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Demand Analysis for Orange Fleshed Sweet Potato in Vandeikya Local Government Area, Benue State, Nigeria

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Abstract **– This study examined Orange fleshed sweet potato (OFSP) demand in Vandeikya LGA, Benue State, Nigeria. Special attention was also given to the question of whether income group allocation between household had any significant effect on OFSP demand. Primary data were used for the study. Data were collected from one hundred (100) respondents randomly selected through the use of questionnaire and oral interview. The data were analysed using descriptive and regression analysis. The result showed that 65% of the respondents were male. The mean age was 37.5 years with most of the respondents (95%) having formal education. It was further observed that majority of the respondents were married and most of them (71%) having a household size of 1-5 persons. Most of the respondents (62%) were salary earners while high income earners spent 10.05% of their income, middle income earners spent 9.75% and low income earners spent 6.18% on OFSP consumption. The regression result revealed that the , income of the respondents, price of OFSP, price of substitutes significantly determined the demand for OFSP at ($p < 0.01$) ditto for education level, nutrition information and age were significant at ($p < 0.05$). The study also revealed that OFSP was price inelastic with a coefficient of -0.23, cross-inelastic (0.0006) and income elastic (13.89) while age has elastic coefficient of 17.61. It was therefore recommended that government should boost the production of OFSP so as to reduce the price and also increase awareness about the importance of OFSP on humans health. Efforts should likewise be made to scale up the utilization of OFSP by value addition to increase the demand and consumption of OFSP.**

Keywords **– Demand Analysis, Orange Fleshed Sweet Potato (OFSP).**

I. INTRODUCTION

The potential demand for basic food staples, including root and tuber products, on both domestic and international markets will continue to rise. According to Scott, Rosegrant and Ringler (Robert Aidoo, 2009), agricultural potential is greatest for root and tuber crops like sweet potato, yam and cassava due to their adaptability to marginal environments, their contribution to household food security, and their flexibility in mixed cropping systems. The end uses of roots and tubers make them an important component of a targeted strategy for improving the welfare of the poor and linking smallholder farmers to markets (Scot *et al*., 2000). Over the last two decades or more, sweet potato (Ipomoea batatas L. Lam) has gained prominence due its short growth cycle and ability to survive in diverse agroecologies and water stress soils (Markos D. *et al*., 2016, Chagonda I. *et al.*, 2014). These traits project sweet potato high among resource-poor households in developing countries. Research evidence suggests that orange-fleshed sweet potato (OFSP) a biofortified sweet potato that highly rich in beta-carotene in particular, could play a role in combating vitamin A deficiency among children and women in Africa and parts of Asia (Van Jaarsveld P. J. *et al*, 2005, Low J.W. *et al.*, 2007). Just one small root (100–125g) of most OFSP cultivars supplies the recommended daily allowance of vitamin A for children

under five years of age (Low J.W. *et al.,* 2007). In Nigeria, though long regarded as a minor root crop, sweet potato is rapidly becoming more important due to its high yielding ability, its capacity to grow on relatively poor soils, and its high content of carbohydrates and vitamins, especially vitamin A (Adesina et al, 2017). The crop has since ceased to be a backyard crop it was noted for. Survey reports in Nigeria show that production, marketing and utilization have expanded in the last decades beyond its traditional central and riverine areas (Agboola, 1979). The pattern of sweet potato consumption in Nigeria has been undergoing dramatic changes. Some economists have attributed these changes to such factors as higher household income, the nutritional information about the importance of sweet potato and a more westernized lifestyle (Tewe *et al.*, 2003). Globally, Nigeria with the production output of 4 million metric tonnes, Nigeria is the highest producer of sweet potato in Africa (FAO, 2018).

Benue state, Nigeria, is one of the major sweet potato consuming state in Nigeria, it is expected that demand for OFSP is on its increase due to the rapid population growth, increase in awareness about the nutritional importance of OFSP and increased per capita consumption. It is thus important to examine the demand for orange fleshed sweet potato in the study area in order to create market and increase the icomes of rural farmers.

II. RESEARCH METHODOLOGY

The study was carried out in Vandeikya Local Government Council which is located between latitude 7°5' and 7°15' north of the Equator and Longitude 9° and 9°6' east of Greenwich. It has a landmass of 183,939 square metres (0.7 sq miles) with a population of well over 80,288. Vandeikya is in the South Eastern part of Benue State and shares boundaries with Obudu and Bekwara in Cross River State to the East, Ushongo to the North and Konshisha LGA to the West. There are twelve administrative council wards (NPC, 2006). The climate is tropical sub humid with the mean annual rainfall of between 1,200 and 2,000 mm (47" and 79") averaging seven months in the year, while the mean annual temperature is 32.5 °C (90 °F). Over 80% of the population are directly engaged in the peasant farming of virtually all major food crops, with concentration on rice, sweet potatoes, cassava, sorghum, citrus, spices, pepper, groundnut and bambara nuts.

