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Determinants of Households' Consumption Frequency for Indigenous Chicken in Kenya

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Abstract
Increasing saturation and maturity in the agricultural commodity market is forcing suppliers to innovate in order to sustain their business performance. This innovation should be anchored on gaining a deeper understanding of existing and potential customers purchase behaviour. For instance, in Kenya, consumption of proteins especially from animal origin is below the world average. The low consumption especially of indigenous chicken (IC) has contributed to the low performance of the value chain. Consequently, there is little information on the factors influencing consumption frequency of IC in Kenya. Therefore the main objective of the study was to assess factors that influence consumption frequency of IC in the counties of Makueni and Nairobi in Kenya. A total of 200 respondents were sampled in a survey, using a multistage sampling technique. The data was collected using structured questionnaire and analyzed using descriptive statistics and binary logistic regression model in STATA 11. The results showed that: - age, gender, education, household size, price and rearing of IC had a significant effect on consumption frequency. Actors in the value chain should strategize to improve performance based on these factors. Additionally, Policy should focus on promoting production of IC and creation of awareness on the benefits associated with IC consumption.
Keywords: Indigenous chicken(IC), consumption frequency, binary logistic regression model.

1.0 INTRODUCTION

Meat and meat products are an important source of protein in human diets and their consumption depends on socio-economic factors, ethics or religious beliefs and tradition (Maria et al., 2014). Poultry meat is preferred by majority of consumers due to its extrinsic and intrinsic cues. The necessity of securing the food supply in terms of quality and quantity for the increasing population as well as the need for animal proteins, health problems due to nutrition, and consumers awareness and tendency to maintain a healthy and balanced diet have all made the poultry sector a significant industry throughout the world (Aral et al., 2012) On the global scene, it's the second largest consumed meat type after pork at 13.6 kg/capita/year (FAOSTAT, 2014). In Kenya, Poultry contributes 55% to the livestock sector, 30% to the agricultural sector and 7.8 % to the GDP (USAID, 2010). The sector employs 2 – 3 million people in Kenya. In 2010 the total number of chickens in Kenya stood at 37.3 Million distributed as follows: - 84% indigenous, 5.7% broilers, 8.3% layers and 1.7% other birds (USAID, 2010). Indigenous chicken (IC) contributes to 71% of the total egg and poultry meat production and therefore influencing significantly on the rural trade, welfare and food security of the smallholder farmers (Nyaga, 2007; Ndenga et al., 2017). The subsector also serves as a source of households' income and employment (ASDS, 2010). Despite these benefits, consumption levels of poultry in Kenya are very low compared to the global average. The per capita consumption in Kenya is expected to increase from 376,200 metric tons(MT) in 2010 – (2kg per capita as a rough average estimate) to 1,124,505 MT in 2020- (4.5 kg percapita – African average per capita consumption in 2010(USAID, 2010). Lack of knowledge on factors influencing consumption levels could be a factor contributing to low consumption levels. Information on determinants of consumption frequencies could inform on policy directives and strategies to be adopted at various stages within the value chain so as to increase consumption level of indigenous chicken. The study sought to fill this void in knowledge by investigating the determinants of indigenous chicken consumption frequencies in Makueni and Nairobi counties. Studies on determinants of indigenous chicken consumption levels are few with none in the Kenyan context. The overall objective of this study was to determine factors influencing consumption frequency of indigenous chicken in Kenya.

Several studies have been conducted on various determinants of household food expenditure. Socio economic and demographic factors have been found to influence consumption patterns in several countries. Billah et al. (2013) used correlation analysis to determine poultry consumption patterns in Bangladesh. The results indicated that age, education level, farm size and annual income significantly influenced poultry consumption. In estimating the determinants to meat consumption patterns in central Kenya, Moni (2014) employed an Almost Ideal Demand System (AIDS) to illustrate that socio economic factors such as age of household head, educational level, gender, household size and off-farm income were important in explaining perceived variations in the consumption patterns. Bourdieu (1984) established that social class and education appeared to have a significance influence on meat consumption. However, income did not influence total meat consumption. Meral et al. (2012) used binary logit

regression method to establish the determinants of red meat consumption in Turkey. Results revealed that gender, education, household size and income were significant and associated with red meat consumption. Pirvutoiu et al. (2013) found that age, limited budget, religious reasons, disease incidences and need for vegetarian diet influenced the consumption frequency for poultry meat. Jabar et al. (1984) investigated consumption patterns of milk and milk products in Bangladesh using regression analysis. Results indicated that income, religion, age, composition of family members and the ability to produce milk at home influenced milk consumption pattern. Adisen (1999) reported that frequency and amount of meat and meat products consumption depends on education level. Kostakis (2013) found that demographic and socio-economic traits such as income, gender, age, and marital status, place of residence and status of employment influenced household expenditures on food in Greece. Kara et al. (2004) determined that gender, education, income level and number of households are important in the consumption of meat and meat products. Upadhyay et al. (2014) employed regression analysis in determining consumption patterns of fish in urban area of Tripura. Results revealed that fish price; number of adult members in a family, quantity of consumption of chicken and mutton affected the quantity of fish purchase.

