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ANALYSIS OF PREFERENCE AND THE DETERMINANTS OF QUAIL EGG DEMAND AMONG HOUSEHOLDS JOS METROPOLIS, PLATEAU STATE, NIGERIA

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ABSTRACT

This study examined the preference and the determinants of quail egg demand in Jos metropolis of plateau state, Nigeria. Using cluster sampling technique, 140 respondents were selected for the study. The specific objectives were to; describe the socioeconomic characteristics of respondents, estimate the factors affecting quail egg demand and preference for protein sources. Primary data were collected by means of well-structured questionnaire administered through personal interview. The data collected was analyzed using descriptive statistics and multiple regression model. The result of socioeconomic characteristics of respondents shows that majority of the respondents, fall between the age group of 31-40 years (49%), (6%) are within the age group of >50 years. The result also revealed that (56%) of the respondents were male while (44%) were females. On education, 44% attended tertiary institution while primary, secondary, and non-formal (2%), (43%), (11%), respectively. The result further indicated that 78% of the respondents are married while 18% are singles, 2% are divorced, and 2% are single parents. It also further indicates that 67% of the respondents have business source of income while only 33% are Civil servants. Also, it shows that most households have a size of about 4-6 persons (33%), 1-3 (26%), 7-9 (23%), 10 and above (6%), 1 had (12%). Preference for protein product shows that about 61% of the households in Jos metropolis of Plateau State preferred beef to other protein products. This is followed by fish with 24%. This is followed by poultry eggs with about 14% of the sampled households preferring the product. The least preferred product is quail products with 1% of the sampled households preferring it. The regression result shows that variables such as price of quail eggs, price of fowl eggs, health reasons, taste and habit were significant at 1% level of probability while household expenditure was significant at 5% level of probability. Unavailability of quail eggs (32%), cost of product (26%), size of egg (19%), market distance (9%), taste of egg (4%) and spoilage (4%) were the major constraints of quail egg demand in the study area. There is the need for poultry farmers to produce more of quail eggs, create awareness to the general public on the benefit of both consumption and production of quail eggs, government should fund research in quail egg production as it will help create more jobs for the teeming unemployed youth. Also, quail eggs should be included as the animal protein source in the free school feeding programme of the federal government of Nigeria.

Keywords: Quail egg, preference, household demand, Jos metropolis, Nigeria.

INTRODUCTION

The Japanese quail (*Cortunix cortunix japonica*) is the smallest avian species of birds farmed for meat and egg production (Panda and Singh, 2006). Distinct characteristics of the quail bird include rapid growth enabling quail to be marketed for consumption at about 5-6 weeks of age, early sexual maturity resulting in a short generation interval, high rate of lay and much lower feed and space requirements than the domestic fowl and less susceptible to common poultry diseases (*Esobhawan*, 2007). The fact that protein consumption in Nigeria, particularly the animal protein component is very low is not a new phenomenon. Being one of the developing countries in the world, Nigeria is faced with worsening situation of inadequate protein consumption (Ayinde and Aromolaram, 2000; FAO, 2002).

The relevance of protein in human and animal nutrition cannot be over emphasized. In recent times, there has been a significant short fall between the production and supply of animal protein to feed the ever increasing population. The human population projection for the Sub-Saharan Africa is put at about one billion by the year 2020 (Winrock, 2002). Nigeria at present with a projected population of over 180 million (NPC, 2006) is expected to contribute a significant percentage of anticipated population growth. This means greater pressure on feeding the populace. The present rate of growth in the agricultural sector is considered too slow to match the expected population growth (Abu and Soetan, 2009).Nigeria, notwithstanding the anticipated thick population, is highly deficient in animal protein security with the per capita consumption put at 9.3g/day as against the 34g/day recommended by the Food and Agricultural Organization (FAO) to be the minimum requirement for the growth and development of the body (Lamorde, 2001; Esobhawan, 2007, Esobhawan, *et al*., 2008). This implies that only about 27.35% of the minimum requirement in animal protein intake is secured in Nigeria. To arrest this unacceptable trend, efforts have been directed towards boosting the livestock industry with micro-livestock having prolific tendency, short gestation period, short generation interval and rapid growth. Among the micro-livestock animals is the Japanese quail (*Coturnix coturnix japonica*) which falls within the above description and should therefore be the animal of choice in increasing animal protein base in the developing countries hence the review on Japanese quail husbandry as a means of increasing animal protein base in developing countries.

