Journal of Food Security, 2018, Vol. 6, No. 2, 51-54
Available online at http://pubs.sciepub.com/jfs/6/2/1

DOI:10.12691/jfs-6-2-1

Determinants of Demand for Rice with Implications for Peri-Urban Household Food Security in Southwestern Cameroon

Arthur Ngandeu Kouekam[1], Ernest L. Molua[2], Ajapnwa Akamin[2], Cynthia J. Mkong[2,*]

[1]Centre for Independent Development Research, CIDR, P.O. Box 58 Buea, SWR, Cameroon
[2]Department of Agricultural Economics and Agribusiness, University of Buea, P.O Box 63 Buea, Cameroon
*Corresponding author: mkongcynthiajeh@gmail.com

Abstract This study evaluates the determinants and elasticity of the demand for rice in Buea municipality. Cross-sectional data was obtained from sixty rice consuming households in six localities of the Buea municipality. The data obtained was analyzed using multiple regression analysis. Product price, consumers' income, family size and substitute price were found to significantly influence the demand for rice at 5% level. The demand for rice is price inelastic and 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 rice in the future in Buea. Estimated cross elasticity coefficient between rice and spaghetti shows that consumers in Buea perceive rice to be complementary to spaghetti. Periodic wage reviews in the line of current economic indices will put more income in the hands of consumers coupled with the adoption of modern processing techniques in rice production which will go a long way to generate increased demand for rice in Buea.

Keywords: *rice, demand, elasticity, food security, Cameroon*

Cite This Article: Arthur Ngandeu Kouekam, Ernest L. Molua, Ajapnwa Akamin, and Cynthia J. Mkong, "Determinants of Demand for Rice with Implications for Peri-Urban Household Food Security in Southwestern Cameroon." *Journal of Food Security*, vol. 6, no. 2 (2018): 51-54. doi: 10.12691/jfs-6-2-1.

1. Introduction

Despite the progress made in the last decade, it is recorded that poverty and malnutrition remain a serious problem in Sub-Saharan Africa and Cameroon in particular. To combat the ills of food insecurity and malnutrition, Africa is witnessing an increasing demand for rice consumption, and many countries on the continent continue to rely heavily on imports for meeting their growing rice consumption needs. This situation continues to pose serious food security challenges since rice is now recognized as a priority and strategic food security crop for the country. During the past three decades the crop has seen a steady increase in demand and its growing importance is evident given its important place in the strategic food security planning policy of the country. The country has less than 40 percent rice self-sufficiency, thus relies on imports to meet shortfalls in production. China, Thailand and Vietnam are the county's main rice suppliers. Cameroon consumes the highest quantity of rice (170 900 tonnes per year) in the Central Africa subregion, followed by the Democratic Republic of Congo (65 500 tonnes); the Central African Republic consumes the least (6 500 tonnes). Cameroon's dependence on rice imports became marked during a global surge in agricultural commodity prices in 2007-2008. This surge affected the economies of African countries and even fuelled widespread protests in some in response to high rice prices. Cameroon is beginning to realize the need to exploit the potential of the rice sector to enhance food security.

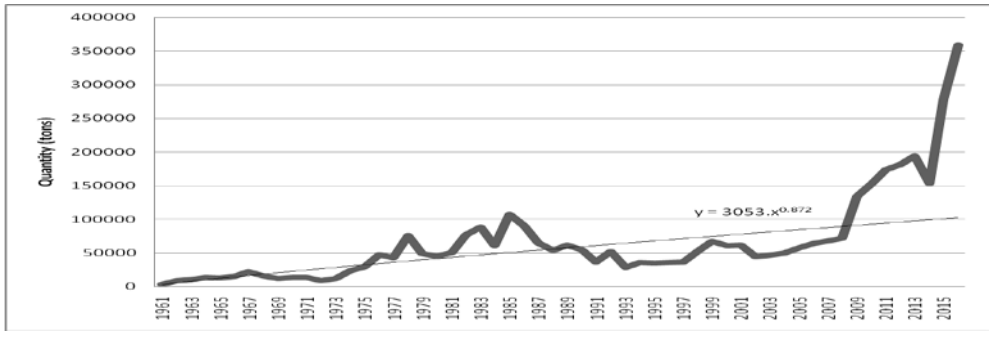

Figure 1. Rice Production Trends in Cameroon, 1961-2016 (Source: authors' computation from FAOSTAT)

Statistics reveal that while agricultural production increased to 12.3% of GDP in 2009, 72.1% of the population still live on less than 2 US Dollars per day, 28% consume inadequate calories and 24% of the children below 5 years are underweight [1]. Rice is one of the staple foods in Cameroon; it is consumed all over the country but produced in only some parts of the country.