The above findings show that both socio-economic and demographic factors influences consumption levels of food. Few studies have been conducted on determinants to consumption frequencies and none on indigenous chickens. This study therefore fills the gap in knowledge by investigating the determinants to consumption frequency in indigenous chicken in Kenya.

2.0 MATERIALS AND METHODS

2.1 The study area and Sampling

This study was conducted in Makueni and Nairobi counties of Kenya. Makueni county lies between latitude $1^0 35'$ South and longitude 37^0 10' East (Makueni county integrated development plan (CIDP), 2013). Nairobi county on the other hand lies between latitude 1^0 17' south and longitude 36^0 49' East and has nine sub counties. The target population for this study consisted of all consumers of indigenous chicken in Nairobi and Makueni counties. Multistage sampling technique was used and 200 consumers selected. Makueni was purposively selected because it represents both production and consumption region of indigenous chicken whereas Nairobi represents a major consumption and terminal market for IC in Kenya having consumers with varied socio-demographics.

2.2 Data collection and Analysis

Primary data was collected with the aid of structured questionnaires administered by trained enumerators in a cross sectional survey design conducted between August and October 2015.Primary data collected included socio-economic factors; age gender, education, income, household size, price, quantity, county, consumption pattern and rearing of IC.

The vehicle for analysis was binary logistic regression model while for performing the analysis; STATA 11 statistical package was used. The dependent variable was consumption frequency which was expressed as a binary (frequent or non frequent) variable while independent variables included both socio-economic and demographic variables. In this study, the average consumption frequency was one month. Consequently, if consumers consumed IC at a frequency less than a month (frequent consumers), then value of **1** was assigned while those who consumed IC at a frequency more than one month (non frequent consumers), value of **0** was assigned. More specifically, the method that was used for econometric analysis was the logistic regression.

$$y_{i=axi+\varepsilon i} \qquad (1)$$

Where: yi is a dependent dummy variable, Xi is the vector of explanatory variables, a is the estimated coefficients of regressors and εi is the disturbance term of the regression. The logit model was expressed as;

$$Li = \ln\left(\frac{\mathrm{Pi}}{1-\mathrm{Pi}}\right) = \beta 1 + \beta \mathrm{iXi} \qquad (2)$$

Where: Li is the *log of odds ratio called logit*, Pi is the probability in favour of frequent consumption, 1-Pi is the probability of non frequent consumption, $\left(\frac{\mathrm{Pi}}{1-\mathrm{Pi}}\right)$ is the ratio of average probability for frequent consumers to non frequent consumers (Erdal and Esengun, 2008), Xi represents a vector of independent variables, βi are slope coefficients which represents the marginal effect in the *log of odds* and β1 is a constant representing the value of *log of odds* when all other predictors have a value of zero.

In binary logistic regression model, the coefficient of the independent variable cannot be directly interpreted as the marginal probability on the dependent variable but rather the log of odds. The log of odds should be converted into marginal probability before interpretation (Gujaratti, 1995);

In econometric analysis, the main question was which factors determine the frequency of indigenous chicken consumption? The following model was developed to predict factors affecting the probability of IC consumption frequency. The model was formulated as:-

$$ICFRQ = \beta 0 + \beta 1GEN + \beta 2INC + \beta 3AGE + \beta 4EDU + \beta 5REAR + \beta 6HS + \beta 7CNT + \beta 8PR + \beta 9QTY + \varepsilon i \quad (3)$$

TABLE 1: Definition of variables used in the model.