The knowledge on the nutrient requirement of the quail bird with awareness and desired characteristics as been mentioned earlier as not being extensively studied and hence the cost implication in the environment (Haruna *et al.*, 2001). These aspects deserve greater attention as Whyte *et al.,* (2007) believed that with adequate knowledge on the nutritional requirements of man, the local farmer could raise these birds economically for the nutritional benefit of many Nigerians. The rising demand for protein by man therefore has led to a tremendous increase in poultry farms all over the country. However, the progress made so far in the poultry sector in Nigeria and many other African countries are currently being undermined by the escalating cost of feeds. According to Apata and Ojo (2000), the high cost of compounded feed is derived largely from the exorbitant processing of feed ingredients, increasing competitive demand for them by man and animals and scarcity of conventional ingredients of between 60-70 percent total costs of their production. Effort should be geared toward evaluating alternative feed ingredients which are readily available in this case maize and Soybean as energy and protein sources respectively for quail diet production. According to Atteh and Ologbenla (2000), such alternatives should have comparative nutritive value but cheaper than the conventional protein sources and should also be in large quantities. More importantly, the effect of the alternative

feed ingredients on the output (in this case quail birds) would also be a concern for consideration as an alternative for attaining maximum marketing weight within the shortest possible time.

Quail eggs are renowned for being rich in vitamins, essential amino acids, unsaturated fatty acids and phospholipids, which are vital for human physical and mental development. Quail eggs can be included in the diets of children, pregnant mothers and geriatric and convalescent patients. Coturnix eggs are characterized by a variety of color patterns; they range from snow white to completely brown more commonly they are tan and dark brown speckled or mottled brown with a chalky blue covering. The average egg from mature female weights about 10 gram, about 8 percent of the body weight of quail hen as compared to 3 percent for chicken eggs. The egg of Japanese quail contains 158 calorie of energy, 74.6% water, 13.10% protein, 11.2% fat and 1.1% total ash. The mineral content includes 0.59mg calcium, 220mg phosphorus and 3.8mg iron. The vitamin content is 300iμ of vitamin A, O, R mg of vitamin B_1, 0.55mg of vitamin B_2 and 0.10mg nicotinic acid. (Aderemi *et al.,* 2003).

METHODOLOGY

The study was carried out in Jos metropolis which consists of Jos North and South local government areas in Plateau state. It is located on latitude 905N $8^0$53'E/09.933^{0}N 8.883^{0}E and latitude 09052'N and longitude 0.08054'E at an elevation 1285m, 4216 is a city in the middle belt of Nigeria. The city has a population of about 900,000 resident based on the 2006 census figure, It is the administrative capital of Plateau State (NPC 2006). The city is located on the Jos plateau at an altitude of 1,217m (4,062 feet) above sea level; Jos enjoys a more temperate climate than most of the rest of Nigeria. Average monthly temperatures ranges from 21^0 to 25^0C (70^0 to 77^0f) and from mid-November to late January night-time temperature drops as low as 11^0C (52^0f), resulting in chilly nights. (Zangubadt, 2006). Geographically Jos is situated almost at the geographical centre of Nigeria and about 179kilometres (111 miles) from Abuja, the nation's capital Jos is linked by road, rail and air to the rest of the country (CBN, 2007). Jos receives about 1,400millimetres (55 inches) of rainfall annually, the precipitation arising from both conventional and or graphic sources, owning to the location of the city on the Jos Plateau. It enjoys two main seasons in a year, the dry season (November-March) and rain season (April – October) with December being the coldest month (10^0C) and March the hottest month (310C). The relative humidity averages between 14% and 74% in the dry and rainy seasons respectively (CBN, 2000).

Sampling Procedure

A multi stage sampling technique was used for the study. Stage one, a purposive sampling was used to select the two (2) local government areas i.e. Jos North, and Jos South which were used for the study reason being that the two local government areas has the highest number of urban dwellers, is also more concentration of quail egg production. In stage two, Six (6) different clusters of residential areas were selected in Jos North and five (5) in Jos south. In stage three, using cluster sampling technique, sixty(60) questionnaire was distributed in the six districts in Jos North and eighty (80) in Jos South, making a total of one hundred and forty (140) questionnaire that was administered out of which a number of (117) were filled and collected. Data for the study was obtained through the use of primary sources. The primary source of data for the study was through a well-structured questionnaire. In a situation where the respondents could not read or write personal interviews were scheduled with them and their responses entered in to the questionnaire.