As shown in Figure 1, production of rice has followed both increasing and decreasing drifts which often correspond to both local and international shocks (e.g. policy adjustments, agricultural trade liberalization, climate variability and biological risks such as pest and disease breakouts). Official figures show rice production to have increased from 11 860.6 tons in 1961 to 33 509.4 tons in 1969. It dropped to 25 024.9 tons in 1970 and again rose to 35 019.69 tons in 1971. Thereafter, a continuous increase in production was registered between 1972 and 1974 from 36 955.4tons to 29 425.6 tons, with the subsequent year characterized by a slight drop in production to 37 309.07 tons. The period between 1975 and 1979 was marked by a remarkable increase in production from 44 279.49 tons to 99 072.6tons. This period was, however, followed by a plummet in production from 92 049.99 tons to 72 342.46 tons in 1980 and 1982 respectively. Nevertheless, a sustained increase in production was recorded between 1983 (102 800.9tons) and 1986 (140 913.1tons). In 1987, production again dropped to 13 2938 tons and later rose from 151 403.2 in 1988 to 185 440 in 1990. An additional fall in production was observed in 1991 (101 837.7) which again increased continuously to 167 731.7 in 1992, 170 211.5 in 1993 and 180190 tons in 1994. A fall in production was once more observed in 1998. The period between 2001 and 2013 in Cameroon was marked by a sustained increase in rice production from 424 445.7 tons in 2001 to 795 787.5 tons in 2013 when production reached its peak.

These swings in production have had significant effects on consumption needs, for which to satisfy the population's demand for rice, large importations are made. Satisfying the high demand for this staple food remains a challenge since its demand keeps increasing each year while national production stagnates at high prices for imported rice. Various constraints also affect rice consumption such as consumer income, availability of cheaper substitutes like spaghetti, high prices, taste and fashion and even cultural practices. These constraints further affect the demand for rice by bringing about poor supply responses and nutritional insecurity.

Dewbre and Borot [2] reported that the agricultural sector in Sub-Saharan Africa is often characterized as dire, needing immediate policy action if food production is to keep up with a growing population, avert famine and reduce poverty. The previous ten to twenty year record of agricultural performance in Cameroon belies such bleak assessment. Rahji and Adewumi [3] pointed out that the concept of self-sufficiency in rice production as a development strategy is a necessary precursor to the ultimate goal of self-reliance standards which is a desirable goal of society. Molua [1] notes that rice is a major crop in Cameroon, produced largely by subsistence farmers and important for household consumption needs in the country. Reference Musa and Othman [4] examined the determinants of consumers purchasing behavior for rice and pointed out that consumer preference for rice varies from country to country. Usually, they were concerned about the quality and price of the commodity when they made purchase. In America, consumers preferred rice which was associated with specific menus, whereas in the Middle East, they mostly favored long grain and well milled rice with strong aroma. Kassali et al. [5] revealed that the demand for rice is affected not only by price of rice, but also by other factors like income, household size, age of respondent, frequency of rice purchase as well as the price of other goods like beans and yams which can be substituted for rice. This study statistically tests the null hypothesis that, 'the price for rice does not influence the demand for rice in Buea and that income of consumers does not influence the demand for rice in Buea."

2. Materials and Methods

Buea is the capital of the South West Region of Cameroon, which constitutes part of the territory of Southern Cameroon. The town is located on the eastern slopes of mount Cameroon and has a population of about 150,000 (at the 2005 census). This includes Bokwango, Muea, Bomaka, Tole, Mile 16, Mile 17, Mile 14, Mile 15, Bova, Bojongo, Likombe, Bwassa, and surrounding villages). Buea was the colonial capital of Southern Cameroons from 1949 until 1961, the German administration in Buea was temporarily suspended during the eruption of Mount Cameroon from April 28 to June 1909. Originally, Buea's population consisted mainly of Bakweri people but due to its position as a 'university town' and regional capital, there are a significant number of other ethnic groups. Because of its location at the foot of Mount Cameroon, the climate of Buea tends to be humid, with the neighborhoods at higher elevations enjoying cooler temperatures while those at lower elevations experiencing a hotter climate.