Variable	Definition
GEN	Gender: 1 – Male, 0- Female
AGE	Age in years
EDU	Education 1 - up to primary school 2 - Secondary school 3 – Tertiary level
HS	Household size
INC	Income earned per month in Kenya shillings (Ksh.) 1- Less than 15,000 2- Between 15,000 and 30,000 3- Greater than 30,000
REAR	Rearing indigenous chicken 1- Yes 0- No
CNT	County (1- Nairobi, 0 – Makueni)
PR	Price of indigenous chicken in Kenya shillings(Ksh.
QTY	Quantity of IC purchased in Kilograms (Kg)

3.0 RESULTS AND DISCUSSION

3.1 Descriptive results

Consumers IC consumption frequency was examined in Makueni and Nairobi counties in this study. Nairobi had 54.5% of the respondents while Makueni had 45.5%. Demographic characteristics of the respondents were given in Table 2 below.

Demographic results indicated that gender distribution was 43.5% female and 56.5% male. Education levels of consumers were grouped as; primary, secondary and tertiary. Majority of consumers had secondary school level at 48.5% while only 21.5% had primary level. The average household size was calculated as 4.2 people with the lowest having only one member and the highest had 20 family members. The minimum age for consumers was 17 years while the maximum age was 85 years. The average age was calculated as 36 years indicating that majority of consumers were at youthful stage (Table 2). Three income groups were identified from the study; those who earned less than Ksh. 15,000, those who earned between Kenya shillings (Ksh.) 15,000 and Ksh 30,000 and those who earned above Ksh. 30,000. According to the results, 35% of the consumers belonged to the lower income group, 27% belonged to the middle income group and 37% belonged to the high income group (Table 2).

In this study, 57% of the consumers reared IC at their homesteads while 43% did not. This indicates that majority of consumers reared IC at their homes. With regard to the place of purchase, 54.5% of the consumers stated that they prefer buying IC at open air market, 42.5% at roadside markets while only 3% purchased at the supermarkets. The average quantity of IC bought was found to be 1.9 Kg with the lowest as 1 Kg and highest quantity as 10Kg. The average price for one kilogram of IC was Ksh.419.35; the lowest price per kilogram was Ksh. 220 while the highest price was Ksh. 600 depending on the market and county.

Table: Demographic characteristics of the consumers

Variable	Definition	Frequency	Percent	MIN	MAX	MEAN
AGE	years	-	-	17	85	36.09
HS	No.	-	-	1	20	4.24
PR	Ksh	-	-	220	600	419.35
QTY	Kg	-	-	1	10	1.97
GEN	Male	13	56.5	-	-	-
	Female	87	43.5			
EDUC	Primary	43	21.5			
	Secondary	97	48.5			
	Tertiary	60	30.0			
INC	1<15,000	70	35			
	15,000-30,000	55	27			
	>30,000	75	37			
REAR	YES	114	57			
	NO	86	43			
CNTY	NAIROBI	109	54.5			
	MAKUENI	91	45.5			
PLACE	ROADSIDE	85	42.5			
	OPEN AIR MKT	109	54.5			
	SUPERMARKET	6	3.0			

SOURCE: Authors computation (2017)

3.2 Econometric Results

Binary logistic regression model was used for analyzing factors affecting consumption frequency and estimated with maximum likelihood method. Results of the regression analysis are presented in Table 3. The results indicate that the explanatory variables predicted 13.39% of the variation in the dependent variable represented by pseudo R^2. Accordingly, all the variables in the conceptual framework were significant at 1%. The z-statistics indicated that two variables were significant at 10%, two variables at 5% and two variables at 1%. Overall, six variables were significant while three variables were not significant in explaining the model (table 3).

Table 3: Factors affecting Indigenous chicken consumption frequency

Variable	Coefficient	Z-statistic	Probability	Marginal Probability (%)
Constant	-1.1514	-0.95	0.341	-21.01
CNT	0.6483	1.58	0.113	14.61
GEN	0.6298*	1.91	0.056	14.28
AGE	-0.0398***	-2.79	0.005	-0.99
EDU	-0.5542**	-2.18	0.029	-12.84
HS	0.1356*	1.83	0.067	3.37
INC	-0.1112	-1.05	0.293	-2.77
PR	0.0065***	2.67	0.008	0.16
QTY	0.0991	1.41	0.159	2.47
REAR	0.6507**	1.99	0.046	14.66
Log likelihood		-116.9269		
Pseudo R^2		0.1339		
Significance level		0.0000		

Significant levels: * (10%), ** (5%), *** (1%)

Table 3 indicates the coefficients of variables, Z-statistics, probabilities which show the significance level and marginal probabilities column which has been computed using the coefficients of individual variable. In logit model, marginal probabilities are used to interpret the effect of the independent variable on the dependent variable as percentage changes (Gujaratti, 1995).

