

ANALYSIS OF THE DEMAND FOR LOCALLY PROCESSED RICE IN NIGER STATE, NIGERIA.

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ABSTRACT

This study analyses the demand for locally processed rice in Niger State. Cross-section data was obtained from 400 rice consumers in 5 Local Government Areas of Niger State. The data obtained was analysed using multiple regression analysis. Own price (P_r), consumer disposable income (Y_d), family size (P_x), and price of cowpea (P_c) were found to significantly influence the demand for rice at the 5% level. The demand for rice is price inelastic, as such consumers are reluctant to forego the consumption of rice due to the prestige attached to its consumption as a "festive food". The relatively high-income elasticity for rice suggests a potential for the emergence of a large market for locally processed rice in future in the study area ceteris paribus. Estimated cross price elasticity coefficient between rice and cowpea shows that consumers in the study area perceive rice to be complementary to cowpea. Periodic wage reviews in line with current economic indices will put more income in the hands of consumers coupled with enforcement of the ban on imported rice and adoption of modern processing techniques which makes locally processed rice similar in quality to its imported counterpart will go a long way to generate increased demand for locally processed rice.

Key words: demand, rice, Niger State

INTRODUCTION

Rice is the second most widely grown cereal in the world, after wheat. It is the single most important staple food for about half of the world's population.(Nyanteng,1987). Among West African countries, after Sierra Leone and Burkina Faso, Nigeria is the next largest producer of rice(Chevalier and Viguier,1993). According to WARDA (1981), the total hectareage under rice production in Nigeria has increased from 134,500 hectares in 1960 to 400,000 hectares in 1980; and yield has also correspondingly increased from 156kg/ha to 500kg/ha. Due to importance of rice as a staple food crop in Nigeria, it is ranked fifth in productions only behind cassava, sorghum, millet, and maize (FAO, 2005). At least, 50% of the world's population obtains 60% of their energy requirement from rice and 30% of all human energy comes from the plant (rice)(FGN,1983). Despite the fact that the Nigerian ecology is conducive to mass production of rice, supply has not kept pace with demand.

Nigeria's food sub-sector is bedevilled with perennial food shortages and soaring food price, and in a bid to revamp the dwindling agricultural sector of the country's economy, various regimes in Nigeria, past and present, have instituted various policies and programmes with little or no perceptible degree of success (Onyeweaku, 1988). This may be attributed to the fact that agricultural production, despite the rise in hectareage of land cultivated and consequent yield, has not kept pace with the fast growing population.

In Nigeria, food production, especially cereals, which constitute a high percentage of staples consumed by the populace, is left in the hands of peasants whose production method is characterised by the use of crude tools and methods, low productivity inputs, and low capital investments as a result of the high incidence of poverty. All these make production more laborious, time consuming, and less efficient.

Furthermore, the astronomic growth in population has made demand pressures on available food supplies to rise. The resultant effect has been a soaring of domestic food prices and imports in recent years, especially for such food item with income elastic demand as rice.

The fundamental dilemma facing food policy makers today is how to make food prices high enough to encourage agricultural production and low enough to be affordable by consumers (Gittinger et al, 1987). The failure in striking a balance between food supply and demand is a major constraint responsible for price instability and fluctuation culminating in staple food scarcity, dietary deficiency, and malnutrition among the teeming population. To ameliorate the inherent constraints associated with hunger, the need to pursue a rigorous food security programme thus becomes imperative. This study examines demand for locally processed rice in Niger State and it is expected to bridge the existing gap in knowledge regarding the structure of the demand for rice in the study area. It will also provide a base-line data for formulating realistic policy measures that could boost increased consumption of rice as means towards raising the standard of living of the populace, hence, boosting national welfare. The study tested the hypothesis that the demand for rice in Niger State is not significantly determined by own price, consumer income, population, and price of cowpea.

METHODOLOGY

Data for this study was obtained form a cross-section of 400 rice consumers randomly selected from 5 local government areas in Niger State namely Kotangora, Bida, Minna, Suleja, and Borgu. Eighty farmers were randomly sampled in each LGA through the use of questionnaire and interviews.

Model specification

It is postulated in the study that the aggregate demand for locally processed rice is determined, *ceteris paribus*, by factors such as own price, consumer income, population, and price of cowpea. The foregoing functional relationship was mathematically represented as:

$$Q_d = f(P_r, Y_d, P_x, P_c, e) \text{-----} (1)$$

Where:

Q_d = Demand for Rice(kg)

P_r = Own price(N)

Y_d = Consumer Disposable Income(N)

P_x = Family size(No. of persons in a household)

P_c = Price of Cowpea (a complement of rice) (N)

e = Disturbance term

The Ordinary Least Squares (OLS) regression technique was used in deriving the relationships of the single-equation model. The above independent variables were regressed on the dependent variable. Four functional forms were used. The models used were the Linear, Exponential, Double logarithm(Cobb-Douglas), and semi-logarithm. The essence was to obtain the model of best fit. Thus the model that provided the best fir was selected on the basis of the following :- (a) the magnitude of the coefficients of the multiple determination R^2 (b) The magnitude and statistical significance of the regression coefficients and (c) the signs of regression coefficients as they conform to a priori expectations. On the basis of the usual statistical and econometric criteria, the double -logarithmic equation was finally selected for further analysis as follows:

$$\text{Log}Q_d = b_0 + b_1 \text{Log}P_r + b_2 \text{Log} Y_d + b_3 \text{Log}P_x + b_4 \text{Log}P_c \text{-----} (2)$$

To facilitate easy estimation of the required demand and supply coefficients using the Ordinary Least Square (OLS) method of multiple regression analysis, equation 2 was transformed into logarithmic form as follows:

$$\text{Log}Q_d = b_0 + b_1\text{Log}P_r + b_2\text{Log}Y_d + b_3\text{Log}P_x + b_4\text{Log}P_c + e_i \quad (3)$$

Where:

Log = Logarithms to base 10

B_s = Demand coefficients which are direct measures of elasticity.