For this study, we distinguish three major dimensions of food and nutrition status as far as rice is concerned - rice availability, rice access and rice utilization. These three dimensions are strongly interlinked. The realization of rice availability is a necessary, but not sufficient condition for the realization of rice access. In turn, the realization of rice access is a necessary, but not sufficient condition for the realization of rice utilization. Rice availability can be described as the extent to which rice is within reach of households (for example in local markets and shops), both in sufficient quantity and quality [6]. At a more local level, rice availability is strongly contingent on road and market infrastructure, the degree of market integration and local markets institutions.

Household rice access level is considered to be achieved when a household has the opportunity to obtain rice of a sufficient quantity and quality to ensure a safe and nutritious diet [6]. To realize this, not only domestic and local rice availability must be realized, all households must have access to necessary resources to acquire the rice. Important drivers of rice access are household resources, rice prices, individual preferences and other socio-political factors. Rice access is to a large extent determined by rice prices and household resources since every household has a

limited amount of resources at its disposal which are allocated across different income and non-income generating activities [7].

The quantity and quality of rice that a household can acquire given its resources will depend on domestic rice prices, which are generally determined by rice availability and aggregate rice demand. For given prices and income, individual preferences will determine the consumption of different commodities including rice. Dietary preferences can be influenced by factors such as culture, religion and social status [8]. Rice utilization refers to an individual's dietary intake and his/her ability to absorb nutrients contained in the rice that is eaten. Hence, rice utilization relates not only to the quantity of rice eaten, but also to the quality of the diet.

The study was carried out in Buea covering the localities of Molyko, Mile 16, Muea, Bokwango, Bakweri town and Soppo. These sites were chosen because they constitute a useful source of primary data since some are urban sites while others are rural sites, enabling us to equitably study the demand for rice in Buea. The data for this study was collected from primary sources through the issue of questionnaires. Quantitative information about the quantity of rice consumed, unit purchase price, consumer income, substitute price and consumers' family size was obtained. Data was collected with respect to age, gender and income of the respondents. Ten respondents were randomly selected from each locality, making up a sample size of 60 individuals. Though some questions were not direct, it was to reduce the respondent's bias as far as possible as well as the large sample size. In our research, we also use simple random sample technique to save unbiased information as well as to obtain a true presentation of rice demand in Buea. The using of a sample size with up to 60 individuals is to get a true representation of the population which is too large.

The economic system consists of producers and consumers who are affected by changing economic conditions. The quantity of goods and services produced, distributed and consumed depends on the efficiency with which the economic system operates. The more efficient the economy is organized, the greater will be the quantity of goods available for sales and consumption. The demand for rice is determined, ceteris paribus, by factors such as own price, consumer income, population, gender, age, and price of substitute good. Such that the equation for our function is:

$$Q_d = f\left(P_r, \mathrm{Y}, P_x, P_s, \mathrm{G}, \mathrm{A}, \mathrm{e}\right) \quad (1)$$

Where Q_d = Demand for rice, P_r = Price for rice, Y= Consumer's income, P_x = Family size, P_s= Price of substitute, G= Gender, A= Age and e= Stochastic error term. The log-log explicit relationship of eq. (1) above is:

$$\begin{aligned} lnQ_d &= b_0 + b_1 lnP_r + b_2 lnY + b_3 lnP_x \\ &\quad + b_4 lnP_s + b_5 lnA + b_6 lnG + e \end{aligned} \quad (2)$$

Where ln = Natural logarithms and b_i = Demand coefficients which are direct measures of elasticity.

3. Results and Discussion

The study finds out that women-head households consume as much rice as male-headed households (almost 50% parity). It is therefore plausible that rice consumption in Buea has no gender discrimination as both women and men are equally engaged in its consumption. The age structure is one of the most important factors that affect rice consumption. It is usually said that youths of today are the cornerstone of the future and given that a young man is normally more dynamic and energetic than an old man. Our findings show that the youths (in the range 20-40 years old) consume more rice than the elderly people (41 years and above), we can see the figure below representing the age group of rice consumers.