Map of Nigeria showing Vandeikya Local Government

Sampling Technique and Sample Size

Purposive sampling was used to select the households from various wards in the study area based on their income levels, which is either low, middle or high level. The low level wards are Tsmbe, Mbayongo, Ninger wards, the middle income level wards are Mbayor, Mbagbam, Mbatyough wards while the high income level wards are Mbakyaha, Vandeikya township, Mbakyaha, Mbadede wards of the Local Government Area. The

various households were randomly selected proportionately using the proportion 3:2:1 for low, middle and high income area respectively. This was because, the low level income areas are more densely populated compared to the middle income and high income areas. In all, 100 household were selected for the study.

Sources of Data

The data collected were obtained using structured questionnaires and interview schedules administered to respondents. The data collected was based on socioeconomic factors which include income level, household size, monthly food expenditure on OFSP and prices of substitutes among others.

Analytical Techniques

The data was analyzed using descriptive and inferential statistics. Frequency distribution and percentages was used to describe the socio-economic characteristics of the respondents. Multiple regression analysis was used to analyse the factors that affect demand for OFSP and the estimation of price elasticity. The explicit function for the regression analysis is presented as;

$$Y = X_1 + X_2 + X_3 + X_4 + X_5 + X_6 + X_7 + X_8 + X_9 + e \quad (1)$$

Where; Y = Quantity of OFSP demanded (in kg)

X_1 = Price of OFSP (in naira)

X_2 = Average monthly income of respondents (in naira)

X_3 = Monthly expenditure on other substitutes (Yam, Cassava and Cocoyam) (in naira)

X_4 = Household size (number of persons)

X_5 = Educational level of respondents (years of education)

X_6 = Age of respondents (years)

X_7 = Sex of house head (male=1 or female=0)

X_8 = Nutrition information (yes=1 or no= 0)

X_9 = Occupation of respondents (salary earners=1 or nonsalary earners= 0)

e = Error term.

III. RESULTS AND DISCUSSION

Socio-Economic Characteristics of Respondents

The socio economic characteristics considered in the study include age, sex of respondents, marital status, household size, educational status, occupation of respondents and income. The distribution is presented below.

Table 1. Socio-Economic Distribution of Respondents according.

Socio Economic Characteristics	Frequency	Percentage (%)
Sex		
Male	63	63

Socio Economic Characteristics	Frequency	Percentage (%)
Female	37	37
Marital Status		
Single	21	21
Married	79	79
Age (Year)		
20-29	25	25
30-39	34	34
40-49	26	26
50-59	10	10
60-69	04	04
70 and above	01	01
Number of years in formal school)		
No formal school	05	05
1-6 years	26	26
6-12	37	37
12-16	23	23
16 and above	09	09
House Size		
1-5 persons	82	82
6-10	18	18
Occupation		
Salary earner	62	62
Non-Salary earner	38	38
Income Level		
Less than – ₦5,000	06	06
₦6,000- ₦10,000	39	39
₦11,000- ₦20,000	14	14
₦21,000- ₦30,000	16	16
₦30,000 and above	25	25

The result from Table1 showed that majority of the respondents were males (63%) while 37% were females. This shows a higher proportion of males than females as head of household in the study area. Majority (79%) of the respondents were married and only 21% of them were single. The result also revealed that 85% of the respondents falls between the age of 20 – 49 years. The mean age was 37.49 years indicating that they are in their active and productive age. The quantity and quality of vitamin A requirement of individual is sometimes determined by age of the members of the household. This is because food consumption is highly related to the health condition of individuals. Age sometimes is a factor that influences the nutritional requirement of people. Furthermore, majority of the respondents were literates with 37% of them having secondary education while 23% had tertiary education. This shows that OFSP demands and its consumption has to do with knowing the nutritional importance of beta-carotene which is the active nutrient inside OFSP. About 62% of the respondents were non salary earners while 38%of them were salary earners. This is because most of the respondents are litterate and they work with both government and private sector. The study also revealed that majority (82%) of the households have an average of five persons, which makes the quantity demanded for OFSP relatively small as compared to when the household increases to an average of eight persons. Income level plays a vital role in the nutritional make-up of individual as observed by the result. People tend to demand more of OFSP as income level increases because OFSP was found to be a normal good in the area. Therefore, consumption can be considered as a function of income.

Relationship between Socio-Economic Characteristics of OFSP Consumers and their Expenditure on OFSP

Table 2 shows the monthly expenditure on OFSP by income level of the respondents in the study area. By careful observations of this Table, the relationship between the income level of the respondents and their respective expenditure on OFSP are clearly stated.

The analysis of monthly expenditure on OFSP by income levels of respondents in the study revealed a lot about OFSP demand in the study area. The Table revealed that average monthly expenditure on OFSP increases as income increases.

