	1
Willing to pay any price to get your desired local rice	91	1
Willing to buy local rice if they are not labelled or branded	84	1
Willing to spend more time in sourcing for local rice	81	1
Willing to pay for local rice if it sells at the same price as foreign rice	89	1
Willing to consume more of local rice if you know the health benefit	99	1
Willing to pay for improved local rice even if it is not certified	33	0

Source: Field Survey, 2021.

Table 4.3.1: Summary statistics of consumers' willingness to pay for local rice.

Willingness to pay for local rice	Frequency	Percentage
Willing to pay	89	92
Not willing to pay	14	8

Source: field survey,2021

Summarily, in table 4.3.1 revealed that 92% of the respondent scored above 6 out of 10 willingness questions been asked. This implies that they are willingness to pay more for local rice while 8% scored less, this means that they are not willing to pay more for local rice due to some characteristics such as taste, grain colour and market price.

Heckman Two Step Analysis of the Factors Influencing Consumers Preference and WTP for Local Rice.

Table 4.4 showed the result of the Heckman probit model. The model was first run and tested for its appropriateness over the standard probit model. The outcome of this operation revealed the presence of a sample selection problem (that is dependence of the error terms on the outcome and selection models) hence, justifying the use of the Heckman probit. Moreover, the likelihood function of the Heckman probit model was significant (Wald = 11.30, with $P < 0.0001$) showing a strong explanatory power of the model.

Table 4.4 also revealed that the coefficient grain size (1.191039) was positively significant at 10% level of probability, implying the bigger the grain size the better the preferred. This finding concurs with Ajayi and Adeboye (2020) who stated that grain size increase preference for locally produced rice in Ekiti State. The coefficient of marital status (-30.4264) was negatively significant at 5% level of probability, signifying an inverse relation. The coefficient of swelling capacity (.7418398) was positively significant at 1% level of probability. This indicates that consumers are likely to prefer rice with swelling capacity in the study area. Ajayi and Adeboye (2020) further reported that swelling capacity of some locally produced local rice are exceptional.

Table 4.4 showed the result of the Heckman probit model. The model was first run and tested for its appropriateness over the standard probit model. The outcome of this operation revealed the presence of a sample selection problem (that is dependence of the error terms on the outcome and selection models) hence, justifying the use of the Heckman probit. Moreover, the likelihood function of the Heckman probit model was significant (Wald = 11.30, with $P < 0.0001$) showing a strong explanatory power of the model.

The coefficient of market price (-.1812322) was negative significant at 5% level of probability, as market price increases, the willingness to pay for local rice reduces. The coefficient of swelling (5.303583) was positively significant at 1% level of probability, signifying that increase in swelling capacity will increase the willingness to pay for local rice in the study area. Iweka and Ederewhevbe (2018) reported that swelling is the major factor responsible for rice preference in South East. The coefficient of grain size (7.926686) was positively significant at 5% level of probability, indicating that as size of rice increase the willingness to pay increases. The coefficient of ease of preparation (.158301) was positively significant at 10% level of probability, indicating that local rice consumers will pay for rice that is easy to prepare. Iweka and Ederewhevbe (2018) stated that local rice is very easy to prepare compared to foreign that is preserved with many preservatives. The coefficient of stickiness (-3.988113) was negatively significant at 1% level of probability implying as stickiness of local rice increases, the willingness to pay reduces.

Table 4.4.1: Heckman two step analysis of the factors influencing consumers' preference WTP

Variables	Preference		Willingness to pay	
	Coefficient	Z -value	Coefficient	Z- value
Age	.964	1.35	.099	0.85
Gender	2.285	0.31	.110	0.05
Marital status	-30.426	-2.21**	3.156	1.01
Grain size	1.191	1.68*	7.927	2.33**
Grain quality	2.309	1.74*	.190	0.95
Market price	-.393	-0.68	-.181	-2.33**
Grain colour	.081	1.37	.068	0.56
Taste	-.042	-0.87	.407	1.45
Stickiness	.287	0.68	-3.988	-1.71*
Ease of preparation	1.464	0.49	.158	1.85*
Monthly income	.38	0.43	.015	0.86
Swelling capacity	.742	3.03***	5.304	2.62***
Cons	-4.977	-0.18	-1.435	-2.92***
Diagnostics				
Lambda	16.02157	1.79*		
Wald chi2 (5)	11.30			
Prob >chi2	0.0014***			

Source: Field survey,2021

***significant at 1% level of probability, ** significant at 5% level of probability, *significant at 10% level of probability

CONCLUSION AND RECOMMENDATION.

From the findings of the study on the assessment of consumers' preference and willingness to pay for local rice in selected LGAs of Niger state, Nigeria, the result revealed that local rice consumers were in their active age, female having the high participation purchase in food items, married with large household size. Most of the respondent had formal education and use family labour as source of labour. Further findings revealed that reasonable price, taste and satisfaction were the major preference for local rice. The coefficient grain size, marital status and swelling capacity affect consumers' preference and willingness to pay for local rice. Also coefficient market price, swelling capacity and ease of preparation influence consumers' willingness for local rice. Therefore, it was recommended that The price of local rice should be reduced by producers in order to increase more patronage, local rice producers should improve on packaging and processing of rice in order to compete with foreign rice.

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