Full Length Research Paper

Consumers' preference attributes for indigenous chicken in Kenya

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Indigenous chicken (*Gallus domesticus*) are an important source of livelihoods and food for majority of households in Kenya. Consumers appreciate Indigenous chicken(IC) more due to its nutritional value and health benefits. The Kenyan chicken market is dominated by indigenous chickens, an indication of consumer preferences. This is despite recent improvements by research institutions resulting to development of Improved Indigenous Chicken (IIC) which has higher productivity levels. Consumer preference assessment gives important information on acceptability of a commodity by consumers. The primary objective of this study, therefore, was to analyze consumer preference attributes for indigenous chickens in Makueni and Nairobi counties. Specifically, the study sought to; identify and rank attributes of indigenous chickens that influences choice and consumption and to; analyze the influence of IC attributes on price. A Cross-sectional survey research was used to obtain 200 respondents with the aid of semi-structured questionnaires. Hedonic pricing model in STATA 11.0 was fitted to estimate the influence of attributes on observed prices. Results indicated that consumers pay a premium of Ksh 30/kilogram for yellow skin and Ksh. 30 kg for low fat content live IC. Dressed IC with white meat colour received a price premium of Ksh. 43 kg while red meat colour received premium of Ksh. 62 kg. Based on the findings of the study, it is recommended that government supports breeding and improvement programs to ensure IC of preferred attributes are available and affordable to the farmers. This would enhance acceptability and utilization by consumers.

Key words: Attributes, choice, hedonic pricing, indigenous chickens, observed prices.

INTRODUCTION

The demand for animal products in the world is projected to expand by the year 2020 due to increase in urbanization, human population and income growth which will create markets for animal products (Delgado et al., 1999), chicken products are likely to benefit from this prospect. 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). The subsector also serves as a source of households' income and employment (ASDS, 2010).

Indigenous chickens (IC) provide a key source of proteins from meat for human diets. It is considered as an alternative to most red meat and is widely eaten across the globe including Kenya. In Kenya, consumers generally prefer indigenous chickens and pay premium prices compared to the other chickens due to the perception that IC tastes better, nutritious and perceived health benefits (USAID, 2010). However, productivity levels of IC are low characterized by low input use

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resulting to low outputs hence limiting their potential for commercialization (Okitoi et al., 2007). For instance, in 2012, Kenya produced 22,700 tonnes of chicken meat and imported 1,830 tonnes to fill the shortage in supply (FAOSTAT, 2015).

The deficit is an indication of the local market failure to stimulate production. This has resulted in development of improved indigenous chicken (IIC) that have high productivity levels compared to IC. Despite this improvement, IC still dominates the chicken market and the country is chicken deficit as indicated above. There is therefore a knowledge gap on what consumers prefer in the IC meat that is probably not in the recently released IIC meat. Lack of consumer preference analysis could be a factor that limits utilization, subsequently low production of newly released IIC meat. The problem therefore is insufficient information on the factors that determine choice of chicken meat by consumers in the market. The overall objective of this study is to fill this gap in knowledge. Specifically, the paper will; identify attributes of live and dressed indigenous chickens, rank the attributes of indigenous chicken meat and analyze the influence of these attributes (skin colour, sex, age, plumage colour, meat colour, skin texture, size, fat content) on price of IC. The null hypothesis investigated was; IC attributes do not have significance influence on IC price. The results will inform and guide producers of improved indigenous chickens on the management practices and production systems to adopt in order to enhance attributes that fulfils market requirements hence increasing chicken prices and demand. Consequently, traders will be able to adopt strategies in transportation, handling, storage and transformation in order to improve retail level chicken prices through emphasis on retail level attributes that are important to end users.

Researchers have applied different methods to assess consumer preferences for product attributes. Among the most commonly used approaches are the revealed preference and stated preference based models. Revealed preferences analyze actual payments on observable transactions for the commodities/services of interest while stated preference makes use of data on hypothetical choices and implicit payments (Hensher et al., 2005). Several studies have applied hedonic pricing to disentangle preference attributes from bundled goods and their economic valuation; Timothy (2006) employed hedonic price model to analyze cattle prices in central corridor of West Africa. Findings of their study indicated that animal age, sex, breed, body condition, purpose of purchase, season of sale and market location influenced short run cattle prices in the study region. Ramatu et al. (2014) determined the quality characteristics of dressed local and imported chicken using hedonic model. Results showed that premium prices were paid for imported, non fatty and tender chicken.