Analytical Technique

Descriptive statistics include the use of frequency, percentage and mean to describe the

preference and socioeconomic characteristics of the respondents in the study area.

Multiple Regression

This was used to estimate the determinants of quail egg demand in the study area.

Model Specification

The explicit form of double log was used because it was the best that fit the model used is presented as:

$Y_2 = X_1, X_2, X_3, X_4 \ldots X_5 + \cup \ldots\ldots\ldots\ldots\ldots$ (10)

$\text{LogY}=b_o+b_1\text{log}X_1+b_2\text{log}X_2+b_3\text{log}X_3+b_4\text{log}X_4+ b_5\text{log}X_5+e_i$ (double log)..…….... (11)

Where

Y=total number of quail eggs demanded

B_0= constraints term

B_1-B_5= regression coefficient of X_1-X_2

X_1=Own price of quail eggs (₦)

X_2=Price of poultry eggs (₦)

X_3=Household size (Number)

X_4=Household income (₦)

X_5=Health reasons (0, 1)

X_6=Taste (0, 1)

RESULTS AND DISCUSSION

Respondents' socioeconomic characteristics

The socio economic characteristics of the respondents considered includes: age, gender, marital status, educational level, household size, and occupation. The result indicate that majority of the respondents, fall between the age group of 31-40 years (49%). This shows that most of the households were in their active age. Only 6% fall within the age group of >50 years. The result also revealed that 56% of the respondents were male while 44% were females. Education is also a vital ingredient among the respondents because it enables them adopt the consumption of quail eggs, having the knowledge of its nutritional and medicinal benefits and values. Majority of the respondents (44%) attended tertiary institution while primary, secondary, and non-formal had 2%, 43%, and 11% respectively. It further indicated that 78% of the respondents are married while 18% are single, 2% are divorced, while 2% are single parents. The result further indicates that 67% of the respondents have business as source of income while 33% are Civil servants. Also, it shows that most households (33%) have a size of 4-6 persons, 1-3 (26%), 7-9 (23%), 10 and above (6%), and one had (12%). Preference for protein products shows that 61% of the households in Jos metropolis of Plateau State preferred beef to other protein products. This is followed by fish with 24%, poultry eggs had 14% of the sampled households. The least preferred product is quail products with 1% of the sampled households.

Table 1: Socioeconomic Characteristics of the Respondents

Gender	Frequency	Percentage (%)	Cumulative frequency
Male	78	56	56
Female	62	44	100
Total	140	100	
Age (years)			
< 30	22	16	16
31-40	69	49	65
41-50	41	29	94
51-above	8	6	100
Total	140	100	
Marital Status			
Married	109	78	78
Single	25	18	96
Widow	6	4	100
Total	**140**	**100**	
Educational Status			
Primary	3	2	2
Secondary	60	43	45
Tertiary	62	44	89
Non-Formal	15	11	100
Total	**140**	**100**	
Occupation			
Civil service	46	33	33
Business	94	67	100
Total	**140**	**100**	
Household size			
1 – 3	36	26	26
4 – 6	50	36	62
7– 9	32	23	85
>10	21	15	100
Total	**140**	**100**	
Protein Preference			
Fish	34	24	24
Meat	85	61	85
			99
Poultry eggs	20	14	
Quail eggs	1	1	100
Total	**140**	**100**	

The Determinants of Quail-egg Demand

The result of the regression analysis shows the determinants of demand for quail eggs as shown in table 2.

The production function analysis was used to determine the effect of these variables on quail egg demand in the study area. All the functional forms namely; linear, semi-log, double-log and exponential were fitted, but Cobb-Douglas (double-log) function that was best fit. The coefficient of multiple determinations (R^2) was 0.73, which implies that about 73% of the changes in the dependent variable (quail egg demand) was caused by the combined effects of the independents variables and the remaining 27% changes in the dependent variable was caused by those variables relevant to the quail egg demand but were not included in the subject of the study. The Dubin-watson statistics is 1.890 and is within plausible region.

The six estimated coefficients of the parameters elasticity of demand were all positive except price of fowl eggs and significant except household size. Own price, price of eggs, health reasons and taste/habit were significant at 1%, household income was significant at 5% while household size was not significant. This implies that these entire variables except household size were important in the study of quail egg demand in the study area.