RESULTS AND DISCUSSION

Estimated Demand Functions

The estimated coefficients of the demand functions specified in equation 1 is shown in the table 1

Table 1: Regression Coefficients on Demand for Rice in Niger State.

Commodity	Constant	Regression Coefficients				F	R ²	R
		Log P _r	Log P _d	Log P _x	Log P _c			
Rice	-319	-6.0**	4.2**	1.413**	.169**	125**	0.770	0.881
	(297)	(0.036)**	(0.025)**	(0.067)**	(0.124)**			

Source: Field Survey, 2003

Figures in Parentheses are Standard Errors

** Significant at the 5% level

The information in the table above yielded the following demand equation.

$$\text{Log} Q_d = .319 - 6.0 \text{Log}P_r + 4.2 \text{Log}Y_d + 1.413 \text{Log} P_x - .169 \text{Log}P_c \quad (3)$$

The demand coefficients in equation 3 have their expected sign. All the independent variables (own price, consumer disposable income, family size, and price of cowpea) are statistically significant at the 5% level. This implies that all the explanatory variables are indeed major factors influencing the per capita demand for locally processed rice in Niger State. The result of this work is consistent with evidence from other research by Allison-Oguru and Ubani (1990), Smith (2005), and Garrido (2005). More so, the F ratio in the equation is statistically significant at the 5% level, signifying that the joint influence of all the explanatory variables on per capita demand for rice produced in the study area is very strong.

The result showed that own price, consumer disposable income, family size (population) and price of cowpea explained 77% of the variation in the quantity demanded for rice processed locally. The high multiple R obtained could be explained in the context of an economy where prices are constantly rising; under such circumstances, it is expected *ceteris paribus* that demand for such goods like rice would correspondingly increase.

From the foregoing results, it can be observed that aggregate demand for locally processed rice in Niger state is jointly determined by factors such as own price, consumer disposable income, family size, and price of cowpea. For the purpose of predicting future demand for rice in the study area, all the independent variables stand out as important and reliable determinants of per capita demand for rice. In view of the results, we fail to accept the null hypothesis as the demand for rice is significantly determined by own price, family size, consumer income and the price of cowpea

Table 2: Estimated Demand Elasticity for Rice in Niger State

Commodity	Price	Income elasticity	Family Size	Cross Price(cowpea)
Rice	-6.0	4.2	1.4	-.169

Source: Computed from Survey data, 2003.

The regression coefficients on demand for rice in Table 2 represents estimated demand elasticity coefficients for rice in the study area. This approach was similarly adopted by Allison-Oguru and Ubani(1999) in estimating elasticity coefficients for fish in Rivers State. The estimated price elasticity coefficients for rice (-6.0) indicate that there is an inverse relationship between the quantities demanded and price changes. As the price increases, the quantity demanded decreases and vice versa. This result is consistent with our a priori expectation. However, the value shows that the demand for rice in the study area is price inelastic. Many consumers are not ready to forgo the consumption of the commodity (rice) on event of price increase, though the quantity demanded may shrink. This could be due to the prestige attached to rice consumption in the study area as a festive and classy food. Notwithstanding its stoniness, consumers in the study area perceive locally processed rice to possess distinct native aroma, flavour and palatability compared with its imported counterpart. The estimated income elasticity coefficients exhibit the expected positive sign. This implies that rice is a normal good. However, the magnitude of the estimated income elasticity coefficients suggests that rice is a luxury good during festive periods of the year. This is probably so because rice is commonly used or served on special occasions, feasts, ceremonies, and celebrations as the acceptable food among the populace in the study area. The relatively high income elasticity for rice suggests in the context of available empirical evidence, a potential for the emergence of a large market for the commodity in the future in the study area since rising income could stimulate purchases of all normal goods.

The estimated cross-price elasticity coefficient between rice and cowpea is negative suggesting consumers of rice in the study area perceive rice to be complementary to cowpea. This conforms to our a priori expectation. It can therefore be argued, from this result that a reduction in the price of cowpea could cause an increase in the per capita demand for rice and vice versa, *ceteris paribus*.

If efforts are geared towards production of more cowpea, it could be capable of causing a reduction in its price so as to induce a higher demand for rice. Indeed, any programme directed toward boosting rice production activities in the state as a whole, should of necessity also encompass the widespread production of cowpea. This will go a long way in stabilising price of rice while at the same time ensuring that people in the study area have access to consuming greater quantity of plant protein at affordable prices.

CONCLUSION AND RECOMMENDATIONS

Since rice is a major staple food in the study area, there is an urgent need to boost production to match up with population growth. This calls for an articulate, realistic, and well thought out strategy to ensure food security for the populace. This will entail the removal of those major constraints, which seriously limit consumption of rice. Modern processing techniques, which confer on locally processed rice a higher quality, will make it to compete favourably with its imported counterpart.

Government so as to boost the welfare of the populace should vigorously pursue periodic wage reviews that take account of current economic indices. This measure will put more income in the hands of consumers and could encourage increased consumption of rice since rice has positive income elasticity. Frequent hikes in the price of petroleum products, which results in the spiralling of food prices, should be curtailed. To stimulate the demand for locally processed rice and to improve the lot of local farmers, ban on rice imports should be strictly enforced.

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