The majority of rice consumers in Buea (60% between 20 and 30 years) are youths and students with small or no families. However, the remaining 40% aged above 30 years have families, 56.2% of which are small sized (with less than 3 children), 37.5% are medium sized (between 4 to 6 children) and the remaining 6.2% have large families (with more than 6 children). These closely relate to monthly earnings of the rice consumers in Buea, the percentage of their monthly earnings assigned to purchasing rice as well as quantity purchased. The income of the consumer is one of the most important factors that affect the demand for rice and so was treated as of essence.

The results show that 48.3% of rice consumers in Buea have monthly earnings between 25000 and 50000 FCFA, 41.7% have theirs between 50000 and 150000 FCFA, 3.3% earn more than 150000 FCFA and 1.7% earn less than 25000 FCFA monthly. The study also revealed that, 55% of the consumers spend between 3 to 5% of their income on rice purchase, 25% spend above 5% and 20% spend less than 2% of their income on rice consumption every month. The study also showed that 48.3% of the consumers consume between 5 and 10kg of rice per month, 25% consume less than 5kg, 21.7% consume between 11 and 25kg while 5% consume more than 25kg every month. The study also showed that the social factors affecting consumers' behavior towards rice demand are taste (65%) and family size (35%). It was also revealed that all respondents consume rice throughout the year. Hence, rice is a year-round meal in Buea.

It is further observed that on average, individuals consume 14 kg of rice monthly depending on the rice variety and brand. The average unit price for rice is 350 FCFA per kilogram depending on the varieties and rice brands. Varieties such as long-grained, short-grained and perfumed rice and brands like Thailand rice", "Riz lion", Neima and Uncle Ben's exist on the market in Buea. The study showed that 73.3% of rice consumers know at least one substitute to rice while 26.7% see rice as non-substitutable. Of the 63.3% who said there exist a substitute to rice, 75% said that rice could be substituted for spaghetti, 13.6% said that it could be substituted for garri, 6.8% said it could be substituted for plantains and the remaining 4.5% said that it could be substituted for cocoyam. The study revealed that the unit price for the substitutes where; the respondents were unable to make an exact guess of the unit prices for the substitute goods, since they are being sold in bulk. Spaghetti is sold in bags of 5Kg each, garri is sold in cups, plantain in bunches and cocoyam in buckets.

Econometric analysis was employed to assess the impact of the independent variables; gender, age, persons per household, consumer income, product price and

substitute price on the dependent variable; quantity demanded. Multiple regression analysis is used with the Ordinary Least Square method of estimation. The estimated coefficients hence elasticities are presented in Table 1 below:

Table 1. Estimated Demand Elasticity for Rice

Index	Constant	Product Price	Consumer Income	Family Size	Substitute	Gnder	Age
Elasticity	0.94	-0.01	4.05	2.83	-0.00	-0.01	- 0.00
t-stats	0.34	2.02	2.07	9.42	3.28	-1.17	-2.04
R-Square = 0.882; F (6, 53) = 65.97							

As noted in Table 1, the constant term is positive; the implication is that, there exist some stochastic variables with an overall positive influence on the quantity of rice demanded. The coefficient of gender is positive; this means that as more women involve in rice consumption, the quantity of rice demanded increases, if women involvement in rice consumption increases by 1 unit, the quantity demanded increases by 1.420 units. The coefficient of age is positive, implying that as the age of consumers increase, the quantity demanded for rice increases. If the age of rice consumers increases by 1 unit, the quantity of rice demanded increases by 0.110 units. The coefficient of persons per household is positive; this means that as the number of persons per household increases, the quantity of rice demanded likewise increases. The results revealed that, as the number of persons per household increases by 1 unit, the quantity of rice demanded increases by 2.828 units. The coefficient of consumer's income is positive; this implies that there is a positive relationship between consumer's income and quantity demanded, i.e. as consumer's income increases, the quantity of rice demanded also increases. As consumer's income increases by 1 unit, the quantity demanded increases by 4.054 units. In addition, the coefficient of product price is negative; this means that, as the price of rice increases, the quantity of rice demanded decreases. From the results, as product price increases by 1 unit, the quantity demanded reduces by 0.009 units. The coefficient for substitute price is negative, indicating that, as the price of the substitute good (say spaghetti) increases by 1 unit, the quantity of rice demanded decreases by 0.002 units.