Sodjinou et al. (2014), employed hedonic pricing model to understand physical traits of "bicycle poultry" in Benin. Results indicated that price of chicken was influenced by the breed of the birds, age, plumage colour and meatiness of the bird. Lee et al. (2012) employed hedonic model to determine the effect of product attributes on retail beef steak prices. The study established that organic production claims, religious processing claims and boneless products were major characteristics that commanded price premiums. Nadarajah (2012) employed simple linear form of hedonic price model to evaluate the relationship between price and quality attributes of shrimp. The results indicated that market price is influenced by extrinsic quality attributes such as carapace length, weight, origin, species, freshness and product form and preservation method. Bett et al. (2011), used hedonic price analysis to determine live indigenous chicken attributes and socio economic characteristics that influences the chicken price in Kenya. Results indicated that plumage colour, sex, body condition, age and weight and body size had significance influence on price.

Most of the studies reviewed so far have focused on valuation of general attributes for breeding aimed at enhancing productivity levels. There is need to understand specific observable categories of attributes that consumers look for while buying indigenous chickens.

METHODOLOGY

The study area

This study was conducted in Makueni and Nairobi counties of Kenya. Nairobi was selected due to diverse socio-economic orientation of its consumers. Being the capital city, the population is therefore composed of consumers from different backgrounds who are expected to have diverse preferences. Makueni represents rural setting with proximity to the capital city. The main economic activity in Makueni is poultry rearing as the county is located in the arid area making it not conducive for crop production. In 2013, Makueni produced 2,178 metric tonnes of poultry meat out of the total production of 28,694 in the country making it the fourth largest producing county (GoK, 2015). Makueni country lies between latitude $1^0 35$' South and longitude 37° 10' East. Rainfall ranges from 300 to 1200 mm in the high areas. The altitude range is 600 meters to 1900 meters above sea level. It lies in the arid and semi-arid zones of the eastern region of the country hence making it suitable for livestock production (Makueni county integrated plan, 2013). Two sub counties; Kaiti and Makueni out of six sub counties were selected for the study. Nairobi county on the other hand lies between latitude $1^{°}$ 17' south and longitude 36° 49' East and has nine sub counties. The county has a total of 696.1 KM^2 with an estimated population of 3,942,054 (Nairobi county integrated

Development plan, 2014). Temperature ranges from 10 to 29°C. It has a bimodal rainfall pattern with long rains falling between March and May and short rains experienced between October and December. The mean annual rainfall is 786.5 mm. Consequently, two sub counties; Westlands and Starehe were selected for the study.

Sampling procedures

The target population for this study consisted of all consumers of live and dressed indigenous chicken in Nairobi and Makueni countries. Determination of the sample size followed a proportionate to size sampling methodology as specified by Kothari (2004) .The sample size was based on the formula below:

$$n = \frac{z^2 pq}{e^2}$$

Where, n is the sample size,
p is the proportion of the population containing the major attributes of interest (consumption of indigenous chicken), q is 1-p, Z is the standard variation given a confidence level of α = 0.05 and e is the acceptable precision of 6.9%.

n = 1.96 × 1.96 x 0.5 × 0.5 / 0.069 × 0.069 = 200

Since it is difficult to determine the population of people consuming indigenous chicken in the study area due to continuous influx of people in urban areas, the assumption will be that 50% of the population in the study area consume indigenous chicken. The acceptable precision of 6.9% was chosen because of the smaller sample size hence higher confidence level of the results. Multistage sampling technique was employed. In the first stage, four sub counties were purposively selected based on their high number of IC markets and consumers in the two counties. The sample size obtained (200) was thus distributed in the sub counties by weight factors based on the 2015 National population census projection which resulted in; Kaiti 38, Makueni 62, Starehe 48 and Westlands 52 consumers. The second and third stage involved purposive selection of major IC markets in each sub county and random selection of IC consumers from the markets identified respectively.

