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# ANALYSIS OF DETERMINANTS OF HOUSEHOLDS' DEMAND FOR POULTRY PRODUCTS IN JOS NORTH LGA, PLATEAU STATE, NIGERIA

*Onuwa, G.C., Ademiluyi, I.O., Wuyep, G., and Owa, G.T
Department of Agricultural Extension and Management, Federal College of Forestry, Jos, Plateau state, Nigeria.
*Corresponding author:onuwag@gmail.com (08035606473)

## ABSTRACT

*This study analyzed the determinants of households demand for poultry products in Jos North LGA of Plateau State, Nigeria. Cluster and random sampling techniques were adopted for the study. Primary data was collected using structured questionnaires. Descriptive statistics and Ordinary Least Square regression analysis were analytical techniques adopted for this study. The results revealed that 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, 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. Improving sensitization on social interventions, e.g. poverty alleviation and empowerment programmes, conditional cash transfers, etc., financial inclusion through improved access to microcredit; livelihood diversification strategies; efficient poultry value chains and commodity price modulation; poultry feed and input subsidies are strongly recommended.*

**Keywords:** Demand, determinants, households, poultry products, Nigeria

## 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 (Bueltler, 2007). However, the level of performance in the livestock industry, particularly in the poultry subsector is on a decline; attributable to high feed cost resulting from rising prices of ingredients for feed formulation, adjustments in feed quality and quantity; as well as technical inefficiency in production among poultry farmers. The net effect of all these are capacity under-utilization, curtailment of planned expansion programs and in extreme cases liquidation. Ali (2002) also posited a great disparity between poultry production and increasing domestic consumption requirements. According to (Yen *et al*., 2003) 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 increasing numbers 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 infrequent 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 products' demand in the study area. Nigeria has the largest population in Sub-Sahara Africa. About 47% resides in the urban areas where the population growth rate is high as compared to rural communities; they constitute the greatest proportion in consumption expenditure particularly for food commodities (FAO, 2013; World Bank, 2004).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 resulted in growth defects, low immunity to disease outbreaks, etc. There is a prevalence of poultry production in the study area but there seem to be a low-demand of about 38%; for its products relative to other sources of animal protein among the respondents. The consumption of poultry products in 2019 was up to 2billion USD. The consumption per capita of eggs and meat in Nigeria is about 3.5kg and 2.5kg respectively. This is significantly lower than the world's averages 9.4kg and 15.2kg respectively (NBS, 2019). 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 on the determinants of household demand for poultry products. Therefore this study aims to analyze the demand for poultry products among households, while the specific objectives were to: describe the socioeconomic characteristics of the respondents; and determine the factors that affect demand for poultry products among households.

## MATERIALS AND METHODS

***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 (PLSG Diary, 2007).

***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. Proportionate sampling techniques were used in selecting ninety (90) respondents for this study, i.e. fifteen (15) respondents per cluster.

***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 best fitted functional form of the OLS regression equation as adapted from (Olayemi, 1998) was the linear regression model and it is explicitly presented in equation (1); $Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \beta_5X_5 + \beta_6X_6 + \beta_7X_7 + \beta_8X_8 + U_i$ ..... (1)

Where: Y = Quantity demanded (kg); $\beta_0$ = constant; $\beta_{1-8}$= 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); $X_8$= Product price (₦); and $U_i$ =Error term

## RESULTS AND DISCUSSION

### *Socioeconomic characteristics of the respondents*

Table 1 revealed that the mean age of the respondents was 35 years, while 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. Also, the mean household population among was 7, while most (59%) of the respondents had household size with a population of 6-10 people, which is an indication of households with

**Table 1: Distribution based on the socioeconomic characteristics of the respondents**

| Variable | Mean | Frequency | Percentage (%) |
|---|---|---|---|
| Age (years) | | | |
| <20 | | 14 | 16 |
| 21-30 | | 36 | 40 |
| 31-40 | | 27 | 30 |
| 41-50 | | 10 | 11 |
| >50 | 35.4 | 3 | 3 |
| Gender | | | |
| Female | | 53 | 59 |
| Male | | 37 | 41 |
| Education status | | | |
| Primary | | 13 | 14 |
| Secondary | | 50 | 56 |
| Tertiary | | 27 | 30 |
| Household Size (population) | | | |
| 1-5 | | 30 | 33 |
| 6-10 | | 53 | 59 |
| >10 | 7.1 | 7 | 8 |
| Access to market | | | |
| No | | 13 | 14 |
| Yes | | 77 | 86 |
| Income(₦) | | | |
| ≤ ₦99,999 | | 53 | 59 |
| ≥₦100000 | 49,111 | 37 | 41 |
| Product price (₦) | | | |
| Egg (crate) | 600 | | |
| Meat (1kg) | 900 | | |

Source: Field survey, 2018.

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 (Yen *et al*., 2003) who also reported the significance of demographic factors on demand. Furthermore, the mean annual household income was ₦49,111; the results also revealed that most (59%) of the respondents earned an average annual household income of ≤ ₦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.

***Factors Affecting Poultry Product Demand***

The regression analysis (Ordinary Least Square) presented in Table 2 was used to determine the factors affecting demand for poultry products among households; it also established the relationship of these factors on households 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; suggesting a linear relationship among the independent variables. The F-statistic was based on the ratio of the mean squares (variances); the estimated F-test was 4.107 and statistically significant 5% ($p \leq 0.05$) level; implying that the model was well fitted to the data set; thus, suggesting the goodness of fit of the regression model. The regression coefficients of education

**Table 2: Analysis of 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 | | |
| F-Ratio | 4.107** | | |

Source: Field survey, 2018; ***= Significant at 1% ($P \leq 0.01$); Level; **= Significant at 5% ($P \leq 0.05$); $^{N.S}$ = Not Significant

(0.969), household size (0.456) and market access (0.483) were positive and statistically significant 5% ($p \leq 0.05$) level. Therefore, the linear relationship between variables in the regression model as indicated by the value of ($R^2$) (0.8757), other factors held constant will result to an 88% increase in variation of households 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 poultry products 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. The availability of substitutes is the most important factor determining price elasticity of demand. Demand for food commodities with close substitutes is elastic (Yen *et al*., 2003). Poultry products have fish, beef, mutton, pork, etc. as its substitutes; hence the demand for animal protein is elastic (Udu, 2007). 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 (Yen *et al*., 2003).

## CONCLUSION AND RECOMMENDATIONS

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. Furthermore, the results indicated a significant relationship between the factors included in

the regression model and the demand for poultry products among households. The variation in the demand for poultry products were accounted for by the variables in the regression model. Based on the findings of this study, the following recommendations are suggested;

i. Increased sensitization of low income households on social interventions, e.g. poverty alleviation and empowerment programmes, conditional cash transfers, etc. this will avail them financial opportunities that will increase purchasing power parity among households.
ii. Improving financial inclusion by increasing access to microcredit through establishing linkages with microfinance institutions particularly for poultry farmers associations to facilitate farm expansion and increase farm output that can adequately meet households demand for poultry products.
iii. Formulating policies that create opportunities for livelihood diversification that improve household income.
iv. Formulating and implementing policies that will regulate agro commodity price volatility particularly among commodities with very close substitutes such as animal proteins, etc.
v. Improving the poultry value chains that facilitate farm efficiency, i.e., production, input supply, storage, marketing, etc.
vi. Subsidizing cost of poultry feeds and inputs, to mitigate high production cost components and consequently reduce cost of poultry products.

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