

## THE CONSUMPTION PATTERN OF GOAT MEAT IN ILORIN METROPOLIS OF KWARA STATE, NIGERIA

Nwauwa, L.O.E., Akintunde, O.K. And Adenegan, K.O  
Department of Agricultural Economics,  
University of Ibadan, Oyo State, Nigeria

### ABSTRACT

Goat is a multi-purpose animal whose uses range from consumption, companionship to commercial meat production. Its production and consequent consumption is widely accepted in Nigeria among the different ethno-religious sects unlike pig, dog and donkey. The paper examined the factors that affect consumption pattern of both kid and mature goat meat in Ilorin metropolis of Kwara State, Nigeria. Primary data were collected from 150 consumers of goat meat through the use of structured questionnaires. The data were analyzed using descriptive statistics and multinomial logit model. The study results showed that 10% of the respondents in the study area consumed both kid and mature goat meat, while the remaining 20% and 70% consumed the kid goat only and mature goat meat only categories, respectively. Tenderness and unpalatable nature of the kid goat meat were found to reduce its demand. The results obtained also showed that the number of the dependants of consumers significantly influenced consumers' preference for the goat meat consumed. The likelihood ratio for the model, lambda ( $\lambda$ ) is 16.9 which is significant at 5% level. This implies that the goat meat consumer groups are heterogeneous. The multinomial logistic estimate for the combined goat meat consumer groups revealed that income and number of dependants of respondents were significant and therefore explained why individuals prefer to consume either the combination of kid and mature goat meat or the mature goat meat instead of the kid goat. The educational status of respondents and price of other meat products were not significant and therefore did not significantly influence individual's preference for a combination of kid and mature goat meat or only mature goat meat, instead of consuming the kid type of meat only. The study therefore recommends that efforts should be made to create awareness of the dangers of consuming meat with high cholesterol content which has been linked to cause many diseases coupled with training of butchers and goat meat processors on modern methods of processing cholesterol-free meat for healthy consumption.

**Key words:** Consumption Pattern, Goat meat, Preference and Multinomial logit model

### INTRODUCTION

Meat is the primary reason for goat keeping, resulting in goat meat constituting the major proportion of the world goat population. Goat meat is also derived from male goat kids and culls from angora and milch goat herds where other goat products such as cheese, hair, mohair, and cashmere are either primary or secondary products, the culling of goats is influenced by the economic value of these. Goat muscle has high myoglobin content, contains both aerobic (red) and anaerobic (white) muscle fibres and undergoes the same postmortem biochemical changes as beef and mutton (Heffron and Dreyer, 1975; Lawrie, 1985). The decline of muscle pH followed a pattern typical of red meat carcasses, to stabilize at around pH 5.4 (Owen *et al.*, 1978; Breukink and Casey, 1989). Several studies have indicated that goat meat is inherently less tender than sheep. Muscle of male Boer goat kids had higher collagen content with lower collagen solubility than male lambs of fur sheep breeds (Heinze *et al.*, 1986). Goats also contribute to human nutrition through their milk. Goats are poor milk producers, not having been selected for this trait. However, Boer goat does (2-6 teeth in age) produce 1.5-2.5 kg milk/day under extensive, semi-hardy conditions, with a protein content of 3.9-4.5%, fat 6.4-9.4% and total solids of 15.8-19.2% (Raats *et al.*, 1983). Specific consumption patterns and preferences for goat meat are dictated by cultural and traditional backgrounds and socio-economic status of the community. There are virtually no religious or cultural taboos on the eating of goat meat, with the result that goat is readily available to societies in which eating beef, pork or other meat types is prohibited. An adult Nigerian was estimated to require about 65g protein per day out of which 35g should come from animal sources (Olubajo, 1976; FAO, 1980). The quantity and quality of meat consumed by a people, and the animal species used for food are governed by several factors, among which are social status and culture.