The coefficient of the adjusted R-square is 0.869. This shows that all the independent variables jointly explain 86.9% of the total variation in the quantity of rice demanded with 13.1% accountable for by the stochastic error term. For gender, the t-value calculated of 2.019 is greater than the table value of 1.674 and we therefore draw the conclusion that gender is an essential factor determining the quantity of rice demanded. Also, age is an essential factor when determining the quantity of rice demanded, since the calculated value of 2.071 is greater than the table value of 1.674, considering 53 degree of freedom. However, two variables; product price and substitute price are not significant according to statistical test since their calculated values; -1.169 and -2.035 respectively are less than the table value of 1.674. The coefficient of the independent variables; product price and consumer income, represents the price elasticity and income elasticity of rice respectively. The coefficient of substitute price is used in computing the cross elasticity of rice. Table 1 shows this clearly that the demand for rice in Buea is price inelastic and income elastic as shown on Table 1.

4. Conclusion

It is usually admitted that to any problem exist a solution, this is the reason why problems faced by food demand in Cameroon are not unsolvable, if just a few of the recommendations proposed here are implemented, the demand for rice in Buea municipality will experience an increase. Rice is now playing an important role in economic, political and social aspects in production and consumption decisions in Cameroon, and Buea in particular. The diversification of staple food (rice) production could be facilitated by efforts that promote technological change in agricultural production, improved rural infrastructure, and diversification in food demand patterns.

References

[1] Ernest L. Molua. Price and non-price determinants of acreage response of rice in Cameroon, ARPN journal of agriculture and biological sciences, 5(3): 20-25, May 2010.

[2] Dewbre J. and A. Borot de Battisti. Agricultural progress in Cameroon, Ghana and Mali: Why it happened and how to sustain it. OECD Food, Agriculture and Fisheries Working Papers No. 9, 2008

[3] Rahji M. and Adewumi M. Market Supply Response and Demand for Local Rice In Nigeria: Implications For Self-Sufficiency Policy. Journal of Central European Agriculture Volume 9 (2008) No. 3. 567-574.

[4] Musa N. and Othman N. Determinants of Consumers Purchasing Behavior for Rice in Malaysia. American International Journal of Contemporary Research.Vol. 1 No. 3, 2011

[5] Kassali R, Kareem R, Oluwasola O and Oheagbulam O. M,. Analysis of demand for rice in Ile Ife, Osun state, Nigeria. Journal of sustainable development in Africa, volume 12, No.2, 2010.

[6] Food and Agriculture Organization of the United Nations. Rice international commodity profile. Markets and trade division, December 2006.

[7] Hoddinott, J. Agriculture, Health, and Nutrition: Toward Conceptualizing the Linkages." In Reshaping Agriculture for Nutrition and Health. IFPRI. 2012.

[8] Atkins, Peter, and Ian Bowler. 2001. "Food Habits, Beliefs and Taboos." In Food in Society: Economy, Culture, Geography., 296-310. Arnold, Hodder Headline Group.

[9] Alfred W. Stonier and Douglas C. Hague, 1972. A textbook of economic theory; fourth edition. Longman group Limited, 1972

[10] A.Ganesh-Kumar, Sanjay K. Prasad and Hemant Pullabhotla, 2012. Supply and demand for cereals in Bangladesh 2010-2030. International Food Policy Research Institute, Discussion paper 01186.

[11] Angus Deaton and John Muellbauer, 1980. An Almost Ideal Demand System. The American economic review, vol. 70, No. 3, 312-326, June 1980.

[12] Gideon Danso-Abbeam, Mubarick Armed and Francis Baidoo, 2014. Determinants of consumer preference for local rice in Tamale Metropolis, Ghana. International journal of education and social science, vol. 1, No. 2, 114-122, 2014.

[13] J. T Omojola, J. A. L. Effoing and I. D. Pepple, 2006. Analysis of the demand of locally processed rice in Niger state, Nigeria. Journal of agriculture and social research, vol. 6, No. 1, 2006.

[14] John Gibson, 2005. Rice demand in papua new Guinea, Pacific economic bulletin, 9 (5): 95-103.