Data collection and analysis

Data was collected using semi-structured questionnaire which ensured that responses gathered sufficiently meets the needs of all objectives within the study. Data collection was administered by well trained enumerators selected from the respective sub counties due to their familiarity with the geography of the area and native

language. Data was analyzed using both descriptive and inferential statistics with the assistance of Excel and STATA Version 11.0 computer software packages. For the first objective, indigenous chicken attributes that were identified during preliminary survey were presented to consumers for confirmation and ranking using Kendall coefficient of concordance. In the third objective, hedonic pricing model was used to analyze the influence of attributes on price.

Theoretical framework

Both live and dressed indigenous chicken differ in their physical characteristics. Such variations are exhibited in attributes such as; age, size, skin colour, skin texture, plumage colour and meat colour. Indigenous chicken is represented as a bundle of characteristics or attributes which consumers consider while making their purchase decision (Becker, 1965; Lancaster, 1966). According to these theories, consumers choose indigenous chicken that maximizes their utility based on consumption characteristics. The underlying assumption postulates that products consist of utility-bearing attributes and that the values of those attributes collectively contribute to the price of the product (Rosen, 1974). This approach is called the hedonic pricing method in which the price of indigenous chicken is viewed as a composite of implicit values/prices of each individual attribute. The price of a good is a function of the amount of attributes that it contains and of the values placed on them (Carman, 1997). This can be represented as:

$$P = \beta_0 + \sum_{j=1}^{m} \left(\beta_j Z_j + \varepsilon \right) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (1)$$

Where the vector Z stands for a particular variable of indigenous chicken meat β_0 is the intercept; β_j is the regression coefficient or the implicit price of the variable and ε is the random error term satisfying the classical regression assumption.

The regression coefficient Bj indicate the marginal change of price with respect to a change in the jth characteristic; Zj changes by one unit when all other marginal effects are kept constant.

Empirical model

Regression equations were carried out for each of live and dressed indigenous chicken due to variations in product attributes and unit prices. The price is the dependent variable upon which product attributes are regressed.

For the live indigenous chicken, the following model was employed:

Table 1. Explanatory variables and the priori expectations for the study.

Dummy variable	Categories	Priori expectation
Plumage color .	White	+
	Black	-
	Brown	+
	Mixed colors	+
Skin texture.	Rough	-
	Smooth	+
Skin color.	Yellow	+
	White	-
Age.	Less than 8 weeks	-
	8-20 weeks	**+**
	21-28 weeks	**+**
	Above 28 weeks.	**-**
Sex.	Male	+
	Female	-
Fat content	Low fat	+
	Moderate	+
	High	-
Size	Less than 1kg.	-, +
	1-2 kg	+
	More than 2 kg.	+, -
Meat color	Red	-
	White	+
	Yellow	+
Tenderness	Very tender	+
	Tender	+, -
	Hard/tough	-

$$lnp_i = \alpha_0 + \sum_{n=1}^{k} \beta fatcontent + \sum_{n=1}^{k} \beta size + \sum_{n=1}^{k} \beta plumagecolor + \sum_{n=1}^{k} \beta skin\,color$$
$$+ \sum_{n=1}^{k} \beta skintexture + \sum_{n=1}^{k} \beta age + \sum_{n=1}^{k} \beta tenderness + \sum_{n=1}^{k} \beta sex + \sum_{n=1}^{k} \beta SD$$
$$+ \varepsilon \quad ……………………………………………………………… (2)$$

For the dressed indigenous chicken;

$$lnp_i = \alpha_0 + \sum_{n=1}^{k} \beta fatcontent + \sum_{n=1}^{k} \beta size + \sum_{n=1}^{k} \beta package + \sum_{n=1}^{k} \beta skincolor$$
$$+ \sum_{n=1}^{k} \beta texture + \sum_{n=1}^{k} \beta age + \sum_{n=1}^{k} \beta tender + \sum_{n=1}^{k} \beta sex + \sum_{n=1}^{k} \beta meatcolor$$
$$+ \sum_{n=1}^{k} \beta region + \sum_{n=1}^{k} \beta SD + \varepsilon \quad …………………………………………. (3)$$

All attributes were expressed as dummies grouped into categories whose impact on price was sought by this study. The dummy categories were identified during a preliminary survey conducted in the two counties and their expected signs on the dependant variable hypothesized as depicted in Table 1.

