Analysis of Poultry Product Demand among Households in Jos-North, Plateau State, Nigeria

Godfrey Onuwa[1*], Ibiyinka O. Ademiluyi[2] and Grace Owa[3]

[1,2,3]*Department of Agricultural Extension and Management, Federal College of Forestry, Jos, Plateau state, Nigeria.*
**Corresponding author*

***Abstract*: This study analyzed the demand for poultry products among households in Jos North Local Government Area of Plateau State, Nigeria. Cluster and random sampling techniques were adopted for the study. Primary data was collected using structured questionnaires. Descriptive and inferential statistics were used for data analysis. The results revealed that most (40%) of the respondents were within the age bracket of 21-30 years. Most (59%) were female, most (56%) attained secondary education., most (59%) had household size with a population of 6-10 people, most (86%) had access to the produce market, most (59%) earned an average annual household income of≤ ₦99,999, the mean price of a crate of egg and 1kg of poultry meat were ₦600 and ₦900 respectively. Also, most (57%) of the respondents preferred poultry products as their major source of animal protein. The estimate of coefficient of multiple determination (R^2) was 0.8757, suggesting that 88% of the variation in the demand for poultry products were accounted for by the variables in the regression model. All the constraints identified by the respondents significantly affected their demand for poultry products. Social interventions, microcredit schemes, input subsidy and supply, technology adoption, improved market linkages and price regulations are recommended.**

***Keywords*: Consumer Behavior, Consumer Preferences, Demand Constraints, Determinants, Demography**

I. INTRODUCTION

The importance of food in socioeconomic development of any economy cannot be over-emphasized. Over the years, a constant threat to human survival has been the apparent difference between the rate of food production and that of growth of human population. There is increasing evidence of high infant mortality, low disease resistance, poor growth and development, etc. which may be attributable to inadequate protein in the diets of most Nigerians. However, the need to meet protein requirement from domestic sources demands intensification of production of poultry products (eggs and meat), derived from prolific poultry birds (layers and broilers). Poultry has a shorter life cycle ranging between 12 weeks to 96 weeks and is much more prolific than larger livestock. Poultry production is relatively been conceived as a technical venture and one of the available sources of nutritious animal protein [I]. However in recent year's rate and level of performance in the livestock industry has fallen below expectation among other factors to high feed cost arising from fluctuations in feed supplies, rising prices of ingredients, poor feed quality and most importantly inefficiency in production. The net effect of all these are capacity under-utilization, curtailment of planned expansion programs and in extreme cases liquidation. According to [II], Nigeria's poultry production is expanding but is not keeping pace with rapidly increasing domestic consumption requirements. According to [III] market structure tends to consider whether the number of firms producing a product is large or whether the firms are of equal sizes or dominated by small groups. There are an increasing number of households involved in the raising poultry birds; however the problems of malnutrition still persists. It is very difficult for an average Nigerian to consume the scale of international nutritional requirement. This can be attributable to high poultry product prices which makes them appear infrequently in most households, except during the festive periods. This low level of consumption makes the malnutrition problem to be persistence. Another observation is the fact that the demand for these products is still far higher than the supply. However certain other factors also affect household demand for these products; factors such as income, availability of close substitutes, prices of alternative commodities, market access, preferences etc. have been identified to have affected poultry product demand in the study area

Nigeria has the largest population in Sub-Sahara Africa. About 47% reside in the urban areas where the population growth rate is estimated at three times than in rural areas, they constitute the greatest proportion in consumption expenditure particularly for food commodities [IV].The nutritional status of many households is characterized by low calorie and proteins intake. Most animal proteins are delicious but are not easily affordable. Animal protein sources include fish, egg, poultry meat, beef, milk, pork and mutton. The development of the poultry industry has also been described as the fastest means of bridging the protein deficiency gap. Most diets are deficient in animal protein which results growth defects, low immunity to disease outbreaks, etc. There's a prevalence of Poultry production in the study area but there seem to be low-demand for its products as a source of animal protein. Poultry products are one of the world's most valuable animal protein sources in terms of benefits and nutritional value. It is important to determine the preferences, determinants and constraints of household demand for poultry products and add to the existing volume of knowledge on consumer behavior and factors affecting demand. Improved protein intake in diets is required for an active and healthy life. Information gap still exists as to the demand pattern and the determinants of

demand for poultry products. Therefore this study aims to analyze the demand for poultry products among households, while the specific objectives were to:

i. describe the socioeconomic characteristics of the respondents;

ii. identify household preferences for animal protein in the study area;

iii. determine the factors that affect demand for poultry products; and

iv. identify the constraints of demand for poultry products.

