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ANALYSIS OF CONSUMER DEMAND FOR FERMENTED CASTOR OIL SEED (*OGIRI*) IN ANAMBRA STATE, NIGERIA

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Abstract

The study analyzed consumer demand for fermented castor oil seed (*Ricinus communls*) which is used as food seasoning in Anambra State, Nigeria. It specifically analyzed the price elasticity of demand and determined the factors that influence the demand for the product. Cross sectional data were collected from 48 respondents spread across two Local Government Areas of the State. The price elasticity of demand model and the Ordinary Least Squares multiple regression technique were used to analyzed the data. The results showed that the consumers had up to secondary education level of education and had an average monthly disposal income of ₦ 27000. Demand for ogiri was relatively inelastic. Price of the product, age of the consumer and price of close substitute negatively influenced demand for the product while disposal income and level of education of the consumer positively influenced demand for the product. The study recommended increased production of castor oil seed as well as continuous consumer education in the area.

Key words: Castor oil seed, Demand, Consumers, Anambra State, Elasticity

Introduction

Consumers play an important role in determining the quantity and quality of food to produce in most countries. They generally care about what they eat, how their food is produced and the impact food production and consumption has on the environment and society and are concerned about the methods of food production and the conditions under which food are grown (Lappo *et al*., 2013).Consumers demand for food in Nigeria has continued to grow with increase in population. However. the rate of increase in human population does not enjoy a corresponding rate of increase in food supply and this is further contributing to the rising prices of food and manufactured goods (Okuneye, 2008, Akanni 2014; Bamiro 2012). The consequences of this is a widening gap between the demand and supply of food (Abdulrahaman, 2013).

Arable plants account for a sizeable proportion of agricultural output in the Country. They are the most important dietary sources for meeting the nutritional needs of majority of the population in Nigeria (Obizoba, 1998). A variety of these arable plants are consumed in Nigeria as staples. The processing and consumption of food crops are related in part to ethnic backgrounds, customs and traditions. Ihekoronye and Ngoddy (1985) and Okoh (1998) also indicated that in spite of the variety and diversification in diets, indigenous food production, capacity and knowledge of nutritional value of some local foods and their production have improved tremendously. Some of these include local food seasoning such as fermented Castor Oil Seed (*Ricinus communls*), which is called Ogiri in the igbo language, African locust bean (*Dawadawa*) and (*Prosopis Africana)* which is called Okpeye in the igbo language.

Fermented castor oil seed is a local seasoning produced from Castor Oil seed (*Ricinus communls*) by traditional fermentation process (Cooper, 2007). It is also used as a flavouring agent in soups, sauce and vegetable dishes especially by the Igbo people of Anambra State, South east Nigeria.

Despite the huge nutritional values and availability of local seasonings such as the fermented castor oil seed (ogiri), they are not widely accepted and used by consumers. Local seasonings serve as antioxidants and have preservative and slows down or prevents the spoilage of food. They also have medicinal values, stimulate appetite, add flavour and texture to food and create visual appeal in meals (Fasoyiro, 2015 and Olife *et al.,* 2013) local seasoning Majority of the consumers prefer the manufactured seasonings which appear neater and whose odour seem to make them more acceptable to consumers from different strata of the society. According Lappo *et al*. (2013), there is increased preference of consumers to buy "socially

responsible" products and the demand for food products from reliable brands/producers has also increased. These manufactured seasoning are also packaged in various sizes and with varying flavor, properties that also give them edge over the local seasoning. These are issues which have dampened the demand for the local seasoning and made their marketing quite unprofitable.

Moreover, the choice of manufactured seasonings over the native or local ones such as ogiri may be attributed to the lack of information on the nutritional benefits of consuming these local products. Such nutritional benefits include the contribution of micronutrients such as Vitamin A, iron, magnesium, calcium to the diet (Olife *et al.*,2013). According to Iyadi (2015), consumers eating habits is a mixture of local production and imported preserved foods. Manufactured foods are becoming an important part of many people's diet across the globe. It appears it is only the older generation of women who know how to use these local seasonings. There seems to be a generational gap in the knowledge of the health and culinary benefits of these seasonings to their consumers. Furthermore, the marketing of the castor oil seed product is constricted by its inability to store for long periods, its high perishability poses a challenge to not just the marketer but more importantly the consumer who due to lack of a necessary amenity like stable electricity supply may be unable to store the product for as long as she wants by refrigeration or cold storage.