Foods of animal origin are essential in man's diet and are an excellent source of essential amino acids, vitamins and minerals (CAST, 1997). The Food and Agriculture Organization (FAO, 1980) estimate for Nigeria is that cattle is the major meat source (36%), followed closely by poultry (34%), small ruminants (24%) and pigs (6%). The dependence of humans on goats was illustrated by French (1970) and Norman (1991). They calculated ratios of humans to goats for various world regions from FAO statistics. The ratio was 3:1 in Africa as a whole and southern Africa 4:1; Asia 10:1; Latin America 12:1. On a global scale goat provide the least meat per caput, being 0.5 kg per caput, compared with beef at 10.1 kg, pork at 12.7 kg, sheep at 1.3 kg and poultry at 7.2 kg. In terms of world regions the provision by goats is the highest in Africa, 1.04 kg per caput, followed by Asia, 0.47 kg per caput (Norman, 1991). There is general agreement that goat meat production sector will continue to grow in the coming decades as taste and preference of niche market populations, health and nutritional concerns are assimilated into the food marketing system (Mack et al, 2009). However, preferences for type of product differ. For instance, Hispanics in the U.S. prefer young kids (cabrito) while Muslims prefer goat meat with lean carcasses and Caribbeans prefer carcasses from older and more mature animals. The same also applies in the study area where majority prefer mature male type (Billy). The livestock producer hardly offers the 'nannies' for slaughter since they are used as breeding stock. According to Magda, (2006), it is often a costly lesson to produce an animal that the market place doesn't particularly want. Hence producers go for the types that majority of the consumers want. There have been a limited number of studies that sought to delineate the attribute of goat meat desired by consumers. Xuanli, *et al*, (2007) show that price, freshness, and colour are the three most important goat meat attributes desired. Mclean-Meyinne, (2003), also found that low fat content and freshness were important, Xuanli, *et al*, (2005) found that roast cut was one of the most desired value-added attributes of goat meat and Mohammed *et al*, (2006), also found that freshness and halal method of processing were very important. Little or no published information is available on whether producers are meeting the carcass or live weight demands of these important products. The number of intermediaries between the producer and the consumer is much less numerous for goat meat compared to those for other meat products in Nigeria such as beef and poultry. Thus, it is important for producer to place animals into the marketing channel close to what is demanded by the targeted market. If the producer does this, traditional economic theory suggests that the producer will be rewarded by the price received. Supply and slaughter of meat goat reaches its peak value at the periods of high demand. These periods fall within the traditional festivals such as Christmas, 'Ileya', and New Year, when the population of the state is swollen by the returnees coming home to celebrate the season with the family members. Most cultural activities and marriages are also scheduled to hold within these periods. The study is of paramount importance as it examines a contemporary issue in the economy of the state – the nature of goat meat consumption in Kwara state. The study identifies those factors explaining the nature of goat consumption by the people of the state especially those factors that explain the demand differentials between the different classes of goat in the state. The result of the study could therefore serve as a pointer to policy options that could be adopted by stakeholders in the domestic goat meat production industry to raise the demand for local meat thereby increasing the contribution of livestock sector to the total GDP in Nigeria.

### METHODOLOGY

#### Data Sources and Collection Procedure

The data used in the paper were collected from Ilorin metropolis of Kwara State, Nigeria. The state is divided into four agricultural zones by the Kwara state Agricultural Development Project (KWADP) authority based on agro-ecological considerations and the study was conducted in zone A (Ilorin metropolis). The target population of this study is people that consume goat meat as part of meeting the national requirement for protein intake; therefore, purposive sampling technique was adopted for the study. A two-stage sampling procedure was used to select a representative sample for the study. The first stage was the random selection of restaurants and goat meat pepper soup joints in Ilorin metropolis and the second stage involved the random selection of 150 respondents that consume goat meat in their daily diet. The data for the study were collected from the respondents through questionnaires and interview schedule. Structured and unstructured questions were used to elicit the required information from the respondents. The questionnaires contained an introductory part, which emphasized the importance of the responses and promised confidentiality of the information provided. They also contained a section which had questions on the respondents' socio-economic backgrounds. Questions were also asked on their demand levels and preference scale for the different category of goat meat consumed. Also secondary information was sourced from

journals, periodicals, Food and Agricultural Organization (FAO), and United States Department of Agriculture bulletins, e.t.c