Hypothesis (H_O): There is no significant relationship between the socioeconomic characteristics of the households and their demand for poultry products.

II. METHODOLOGY

Study Area: This study was carried out in Jos North Local Government Area (LGA) of Plateau State. It is located between longitude 8°40N & 9°50E and latitude 9°40'N and 10°45'E. Jos North LGA has a near temperate climate, though located in the tropics. It has an average temperature of between 18°C-30°C, with annual rainfall of 1,300mm - 1,500mm per annum [V].

*Sampling Procedure***:** The data used in this study were generated from a survey of households in Jos-North LGA, Plateau State, Nigeria. Cluster and random sampling techniques were used in selecting respondents for the study.The population was grouped into units called clusters based on their homogenous and demographic structure. People of equal socioeconomic status lived in the same clusters. Two (2) clusters (low income and high income households) were identified for this study, each cluster comprised of three (3) settlements. Cluster A comprised the following settlements; Angwuan Rogo, Ali Kazaure and Rikkos, while Cluster B comprised the following settlements; Apollo crescent, Rock haven and Ibrahim Taiwo. Random sampling method was also used in selecting ninety (90) respondents for the purpose of this study, i.e. fifteen (15) respondents per settlement.

*Data Collection***:** Primary data were collected through the use of structured questionnaires designed in line with the objectives of the study.

*Analytical Technique***:** Data collected were analyzed using descriptive statistics (mean, frequency counts and percentages) and Ordinary Least Square (OLS) regression analysis. The descriptive statistics was used to analyze objective i, ii and iv while the OLS regression model was used to analyze objective iii.

*Ordinary Least Square (OLS) Regression Model***:** The explicit form of the OLS regression model as adapted from [VI] is presented as follows;

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + U_i \quad \text{.....(I)}$$

Where:

Y = Quantity demanded (kg and crates)

β_0 = constant;

β_{1-8}= estimated coefficients (Regression coefficients of $X_1 - X_8$);

X_1=age (years);

X_2=gender (male = 1; female = 0);

X_3= Education (0 = non-formal; 1= primary; 2= secondary; 3= tertiary);

$X_{4=}$ Household size (population);

$X_{5=}$ Market access (Yes=1; No =0);

$X_{6=}$ Household income (₦);

$X_{7=}$ Availability of substitutes (Yes= 1; No =0); and

$X_{8=}$ Product price (₦); and

U_i =Error term

III. RESULTS AND DISCUSSION

Socioeconomic Characteristics of the Respondents

From the results in Table I most (40%) of the respondents were within the age bracket of 21-30 years.Adequate protein intake, particularly poultry product consumption will be required by individuals within this age bracket so as to maintain healthy life styles. Most (59%) were female, which is an indication of a population dominated by women. Most (56%) attained secondary education, tertiary education was (30%), and primary education (14%), implying that a greater proportion of the population were literate which enables them to have better understanding of nutritional value of protein intake particularly the consumption of poultry products. Most (59%) of the respondents had household size with a population of 6-10 people, which is an indication of households with relative number of dependents who had varied demands for animal protein.The result reveals that most (86%) had access to the product market, implying that the respondents had access to poultry products in the study area. These products had several market channels and hence easy distribution to final consumers, these results corroborates with the findings of [III] who also reported the significance of demographic factors on demand. Also, the results revealed that most (59%) of the respondents earned an average annual household income of $\leq$ ₦99,999, this is an indication that a greater proportion of the respondents earned low incomes and lived below the poverty line, the implication of this is that most of the households had very low disposal incomes which competes with several other consumption expenditures and hence this affects household demand for animal proteins and particularly poultry products. In addition, unit prices of

poultry product tend to be relatively cheaper as compared to other animal protein sources; the result revealed that the mean price of a crate of egg and 1kg of poultry meat were ₦600 and ₦900 respectively.