Overall variables described are dummy variables. In a semi logarithmic functional form (adopted for this study), the effect of a dummy variable on the dependant variable is not equal to the first derivative of the regression function with respect of the dummy variable in question, unlike the effect of a continuous variable (Kennedy, 1981). In other words, the first derivative (β) is only a potentially imprecise approximation of the effect of the dummy variables on the dependent variable. Among the approaches available to correct this is the method suggested by (Kennedy 1981). Following this method, the effect of a change of X_k is from zero to one on P, can be

calculated as follows (Kennedy, 1981).

$$g_k = exp\left(\beta_k - \frac{1}{2} V(\beta_K)\right) - 1 \dots \dots \dots \dots \dots \dots \dots \dots (4)$$

Where v (β_k) is the estimated variance of the estimated coefficient β_k Hedonic model was estimated using ordinary least square method (OLS) of regression analysis. In empirical estimation, the theoretical foundation for hedonic models provides little guidance on appropriate functional form. This study adopted a log-linear functional form, although linear model was also considered and the results were quantitatively similar but were not presented for brevity.

The significant effect of each independent variable on the price was tested with a t-statistic. Insignificant coefficients of the variables suggested that consumers either do not have adequate information to incorporate the characteristics into their buying decisions or that they place no value on such attributes when they buy indigenous chicken.

Marginal implicit prices were calculated by multiplying the average price with the relative change which is the corrected unbiased partial derivative of price with respect to each product attribute (Kennedy, 1981). The coefficients of attributes are interpreted as percentage changes with respect to the default dummies (Gujaratti, 1995). This implies the presence of an attribute's dummy over the default dummy will bring about either a decrease or an increase in the price depending on the sign of the coefficient. Positive signs imply price premiums for the dummy in question whereas a negative sign implies a price cut (discount). Attributes included in live IC model were; plumage colour, skin texture, age, sex, tenderness, fat content and size. Meat colour and package are unique attributes included for the dressed IC model in addition to those studied under live I.C.

RESULTS AND DISCUSSION

Socioeconomic characteristics of the sampled households

Out of the sampled respondents in both counties, 56% comprised of male while the rest were female as shown in Table 2 implying that in Urban centres there is a large percentage of male as compared to women who in most cases are found in rural areas engaged in farming activities. This can be attributed to rural – urban migration in search of employment by majority of men (Table 2).

The mean age for the respondents was 36 years (Table 2). The literacy rate of 96.5% seemed to be higher in the study area compared to the national average literacy rate of 87.01% (World Bank, 2015). Majority of the respondents; 48% had secondary level of education while only 12% had undergraduate degrees (Table 2). The average family size for the current study was 4 members with a minimum of 1 and a maximum of 11 family members. This is probably due to the fact that majority of respondents were urban dwellers with high literacy rate hence conscious of family planning measures. Among the sampled respondents, 72% were married while 27% were single. Monthly income of upto Ksh. 10,000 was earned by 35% of the respondents while 21% earned a monthly income of above Ksh. 30,000 (Table 2).

Attributes of indigenous chicken that influence choice and consumption

Based on a preliminary survey conducted in Nairobi and Makueni, the following attributes were identified to influence choice and consumption of both dressed and live indigenous chicken, they include; price, size, plumage colour, skin texture, age, meat colour, package, fat content, sex, tenderness and skin colour. These factors were then presented to respondents for confirmation as shown in Table 3.

Preferences for indigenous chicken attributes are presented in Table 3. According to the results, 89% of interviewed respondents who bought live IC preferred smooth skin, while for dressed IC, 76% of the respondents preferred smooth skin over rough skin (24%). This is probably because rough skin is associated with older and hence fatter chickens. Majority of the consumers preferred chickens with moderate fats; 70 and 56% for live and dressed chickens respectively indicating dislike for more fat chickens (Table 3). Indigenous chickens aged between 8 weeks and 28 weeks were more preferred by respondents where 80 and 95% of live and dressed chickens were bought respectively (Table 3). This is because older chickens are perceived to be hard and hence difficult to cook with accumulated fat content. Yellow skin colour was preferred by 78 and 83% of consumers for live and dressed IC respectively. This is attributed to the fact that consumers perceive yellow skin to be rich in nutrients than other skin colours. Furthermore, scientifically, yellow colour is an indication of presence of carotenes which are precursors for vitamins in the meat. Consumers who bought live indigenous chicken showed 81% preference for tender chicken compared to other forms of tenderness (Table 3). Tenderness is preferred due to good taste and ease of preparation. Regarding plumage colour, 47% of the respondents preferred brown colour while only 6% bought black plumage IC. Black plumage chickens are associated with witchcraft hence their low preference. In both live and dressed chickens, consumers' preferred male chicken compared to their female counterparts. Males were preferred due to their tendency to have low fats and big size at an early age hence making them tender at maturity compared to the females (Table 3).