According to the results, gender is positively related to consumption frequency. Ceteris paribus, each unit change in gender significantly (P<0.1) results in 14.28% increase in consumption frequency. In other words, the consumption frequency for male consumers is 14.28% higher than that of their female counterparts (Table 3). This can be attributed to the fact that men are endowed with income than female and they are the majority in major towns due to rural-urban migration in search of employment. These results corroborates with those of other researchers. Gossard and York (2003) found that gender had strong influence on meat consumption in US residents. They implied that men physiologically required more meat than women due to the average differences in weight.

Age of the household head has a negative and significant (P<0.01) influence on the consumption frequency

of indigenous chicken. The probability of increasing consumption frequency declined with increase in age. This connotes that the older the household head, the lesser the consumption frequency when compared to the younger house hold heads. This finding is consistent with those of Kostakis (2013) who found that as age increases, the probability of reducing food expenditures increases. One possible reason to this is that elderly people pay attention to a healthier lifestyle and would prefer being vegetarian. Mehmet et al. (2015) found that the age of the respondent was a significant predictor for fish consumption frequency.

Education level was found out to be an important factor for healthy diet behaviour. This variable is included in the model because better educated families have better nutritional awareness. According to the results, it was found that there is a negative and statistically significant ($P<0.05$) relationship between education level and indigenous chicken(IC) consumption frequency. It was determined that when education level rises, IC consumption frequency decreases by about 12.84% (Table 3). This results corroborates with those of other researchers (Gossard and York, 2003; Kostakis, 2013 and Mehmet et al., 2015). Most educated people are believed to be more informed on health risks associated with excessive meat consumption hence tend to be strict vegetarian.

Household size is considered as a variable for explaining the amount of IC consumption. Results indicated that household size positively and significantly ($P<0.1$) influenced consumption frequency of IC. In addition, household size has a marginal effect of about 3.37%. This implies that IC consumption frequency increases by 3.37% for each unit increase in the number of household members. This can be attributed to different preferences among household members which influences on consumption levels. This result is consistent with those of Mehmet et al. (2015) who found that consumption frequency for fish increased with household size. Moni (2014) also reported that household size positively influenced the consumption of chicken, beef and pork in central Kenya. Another important variable that influenced consumption frequency is whether consumers reared IC at their homes. According to the results, rearing of IC had a positive and significant ($P<0.05$) relationship on the consumption frequency. Consequently, consumption frequency of IC was 14.66% higher for households that reared IC than for those who did not. This can be attributed to the additional incentive of a ready stock of IC for consumption in times of need when funds for purchasing are not available in the family. Mozumdar et al. (2009) found that consumption of meat and eggs increased in households who reared more small scale poultry in Bangladesh.

Price of IC had positive and highly significant ($P<0.01$) influence on the consumption frequency. In addition, a unit increase in price of IC resulted to an increase in consumption frequency by 0.1%. This indicates that as price of IC increased, consumption frequency increased also though with a small margin. This implies that IC is considered as a Veblen good in the study area and hence Consumers associate its consumption with status. Accordingly the perceptions on health benefits associated with consuming white meat could explain the inelastic nature of its consumption to a positive price change. Contrary to our expectations, household income level did not significantly influence consumption frequency of IC. Income in addition had a negative sign implying an inverse relationship with consumption frequency. Other variables that were not significant in the model were County of residence and quantity of IC purchased. The county of residence had a negative sign implying less consumption frequency for Nairobi residents compared to those in Makueni. This was expected since Makueni being less urban than Nairobi, it has more producing households and hence from our previous findings, consumers in producing households consume IC at a higher frequency.

4.0 CONCLUSION AND IMPLICATIONS

Socio-economic characteristics are major determinants influencing consumption frequency of IC across households. Our empirical results suggested that rearing of IC is a key determinant affecting its consumption frequency across households. This result is intuitive and supported by previous research. Furthermore, it was estimated that IC consumption frequency is positively affected by gender, household size and price of IC. Male consumers are likely to consume more frequently due to income endowment as household heads. Large family sizes will consume IC at higher frequency due to differences in preferences among family members than small sized households. Consumption frequency for IC increases regardless of its upward trend in price. This is probably due to the Veblen nature of IC and its perceived health benefits. On the other hand, age and education level of the consumers negatively influenced consumption frequency. Aged consumers were found to consume IC less frequent due to attention they pay for a healthy lifestyle.

The results of this study can inform policy deliberations by public organizations. For instance, the need for extension to focus on promoting production of IC, government subsidy on IC inputs and knowledge and awareness creation on the health benefits of IC across consumers of different ages, gender, education level and income groups will enhance consumption frequencies of IC. Marketers of IC on the other hand, can use the important socio demographic variables in formulating strategies that will enhance performance of the IC value chain. This study recommends for further research on comparison of consumption frequency for different meat types and incorporation of more determinants to consumption frequency that were not covered in this analysis due to the limited nature of the data.