Animal Protein Preferences among Households

The result in Table II revealed that most (57%) of the households preferred poultry products as their major source of animal protein, implying that households in the study area consumed more poultry products over other animal proteins. In addition, the consumption fish (44%), beef (39%), and pork (31%) as animal proteins were in significant amounts. This result corroborates with the findings of [VII] who also reported variations in demand for food commodities among households.

Factors Affecting Poultry Product Demand

The Ordinary Least Square (OLS) regression was used to determine the factors affecting demand for poultry products among households. The regression analysis (Ordinary Least Square) presented in Table III was used to establish the effects of the socioeconomic characteristics of the respondents on their demand for poultry products in the study area. The estimate of the coefficient of multiple determinations (R^2) was 0.8757, implying that about 88% of the variation in the demand for poultry products were accounted for by the independent variables in the regression model. Therefore, the regression model is well fitted to the data, suggesting a linear relationship among the variables. The regression coefficients of education (0.969), household size (0.456) and market access (0.483) were positive and statistically significant 5% ($p \leq 0.05$) level , implying that an increase in these variables, other factors held constant will lead to an increase in the demand for poultry products. The coefficient of close substitutes (-0.216) was negative but statistically significant at 5% ($p \leq 0.05$) level, this is an indication of an inverse relationship with the demand for poultry products, implying that an increase in the availability of close substitutes may result to a diversification of options and preferences for animal protein and hence consumers may tend to patronize multiple alternatives or close substitutes that maximizes their utility. Demand for goods which have close substitute is likely to be elastic while those that do not have close substitutes are inelastic. A commodity with a close substitutes is one which can be replaced if the price rises too high to discourage purchases. The availability of substitutes is the most important factor determining price elasticity of demand. Demand for food commodities with close substitutes is elastic [III]. Poultry products have fish, beef, mutton, pork, etc. as its substitutes; hence the demand for animal protein is elastic [VIII]. Furthermore, the coefficients of household income (-0.064) and product price (-0.0331) were negative but statistically significant at 1% level, this is an indication of an inverse relationship with the demand for poultry products, implying that an increase in household income may result to a negative shift in household demand for poultry products hence high income households will have more purchasing power, options and other preferences for animal proteins. The distribution of income affects the pattern of demand for animal proteins particularly, poultry products. Product prices may tend to shift the demand for the poultry products to other relatively cheaper sources of animal protein. The most importance influence on the quantity demanded of any commodity is price. All commodities are competing for the limited income of households; commodity price enables the consumer to compare utility derived from the consumption of one commodity over another. In addition, seasonal variations such as weather, festivity, etc. also affect the demand for poultry products [III].

Constraints of Demand for Poultry Products

The results in table IV revealed the constraints of demand for poultry products as posited by the respondents, were as follows; level of income (36%), price volatility (29%), market forces (28%), availability of substitutes (22%), disease outbreak (17%), shelf life (16%), storage facility (11%) and proximity to market (6%), these results corroborates with the findings of [IX] who reported similar demand constraints for processed foods. These factors significantly affected the demand for poultry products in the study area.

IV. CONCLUSIONS

This study analyzed poultry product demand among households in Jos north LGA, Plateau state, Nigeria. The result revealed that the socioeconomic characteristics significantly affected the demand for poultry products among households. Also, most of the households preferred and consumed more poultry products over other animal proteins in the study area. Furthermore, a significant relationship between the socioeconomic characteristics of the households and their demand for poultry products was indicated from the result. The variation in the demand for poultry products were accounted for by the variables in the regression model. The constraints identified among the households significantly affected their demand for poultry products in the study area. Based on the findings of this study, the following recommendations are suggested;

i. Social interventions for low income households.
ii. Improved access to microcredit for poultry farmers.
iii. Establishing market linkages for poultry farmers.
iv. Improving the poultry value chain, i.e., production, input supply, storage, marketing, etc.
v. Subsidizing cost of poultry inputs and technology.
vi. Improving transportation systems for efficient product delivery.
vii. Formulation of policies that support growth of the poultry subsector.
viii. Adoption of appropriate production technology, e.g. storage facilities, hatchery, etc.