Own price of quail eggs (x_1)

The coefficient of own price (0.396) was found to be positive and significant at 1 percent level of probability for the quail egg demand in the study area indicating own price is an important factor in quail egg demand and that there is a direct relationship. This implies that as the price of quail egg increases, the quantity of quail demand will increase accordingly by 3.0%. This is consistent with the findings of Toluwase and Kolapo (2017), that the demand for quail egg is positively related to its own price.

Price of fowl eggs (x_2)

The coefficient of fowl egg (-0.705) which is a substitute was negative and significant at 1 percent level of probability for quail egg demand in the study area. This shows that price of fowl eggs is an important factor in quail egg demand and which also implies that as the price of quail egg increase, the price of fowl egg will decrease by 7.05%. There is therefore an inverse relationship between quail egg demand and fowl egg price and is consistent with the theory of demand, suggesting that fowl egg is a substitute. This is consistent with the findings of Toluwase and Kolapo (2017) in their findings that prices of other close substituent including price of turkey, price of fish, and price of cow-hide determine the demand for chicken in Ondo State. The respondents tend to go for other close substitutes if price of chicken increases.

Household income (x_4)

The coefficient of household income (0.905) was positive and significant at 5 percent level of probability in quail egg. Expenditure has a positive relationship with the demand for quail egg. This implies that as the household income increases, the demand for quail egg will increase by 9.05%. This shows that budget share for quail egg tends to increase with increase in household expenses. This positive sign of poultry household income suggest on a direct relationship with quail egg demand in the study area. This is consistent with the theory of demand. This is in agreement with the findings of (Delgado *et al*., 2003; Sekumade and Toluwase, 2016), that the demand for fish is positively related to income (disposable income),

Health reasons (X_5)

The coefficient of health (0.955) for the quail egg demand is positive and significant at 1% level of probability. This shows that quail egg demand will rise by 9.55% if health related solution is found in quail egg consumption. This significance of the coefficient of health due to the quail egg consumption suggests that it is an

important factor in determining quail egg demand in the study area.

Taste (X_6)

The coefficient of Taste (0.359) in quail egg demand is positive and significant at 1% level of probability. This implies that taste is an important factor in quail egg demand in the study area. This significance of the coefficient of taste implies that as the taste for quail products consumption increases, quail products demand will increase by 3.59%.

Table 2: **Result of Regression Analysis Showing Factor that Influence the Level of Demand for Quail Eggs in the Study Area.**

Variables	coefficient	standard error	T-statistics
Constant	5.944	1.431	4.153***
Own price of quail eggs	0.396	0.112	3.244***
Price of fowl eggs	-0.705	-0.203	-3.456***
Household size	0.342	0.697	0.491^{NS}
Household income	0.905	0.380	2.312**
Health reasons	0.955	0.206	4.632***
Taste	0.359	0.692	5.191***
R^2		70.3	
DW		1.890	

Source: Field survey 2014.

*Significance at 10% ** Significance at 5% level *** significance at 1% level.

Constraints to quail products demand were sought out which includes Price of quail eggs. Availability of quail eggs, Spoilage of quail eggs, Size of quail eggs, quantity needed, Distance from market and Taste. Among the said constraints, poor availability of the product was identified to be the major problem with 32% then followed by price of the eggs 26% and also the size of the egg also discourage people from consuming the product (18%). This finding is simple to say that the demand for quail egg is mostly affected by its poor availability to the consumers who are willing to consume the product. As shown in the table 4.

Table 4: Constraints Facing Quail Egg Demand

Constraints	Frequency	Percentage
Price of product	59	26
Availability of product	71	32
Quail Egg Spoilage	10	4
Size of Quail Egg	42	19
Quantity needed	13	6
Distance from market	19	9
Taste	8	4

Source: Field survey 2014.

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Summary and Conclusion

The finding of this study has shown that quail egg could be a major source of animal protein to households in Nigeria if only it could be produced in the required quantity to the consumers. There is also the need to create more awareness to the general public on the benefits of both the consumption and production of quail eggs as this will create more jobs for unemployed youth. In conclusion, there is need to produce more of quail eggs to meet with the rising demand for the product.

Recommendations

Based on the result from this research, the following recommendation should be considered. The need to produce more of the quail product, the need for the national orientation agency (NOA) to create more awareness to the general public on the benefits and potentials of quail egg, they should be recommended to patients due to its medicinal value and also there is need to carry out more research on method of preservation to prolong its storability.

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