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REFERENCES

Adisen, H. (1999). A case study on red meat consumption. Yuzuncuyil University Thesis, Van.

Ali, J., Kapoor, S. and Moothy, J. (2010). Buying behaviour of consumers for food products in an emerging economy. British Food Journal, 112(2): 109-124.

ASDS (2010). Agriculture Sector Development Strategy; 2010 – 2020, Nairobi: Government Printer.

Billah, S.M., Nargis, F., Hossain, M.E., Howlider, M.A.R. and Lee, S.H. (2013). Family poultry production and consumption patterns in selected households of Bangladesh. Journal of Agricultural Extension and Rural Development, 5(4):62-69.

Bourdieu, P. (1984). Distinction: A social critique of the judgement of taste, R. Nice (trans.). Cambridge, MA: Havard University Press.

Erdal, G., Esengun, K. (2008). The analysis of the factors affecting fish consumption in Tokat province by logit model. Ege University Journal of

FAOSTAT, Food and Agriculture Organization of the United Nations (2014). Retrieved from: http://www.faostat.fao.org.

Fisheries and Aquatic Sciences, 25(3): 203-209.

Gossard, M.H. and York, R. (2003). Social structural influences on meat consumption. Human Ecology Review, 10(1): 1-9.

Greene, W.H. (2011). Econometric Analysis. Seventh Edition. Prentice Hall, ISBN-10:0131395386, New Jersey.

Gujarati, Damodar (1995). *Basic Econometrics*, 3rd Edition. New York: McGraw-Hill.

Ion, P. and Agatha, P.(2013). Research on consumer behaviour on Bucharest poultry meat market. Animal Science and Biotechnologies, 46(1):389-396.

Jabber, M.A. and Raha, S.K. (1984). Consumption patterns of milk and milk products in Bangladesh. Bangladesh Journal of Agricultural Economics, 7(2):29-44.

Kara, M.K., Eyduran, E., Ozdemir, T. and Zer, C.A. (2004). Study on meat and meat products consumption customs in Van city. 4th National Zootechnics Congress Book, Suleyman Demirel University: 661-664. Isparta.

Kostakis, I. (2013). The determinants of households food consumption in Greece. International Journal of Food and Agricultural Economics, 2(2):17-28.

Maria, F.F. and Luis, G. (2014). Consumer preference, behaviour and perception about meat and meat products; an overview. Meat sciences, 98:361-371.

Mehmet, F.C., Aytekin, G. and Hayriye, Y.C. (2015). Fish consumption preferences and factors influencing it. Food Science and Technology (Campinas), 35(20.

Moni, A.N. (2014). An assessement of demand for meat in rural and peri-urban areas of central Kenya. Msc. Thesis, Nairobi University, Kenya.

Mozumdar, L., Farid, K.S., Ahmed, J.U. and Rahman, M.W. (2009). Broiler farming: An approach to improve rural livelihood. J. Bangladesh Agriculture, 7: 395-402.

Ndenga, C., Eric, K.B. and Lucy, W.K. (2017). Consumers' preference attributes for indigenous chicken in Kenya. Journal of Agricultural Economics and Development, 6(1):001-011.

Nyaga, P. (2007). Poultry sector country review. FAO animal production and health division, emergency centre for transboundary animal diseases, socio-economic production and Biodiversity unit, ROME, Italy: FAO.

Sobhy, I., Safer, A.K., Nuru, A., Ahmed, A.A. and Abdu, Z. (2014). Factors that affect consumption patterns and market demands for honey in the Kingdom of Saudi Arabia. Journal of Food and Nutrition Sciences, 5: 1725-1737.

Tambi, E. (2011). Analysis of household attitudes towards the purchase of livestock products and fish in Cameroon. Agricultural Economics, 26(2):135-147.

Upadhyay, A.D., Pandey, D.K. and Jackie, S.Y. (2014). Socio economic determinants of Consumption pattern of fish in urban area of Tripura. Economic Affairs, 59(3):355-362.

Yilmaz, A.E.A., Pinar, D., Ahmet, C.A., Yavuz, C., Cagla, Y.K.K. and Mehmet, S.A. (2013). Consumer preferences and consumption situation of chicken meat in Ankara province, Turkey. Turkish Journal of Veterinary and Animal Sciences, 37:582-587.