Seasonality of supply of the locally produced fermented castor oil seed product is also a major challenge. This further makes the competition between the seasoning and the manufactured ones largely skewed in favour of the latter. This also adversely affects the marketing of the product. There is therefore an urgent need to evaluate the demand function for local seasoning and thereby provide an accurate analysis of their demand locally. This study set out to estimate the elasticity of demand for castor oil seed products and to determine the factors that influence the demand for castor oil seed products by consumer.

Methodology

The study was conducted in Anambra State. The State was chosen because of the high concentration of fermented castor oil seed consumers in the area. The State lies between latitude 5^0 42′and 6^0 47′ North and longitudes 6^0 37′and 7^0 23′East of the Greenwich meridian. The State has two distinct seasons, the wet or rainy season which lasts from March to October and the dry season which last from November to February. The State has an average annual rainfall of 102.5mm and the mean temperature ranges between 20.7^0C – 30.8^0C. (Ejikeme *et al.*, 2017). The State is mainly occupied by small scale farmers who grow crops such as yam, rice, melon, cocoyam, cassava, beans, vegetable castor seed.

Multistage sampling was used to select the respondents. First, two agricultural zones with high concentration of castor oil seed consumers were purposively selected out of the four agricultural zones in the State. Second, a Local Government Area (LGA) with high concentration of castor oil seed consumers was purposively selected out of each of the two agricultural zones, giving a total of two Local Government Areas for the study. Third, three communities with a high concentration of fermented castor oil seed consumers were purposively selected from each LGA giving a total of six communities for the study. Lastly, eight fermented castor oil seed product consumers were randomly selected from each community to give a total of 48 consumers for the study.

The primary data collected were analyzed quantitatively and qualitatively. The socioeconomic characteristics of the respondents and the quantity of castor oil seed supplied and demanded were analyzed using descriptive statistics such as means, frequency distribution and percentages.

The elasticity of demand for fermented castor oil seed products was estimated using the price elasticity of demand model as specified by Nwigwe (2015). The model is specified as:

Given the demand function qi = f (Pi, Pj, y)

$$e_p = \frac{\delta qi}{\delta pi} \times \frac{pi}{qi}$$

Where

i = castor oil seed product

qi = quantity demanded

ep = Price elasticity of demand

Pi = Price of product

Δ = Change in

The Ordinary Least Square method (OLS) multiple regression technique was used to estimate factors that influence consumer's demand for castor oil seed products. According to Udoh *et al.* (2013), the demand for food is influenced by several factors which include: income, own-price, consumer preferences, and prices of other substitutes as well as demographic factors, such as changes in household size and in the

age distribution of the population. The model is specified below

$$Q_d = f(P_r, Y_d, H_s, P_s, O_{cc}, A_{ge,} E_{du,})$$

Where

Qd = Demand for product (Kg)

Pr = Product price (₦) (The studies assumes a perfect competition where product price is static in the short run and no single producer can single handedly change the quantity produced

Yd = Consumer disposal income (₦)

Hs = Household size (Number of persons in a household)

Ps = Price of close substitute (₦)

Major Occ = Occupation (Dummy: Farming = 1, others 0)

Age = Age of household head (Years)

Edu = Level of education (Years spent in school)

Results and Discussion

The results of the analyses carried out in the study were presented in this section. Table 1 presents the result of the analysis of socio-economic characteristics of the respondents.

The result from the table above shows that about 91% of the consumers were between the ages of 20 – 59 years. The mean age of the consumers was 36 years. This result is an indication that most of the respondents were still in the active age bracket. This result debunks the generally held view that it is the elderly that sell and use local seasoning. It may also be an indication that younger persons are getting acquainted with the use of traditional cooking ingredients.

The result also shows that 43.75% of consumers was male and 36.25% was females. This result implies that though females dominate the sale and consumption of Ogiri, males also make up a sizeable proportion of both buyers and sellers of the product.

The result in Table 1 shows that a large proportion (31.25%) of consumers completed secondary level of education. This may be an indication that they may not have been educated enough or aware of the benefits of using the local seasoning which may also include buying them as a cheaper price. They may also not be fully aware of the enormous health benefits they may be deriving from consuming the local seasoning

The result in the Table shows that majority (about 74%) of the consumers had between of 11 – 20 years of formal education. The consumers spent an average of 13 years in school. The result is an indication that the respondents were educated and should therefore be rational in their choice of products to consume.

The results in Table 1 shows that majority of consumers (54.17%) had household size of between 6 – 10 persons. The mean household size of consumers was 6 persons. This result is an indication that the respondents had large household size and this may a reason for their preference for the cheaper local seasoning.