**DATA ANALYSIS**

The tools employed for the analysis of this study were descriptive statistics and multinomial logit model. The descriptive statistical tool comprised frequency counts, percentages, means and modes, were used to analyze the socio-economic characteristics of goat meat consumers in the state. The multinomial logit model was used to examine those factors that influence the people's preference for the different category of goat meat. The multinomial logit model was used to assess why households in the study area prefer kid goat meat varieties to the older/mature goat meat. The multinomial logit model was chosen based on survey result that revealed that goat meat consumption (dependent variable) was found to be a categorical variable which can take three categories of levels (1, 2 and 3). 1 is used for the kid consumer group, 2 is used for the combined kid and mature goat meat consumer group while 3 is for the mature goat meat consumer group. The kid goat meat consumer group was taken as the reference group. The multinomial logit model was therefore used to identify the variables that make persons belong the categories 2 (kid and mature goat meat consumer group) and 3 (mature goat meat consumer group) instead of 1 (the kid goat meat consumer group) as follows. The probability that the *i*th person belongs to the *j*th goat meat consumer group reduces to:

$$P_{ij} = \frac{e^{\beta_{jxi}}}{\sum_{k=1}^3 e^{\beta_{kxi}}} \tag{1}$$

According to Maddala (1983), the multinomial model makes the choice of probabilities on the individual characteristics of agents. Following Maddala, (1980), and Babcock, Chaherli and Lakshunminariayam, (1995), the basic model is written as.

$$P_{ij} = \frac{e^{\beta_{jxi}}}{\sum_{k=0}^j e^{\beta_{kxi}}} \tag{2}$$

Where *i* = 1,2,...,n variables,

*k* = 0,1,...,j groups and

$\beta_j$  = vector of parameter that relates  $x_{j,s}$  to the probability of being in group *j* where there are *j* + 1 groups.

For this study, the  $X_i$  variables range from  $x_1$  to  $x_7$

where  $x_1$  = Age of the individual,

$x_2$  = Gender

$x_3$  = Marital status,

$x_4$  = No. of dependents,

$x_6$  = Educational status of the individual,

$x_7$  = Price of other meat products (#/kg) and

$x_8$  = Price of goat meat consumed (#/kg).

**Normalisation of the model**

As a rule, the summation of the probability for the three categorical groups in the model must equal to unity. This calls for a normalization of the equation model. The common rule is to set one of the parameters vectors equal to zero (Kimhi, 1994). Hence, for *k* number of choices, only *v*-1 distinct parameters is identified and estimated. Based on equation (2), the probability of being in the reference group – the kid goat consumer group with parameter vector equal to zero is:

$$P_{i0} = \frac{1}{1 + \sum_{k=1}^j e^{\beta_{kxi}}} \tag{3}$$

Similarly, the probability of being in each of the *j* groups is

$$P_{ij} = \frac{e^{\beta_{jxi}}}{1 + \sum_{k=1}^j e^{\beta_{kxi}}} \tag{4}$$

$k = j$

Dividing equation (4) by equation (3) gives

$$\frac{P_{ij}}{P_{io}} = \beta_{jxi} \quad (5)$$

This denotes the relative probability of each group to the probability of the reference group. Hence, the estimated coefficients for each group reflect the effect of  $x_i$ 's on the likelihood of the consumer's household belonging to that alternative group relative to the reference group. The logarithm of the odd ratio in the equation to base  $e$  gives the estimating equation:

$$\ln \frac{[P_{ij}]}{[P_{io}]} = \beta_{jxi} \quad (6)$$

Following Hill, (1983), the coefficient of the group can be given using the formula, thus:

$$\beta_v = [\beta_1 + \beta_2 + \dots + v-1] \quad (7)$$

## RESULTS AND DISCUSSION

### Socio-economic Characteristics of Goat Meat Consumers

Table 1 presents the socio-economic characteristics of goat meat consumers in the study area. A total of 150 consumers of goat meat were interviewed covering the area of study. The majority (67 percent) of respondents were adults over 31 years of age. This represented the group with adequate purchasing power and therefore market evaluation results would be highly reliable. The respondents were also found to be largely male of 68 percent while female making up 32 percent. The respondents were distributed over a wide range of educational backgrounds consisting of 5 percent without any formal education, 67 percent of low educational level and 28 percent with education higher than secondary schools. Occupation is the primary determinant of the level of consumers' income. Income in turn determines the individuals' level of consumption. Consumption is usually hypothesized to be a function of disposable income. Majority of the respondents are traders (64 percent), civil servants (24 percent), artisans (8 percent) and farmers (4 percent). The total number of dependants living with the individual respondents to a large extent determines their goat meat consumption pattern. It is expected that individuals with larger dependants will tend to consume less than those with smaller number of dependants. This is because the respondents that have larger dependants would have less per capita income than the one with smaller dependants. Majority of the respondents (52 percent) have dependants of less than 5, (22 percent) have dependants of between 5-9 persons while the remaining (26 percent) have dependants of more than 10 people. The average number of dependants was 5 persons per individual. Within the study area, three categories of goat meat consumers were identified during the study, namely: individuals that consume kid/younger goat meat, those that consume mature/older goat meat and those that consume a combination of the kid and older goat meat. The commonest type of goat meat consumed by the respondents in the study area was the older/mature category. This was consumed by majority of the individuals (70 percent) in the study area. 20 percent consumed kid while a few (10 percent) consumed a combination of the kid and old meat goat category. The result of the study did not agree with the general knowledge that education creates awareness. It was expected that since more than 90 percent of the respondents had one level of education or the other, this would have reflected in their choice of goat meat category that yields better quality. Older goat meat contains denatured protein, hard bones, producing low quality meat and high fat content. Level of education here did not help the respondents make better choice in comparison to the awareness received from educational training. The respondents gave reasons why they preferred a particular goat meat type. Those preferring kid type say that tenderness, low fat content and both flesh and bone portion of the meat are edible while those that preferred older/mature type say that their reasons range from palatability, toughness and the fact that meat lasts longer after cooking. A similar study carried out in the United States of America by Mack, et al (2009) revealed that Americans and Hispanics prefer kids to the mature or older goat meat. Their reason according to the report ranges from tenderness to low fat content. This is contrary to what is obtained in the study area. The reason for the differences can be

deduced from the fact that those in America have the awareness of nutritional quality of meat products. Also environmental factors such as economic and genetic make up of the animals in the two places are not the same. Standard kid goat in the US weighs approximately 13-15 kg while kid goat in Nigeria weighs between 5-7 kg. So what they actually call kid goat in US by weight standard is full grown goat in Nigeria. Also, African culture favours consumption of tough and hard meat with a lot of fat which makes it more palatable without minding the effect of the cholesterol content which causes heart attack and other related diseases.

**Table 1: Socio-economic Characteristics of Respondents**

Age Group (yrs)		
Characteristics	Frequency	Percentage
12-20	5	3
21-30	45	30
31-40	68	45
41-50	22	15
51 and above	10	7
Gender		
Male	102	68
Female	48	32
Educational Status		
No. Formal Education	8	5
Primary	37	25
Secondary	63	42
Tertiary	42	28
Occupation		
Trading	96	64
Civil service	36	24
Artisan	12	8
Farming	6	4
No. of Dependants of Respondents		
1-2	54	36
3-4	24	16
5-7	12	8
8-9	21	14
10 and above	39	26
Type of goat meat preferred by the Respondents		
Kid	30	20
Old	105	70
Combined	15	10
<b>Total</b>	<b>150</b>	<b>100</b>

Source: Field Survey (2009)

❖ 100% = 150 respondents

#### Determinants of Goat Meat Consumption

The variables that determine the various goat meat consumer categories were analysed using the multinomial logit model. The result of the model estimation is presented in table 2 below.