Low income group expended an average of ₦1132 monthly on OFSP, middle income expends ₦2255 and high income earners expended ₦4365 of their income. This clearly shows that their expenditure on OFSP increases as their income increases. Therefore, OFSP was observed to be a normal good whose demand increases as income level increases. High income earners spent 10.05% of their income on fish, middle income earners 9.75 and low income earners 6.18%. This indicates that, the high income groups spent a lesser proportion of their income on fish while low income groups spent more proportion of their income on fish. This situation reflects the Engel's law which states that, as income increases, the proportion of income spent on food decreases.

Table 2. Respondent monthly Expenditure on OFSP.

Income	Frequency	Average Monthly Income ₦	Average Monthly Expenditure on Fish ₦	Percentage of Income Spent on Fish (%)
High ₦ 30000 and above	25	43,900	4,365	10.05

Income	Frequency	Average Monthly Income ₦	Average Monthly Expenditure on Fish ₦	Percentage of Income Spent on Fish (%)
Middle (₦ 11,000- 30000)	30	22,000	2,255	9.75
Low (Less than ₦ 10000)	45	7,000	1,132	6.18

Factors Affecting Demand for OFSP

The regression results revaled that the coefficient of price of OFSP was negative and also statistically significant at ($p < 0.01$). This implies that as the price of OFSP decreases, quantity of OFSP demanded increases which conforms with the law of demand. Its significance at ($p < 0.01$) revealed that price of OFSP is an important factor for OFSP demand. The coefficient of income of respondents was positive and also statistically significant at ($p < 0.01$). The positive sign shows that OFSP is a normal good such that, as income increases, OFSP demand also increases; due to the increase in purchasing power. The result also revealed that, the age of respondents was positive and significant at ($p < 0.05$) which implies that age directly influences OFSP demand. As age increases, the demand for OFSP also increases this could be as a result of nutritional properties embedded in OFSP. Nutrition information is significant at ($p < 0.05$) and has positive coefficient, this implies that as the level of nutrition information to the respondents increase to demand for OFSP also increases.

Table 3. Regression results of factors affecting demand for OFSP.

Variables	Coefficient	Standard Error	P
Constant	95.7808	2.0644	0.0000
Income	0.0344	0.0079	0.0000***
Price of OFSP	-0.1927	0.0031	0.0000***
Household expenditure on substitute	0.3499	0.0493	0.0000***
Age of the respondent	22.6674	10.6908	0.0456**
Household size	14.7141	39.6678	0.0025**
Education level	0.0089	0.0087	0.3085
Nutrition information	0.0201	0.0712	0.0481**
Sex of household	-0.0223	0.0655	0.7340
Marital status	0.0899	0.0973	0.3482

***significant at 1% **significant at 5%.

Elasticity of Demand for OFSP

The elasticities of the significant variables are shown in Table 4. Price elasticity of demand is the responsiveness of demand to change in price. This was calculated to be -0.23 which means that demand for OFSP is price inelastic such that, a large change in price leads to a less than proportionate change in the quantity of OFSP demanded. Income elasticity is the degree of responsiveness of demand to change in income calculated

to be 13.89 which is highly elastic because it is greater than unity. This means that a small change in income leads to a larger change in quantity of OFSP demanded; a good characteristics of normal goods. OFSP is therefore a normal good in the study area. Cross-elasticity is the responsiveness of demand for OFSP to change in the price of its substitutes yam, cassava and cocoyam. This was calculated to be 0.0006 which is an indication of relative elasticity because it is less than unity. It means that an increase in price of OFSP leads to increase in quantity demanded of yam, cassava and cocoyam. Elasticity of demand with respect to age was calculated as 17.61 which means a little change in age of respondents leads to a larger change in the demand for OFSP. That is, as the respondents grow older, their demand for OFSP increases which could be attributed to medical advice.

Table 4. Elasticities of the Variables.

Elasticity	Coefficient of Elasticity	Remark
Income	13.89	Elastic
Price	-0.23	Inelastic
Cross-elasticity	0.0006	Inelastic
Age	17.61	Elastic

IV. CONCLUSION

Major Findings

The study examined the demand for Orange Flesded sweet potato OFSP in Vandeikya Local Government Area of Benue State, Nigeria. The shows that majority of the household are male headed and the large portion of the sampled population has formal education. The result also revealed that the major factors affecting OFSP demand are price, income, age of the respondents, nutrition information and price of substitute. The findings show that demand for OFSP was relatively inelastic in terms of price of OFSP and prices of substitutes while it was elastic in terms of

income and age of respondents.

V. RECOMMENDATION

Based on the findings of the study, it was recommended that government and other bodies should continue to educate the respondents on the importance of OFSP on their health. As the income of the respondents increases, OFSP demands also increases, therefore government should provide income opportunities by creating jobs to improve the people's purchasing power.

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