REFERENCES

[1] Bueltler, A. 2007. Introduction to poultry production in Saskatchewan University or Saskachwansas.http/www.agriculture.gov.sk.ca/introduction-poultry-production.

[2] Ali, A. 2002. Introduction to Poultry production. University Press, Nigeria.

[3] Yen, S.T., Lin, B. H., and Smallwood, D.M. 2003. Quasi and stimulate likelihood approaches to censored demand systems: Food consumption by food stamp recipients in the United States. Am J. Agric. Econ; 85 (2): 458 – 478.

[4] World Bank. 2004. Poultry plays an important role in Africa Export; Neglect of Local Practice-Technical report.

[5] Plateau State Government (PLSG) Dairy. 2007.

[6] Olayemi, J. K. 1998. Elements of Applied Econometrics. Ibadan University Press, Nigeria.

[7] Huang, K.S. and Lin, B. 2000. Estimation of food Demand and Nutrient Elasticity's from Household Survey Data Washington, D. C.: US dept. of Agriculture.

[8] Udu, A. 2007. The fast method estimating unconditional demand elasticity's for processed in present of fixed effect. Agricultural Research Econ. J. 29. (2)2976-295.

[9] Bergold, J., Akobundu, E. & Peterson, E.B. 2004. The Fast Estimating Unconditional Demand Elasticities For Processed Foods in the Presence of Fixed Effects. J. Agric Resource Econ. 29 (2): 276 – 295.

TABLES

Table I: Distribution Based On the Socioeconomic Characteristics of the Respondents

Variable	Mean	Frequency	Percentage (%)
Age			
<20		14	16
21-30		36	40
31-40		27	30
41-50		10	11
>50		3	3
Gender			
Female		53	59
Male		37	41
*Education status*Primary		13	14
Secondary		50	56
Tertiary		27	30
Household Size			
1-5		30	33
6-10		53	59
>10		7	8
Access to market			
No		13	14
Yes		77	86
Income(₦)			
≤ ₦99,999		53	59
≥₦100000		37	41
Product price			
Egg (crate)	600		
Meat (1kg)	900		

Source: Field Survey, 2018.

Table II: Distribution Based On Animal Protein Preferences

Animal Protein	Frequency*	Percentage (%)	Rank
Poultry product	51	57	1st
Fish	40	44	2nd
Beef	35	39	3rd
Pork	28	31	4th
mutton	22	24	5th
Chevon	15	17	6th

Source: Field Survey, 2018; * = Multiple Response

Table III: Factors Affecting Poultry Product Demand

Variable	Coefficients	Standard Error	T-Stat
Intercept	0.77431	0.26482	2.92391***
Age(X_1)	0.56017	0.49716	$1.1267^{n.s}$
Gender(X_2)	0.01508	0.33189	$0.04543^{n.s}$
Edu(X_3)	0.96935	0.47894	2.0239**
H/Size(X_4)	0.45602	0.19027	2.3974**
Market Access(X_5)	0.48371	0.20362	2.3757**
H/Income(X_6)	-0.06487	0.01995	-3.2347***
Substitutes (X_7)	-0.21695	0.10382	-2.0896**
Price (X_8)	-0.03309	0.00901	-3.6725***
R^2 0.875776331			

Source: Field Survey 2018; ***= Significant at 1% ($P \leq 0.01$); Level; **= Significant at 5% ($P \leq 0.05$); $^{N.S}$ = Not Significant; R^2 = Coefficient of Determination

Table IV: Distribution Based On the Constraints of Demand For Poultry Products

Constraints	Frequency*	Percentage (%)
Level of income	32	36
Disease outbreak	15	17
Market forces	25	28
Proximity to market	5	6
Price volatility	26	29
Substitutes	20	22
Shelf life	14	16
Storage facility	10	11

Source: Field Survey, 2018; * = Multiple Response