**Table 2: Multinomial Logistic Estimate of Goat Meat Consumer Groups**

Variables	Consumers of Kid and Mature Goat Meat	Consumers of Mature Goat Meat Only
	Parameter	
Income ( $\square$ )	0.6546(0.3292)*	0.3314(0.2321)*
No. of dependants	0.1445(0.2535)*	-0.1385(0.1863)*
Educational Status	-0.3776(0.3343)	-0.2006(0.2447)
Price of other meat products	-4.4229	-4.7114
Constant	2.6743(1.3863)	0.5977(0.9593)
Log likelihood	-122.1250	
Likelihood Ratio ( $\lambda$ )	16.9 *	
n	150	

Note:  $y=0$  is the base outcome

Figures in bracket are standard errors of the estimate of regression co-efficient.

\* Implies significant at 5% confident level.

Source: Data Analysis (2009).

From the results of the study in table 2 above, the likelihood ratio for the model,  $\lambda$  is 16.9 which is significant at 5% level. This implies that the goat meat consumer groups are heterogeneous. The multinomial logistic estimate for the combined goat meat consumer groups revealed that income and number of dependants of respondents were significant and therefore explained why individuals prefer to consume either the combination of kid and mature goat meat or the mature goat meat instead of the kid goat. The educational status of respondents and price of other meat products were not significant and therefore did not significantly influence individual's preference for a combination of kid and mature goat meat or only mature goat meat, instead of consuming the kid type of meat only. The number of dependants variable coefficient was negative for the consumers of mature goat meat group implying that the probability of the individual consuming mature goat meat increases as the number of dependants decreases. Opposite was the case for combination of kid and mature goat meat group which is positive. This can be explained by the fact that individuals in this group are addicted to goat meat consumption and increase in number of dependants does not reduce their quest and consumption of same. Their attitude towards goat meat consumption is any type of meat is consumable whether mature or not. Income of the respondents was positive signifying that the variable explains why the individuals would forego the kid goat meat for a combination of kid and mature goat meat or the mature goat meat only. The probability of consuming a combination of kid and mature goat meat or mature goat meat only relative to the kid goat meat increases as the income increases. However education variable was not significant.

### CONCLUSION

The study results showed that majority of the respondents were traders with an average number of dependants of 5. Based on the type of goat meat consumed, respondents can be classified into three groups: individuals that consumed kid goat meat only, those that consumed mature goat meat only and those that consumed a combination of kid and mature goat meat type. The health implication of the mature goat meat type notwithstanding, majority of the respondents still prefer to consume the mature goat meat category. This group constitutes 70 per cent of the respondents in the study area. The multinomial logit model revealed that the number of dependants and income significantly influenced individual's preference for a combination of kid and mature goat meat or only mature goat meat, instead of consuming the kid goat meat only. The educational status of the respondents and the price ( $\#/\text{kg}$ ) of other meat products did not significantly influence respondent's preference for a combination of kid and mature goat meat or only mature goat meat, instead of consuming the kid goat meat type only.

### RECOMMENDATIONS

The study therefore recommends that efforts should be made to create awareness of the dangers of consuming meat with high cholesterol content which has been linked to cause many diseases such as heart-related diseases. This awareness programme can be carried out by joint efforts of the Federal Ministry of Health and National Orientation Agency. Also butchers and goat meat processors should ensure that the fats contained in the meat are further processed to reduce the level of cholesterol before the meat is offered for sales.

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