The result also shows that majority (89.58%) of the respondent had a monthly disposal income of between ₦1,000 – 39,000. The mean for the month was calculated to be ₦27,000. This is an indication that the respondents are majorly in the low income category of the society. It may be also be a reason for the choice of the cheaper local seasoning.

The result in the table shows that 20.83% of the respondents (consumers) was involved in farming as a primary occupation, none of the respondents indicated paid civil servant as a secondary occupation. Also, 62.5% of indicated trading and 10.42% indicated craftsmanship as secondary occupations. Just 6.25% indicated being involved in other occupations. It could be inferred from the result that the respondents were majorly farmers and petty traders. This result differs from that of Oyinbo (2014) and Kassali *et al.* (2012) who reported that majority of the household heads were civil servants in a study of demand for rice.

Table 1: Socioeconomic characteristics of respondents

Variables		Consumers
Age	Frequency	Percentage
20 – 39	36	75
40 – 59	8	16.67
60 – 79	4	8.33
80 – 99	-	0
Total	**48**	**100**
Mean		**36**
Sex		
Male	21	43.75
Female	27	56.25
Total	**48**	**100**
Level of education		
No formal	0	0
Primary incomplete	1	2.08
Primary complete	2	4.17
Secondary incomplete	5	10.42
Secondary complete	15	31.25
Tertiary incomplete	12	25
Tertiary complete	13	27.08
Total	**48**	**100**
1 – 5	4	8.33
6 – 10	8	16.67
11 – 15	21	43.75
16 – 20	15	31.25
Total	**48**	**100**
Mean	**13**	
Household size		
1 – 5	21	43.75
6 – 10	26	54.17
11 – 15	1	2.08
Total	**48**	**100**
Mean		**6**
Monthly disposal		
Income		
1,000 – 39,000	40	89.58
40,000 – 69,000	6	6.25
70,000 – 99,000	2	4.17
Total	**48**	**100**
Mean	**27,000**	
Primary occupation		
Farming	10	20.83
Civil Servant	0	0
Trading	30	62.5
Craftmanship	5	10.42
Others	3	6.25
Total	**48**	**100**

Source: Field survey.

Elasticity of Demand for Fermented Castor Oil Seed Product in the Study Area

The elasticity of demand for fermented castor oil seed product was estimated, the result is presented in Table 2.

The results show how price elasticity of demand for fermented castor oil seed product (ogiri). 71.17% of the consumers which constituted majority of the respondents in the area had price elastic demand for the local seasoning, while 20.83% of the consumers had relative price inelastic demand for the product. No consumer had either perfectly price elastic or perfectly price inelastic demand for the product. The implication is that change in price of the fermented castor oil seed leads to a more than proportionate response in the quantity demanded by the consumer in the area. The elastic demand for ogiri may be a reflection of the many consumer preferences to which the product could be put. The product has seasoning medicinal and preservative value and is therefore demanded by large category of consumers.

Table 2: Elasticity of demand for castor oil seed product in the study area.

Price elasticity	frequency	Percentage
Perfectly inelastic (ep=0)	0	0
elastic (ep>1)	38	71.17
elastic (ep<1)	10	20.83
Unit elasticity (ep=1)	0	0

Source: field survey data, 2017.

Factors that Influence the Demand for Fermented Castor Oil Seed Product

Multiple regression result on the factors that influence the demand for fermented castor oil seed product in Anambra State, Nigeria. The ordinary least squares multiple regression technique was used. The linear function provided the best fit and was chosen and used for further analysis as well as the lead equation. The choice was based on the magnitude of the Coefficient of Multiple Determination (R^2) which was 0.72. This implies that about approximately 72% of the variability in the demand for fermented castor oil seed product was accounted for by the specified explanatory variables. The result is presented in Table 3.

Pr (Product Price):- The co-efficient of product price of the product was significant ($p<0.01$) and negatively related to the demand for castor oil seed product by consumers. The implication of the negative relationship is that the higher the product price, the lower the demand for the product. This could be due to the fact that consumers generally prefer to buy products at cheaper and moderate prices and hence, the demand of such products will increase when the product price is low. Similarly, when the price of the product is high or increases, consumers demand for such product will tend to reduce. Obizoba and Atu (1992) identified product price as a factor that influences the demand of products by consumers in their research on production and chemical evaluation of some food condiments in Nigeria. This result agrees with the findings of Oyinbo (2014) who reported a negative relationship between price and consumer's demand for rice.

Yd (Disposal income): The co-efficient of disposal income was significant ($p<0.10$) and positively related to the demand for castor oil seed product. This implies that as the consumer's level of disposal income increases, the demand for castor oil seed product increases as well. This result does not conform to *a priori* but may be due to the fact that consumers demand for commodities tends to increase when their income level increases. This is in agreement with findings of Oyinbo (2014), Akanni (2014) and Udoh *et al* (2013) who reported a direct relationship between demand for food grain and consumers' income.

Ps (Price of close substitutes):- The coefficient of price of close substitutes was significant ($p<0.05$) and negatively related to the demand for castor oil seed product. This implies that as the price of close substitute goods to castor oil seed product increases, the demand for castor oil seed product decreases. Here the two products are behaving more like complements and this again may be explained by the several uses to which the fermented castor oil seed could be put to.

Age: The coefficient of age was significant ($p<0.01$) and negatively related to the demand for castor oil seed product. This implies that as the consumer tends to increase in age, his demand for castor oil seed product decreases. This simply shows that the demand for the product is higher among the young and middle aged consumers in the society. The result is not in

agreement with that of Akanni (2014) who reported a direct relationship between age of the consumer and his demand for food grain.

Level of education: The coefficient of level of education was significant ($p<0.05$) and positively related to the demand for castor oil seed. This implies that as the consumer's level of education increases, the demand for castor oil seed product increases as well. This could be attributed to the fact that educated people tend to know more about the health benefits in consuming such natural products when compared to the synthetic and or manufactured ones. Udoh *et al.* (2013) and Akanni (2014) also reported a direct relationship between consumers' level of education and their demand for food.

Major occupation is negatively related to the demand for castor oil seed product but not significant at 1%, 5% or 10%. This implies that major occupation of the respondents has no effect on the demand for castor oil seed product.

Household size is positively related to the demand for castor oil seed product but not significant. This implies that household size of the respondents has no effect on the demand for castor oil seed product.

Table 3: Multiple regression result on the factors that influence the demand for fermented Castor Oil Seed product by consumers in Anambra State, Nigeria

Explanatory variables	Linear function+	Semi-log function	Double-log function	Exponential function
Constant	-669.824	-1965.31	-11.9436	-3.35854
	(-4.77022)	(-6.15547)	(-3.92817)	(-2.00005)
Product price (Pr)	-4.82763	-81.0858	-1.03586	-0.04743
	(-4.3208)*	(-4.01731)*	(-5.38912)*	(-3.54938)*
Disposal income (Yd)	22.79802	468.2204	2.783418	0.067781
	(1.833977)***	(6.55352)*	(4.090977)*	(3.360451)*
Household size (Hs)	2.26E-05	83.19625	0.560402	0.137335
	(0.048575)	(1.298401)	(0.918395)	(0.923827)
Price of close substitute (Ps)	-2.62842	-44.2363	-0.30818	-0.02001
	(-2.16003)**	(-1.53469)	(-1.12272)	(-1.3749)
Major occupation (Mo)	-24.4651	-46.1164	0.720976	1.225468
	(-0.19309)	(-0.34364)	(0.564142)	(0.808764)
Age	-11.5043	-2.22956	-0.02198	-2.17E-06
	(-6.82089)*	(-0.26436)	(-0.27372)	(-0.39057)
Level of education (Edu)	47.99338	209.6556	1.66388	0.401614
	(2.323082)**	(1.982927)**	(1.65252)	(1.62556)
R^2	0.720	0.671	0.638	0.514
f-value	14.734	11.691	10.0793	6.051887
Error	163.60021	177.3287	1.688709	1.956489
N	48	48	48	48

* = significant at 1%, ** = significant at 5%, *** = significant at 10%, +lead equation.
Source: Computed from Field Survey Data, 2017

Conclusion and Recommendations

Castor oil seed product is a major seasoning in the study and is used mostly by young and middle age individuals. The demand castor oil seed product by consumers is elastic and is positively influenced by the level of disposal income and education, and negatively influenced by age of the consumer, price of the product and price of close substitutes. Based on the conclusion the following recommendations are made:

1. Increased production of castor oil seed should be encouraged in the area as this will increase supply and thereby ensure prices are affordable by consumers.
2. Continuous education of consumers on the benefits of consuming fermented castor oil seed will likely increase the demand for the product in the area.
3. An increase in the income of consumers will encourage them get more of the products. It is therefore important that the government approves the increase in the wages and salaries of workers as this will enhance their disposal income.

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