Kendall coefficient of concordance was performed to

Table 2. Socio economic characteristics of the sampled households.

Characteristic	%	Min	Max	Mean	SD
Gender					
Male	57				
Female	43				
Age	__	17	85	36.09	12.89
Household size	__	1	11	4.1	2.35
Marital status					
-Married	72.5				
-Single	26.5				
-Widow	0.5				
-Divorced	0.5				
Monthly income					
<Ksh 10,000	35				
Ksh.10,000-20,000	28				
Ksh.20,000-30,000	16				
>ksh.30,000	21				
Household size	__	1	11	4.1	2.35
Education					
illiterate	3.5				
Primary	18				
Secondary	48.5				
Diploma	14				
Degree	12				
certificate	3				

rank the attributes and determine the level of agreement among consumers on the rankings of attributes. Based on this, an attribute with the highest sum of ranks was

least whereas that with the least sum of ranks presented in Table 4.

From the Table 4, size was ranked as the most important attribute influencing consumers' choice and consumption for live IC. Price, age, sex and plumage colour were ranked in the second, third, fourth and fifth positions respectively. Skin texture, tenderness and skin colour were least ranked attributes (Table 4). F-Test results from Kendall's analysis indicated that 32% of the respondents agreed with the ranking which was significant at 99% percent level of confidence (Table 4). For the dressed indigenous chicken, attributes that were ranked most in order of important included; price, freshness, fat content and age. Attributes such as; plumage colour, skin colour and skin texture were not easily observable hence difficult to establish in the dressed chicken. Plumage colour was omitted for the dressed but skin colour and skin texture were included in

the ranking. F-Test results from the Kendall's coefficient of concordance revealed that there is 14% level of was ranked first. The results of Kendall ranking are ranked agreement among the rankers (respondents) in ranking of the attributes while making purchase decision at 95% level of confidence.

In summary, the most preferred attributes by consumers while making purchase decision for Indigenous chickens were price, size, age, sex, colour, fat content and freshness. These results are consistent with the findings of other researchers. Prameela and Husain (2007) showed that product features such as taste and freshness determined consumers' choice. Kramer (1988) indicated that consumers' behaviour was generally dependant on taste, price, convenience and quality. Sodjinou et al. (2014) indicated the weight (size in the present study), plumage colour and sex were the most important characters affecting village poultry price in Benin. According to their study, plumage colour and sex came in the second and third positions respectively.
Plumage colour varied depending on the purpose of purchase (appease gods, cook or ceremonial).

Table 3. Preference attributes for live and dressed IC.

Attribute	Category	% in Live	% in Dressed
Plumage color	White	10	-
	Black	6	-
	Brown	47	-
	Mixed Colors	37	-
Skin Texture	Rough	11	24
	Smooth	89	76
Skin Color	Yellow	78	83
	White	22	17
Meat color	White	-	62
	Red	-	19
	Yellow	-	19
Age	< 8 weeks	2	0
	8 – 20 Weeks	30	60
	21 – 28 weeks	50	35
	>28 weeks	18	5
Sex	Male	68	55
	Female	32	45
Tenderness	Very tender	18	8
	Tender	81	90
	Hard/Tough	1	2
Fat content	Low fat	21	44
	Moderate fat	70	56
	High fat	9	0
Size	<1 kg	3	2
	1-2 kg	67	71
	>2 kg	30	27
Freshness	Fresh	-	96
	Frozen	-	4
Average price		Ksh. 402.78	Ksh. 458

Influence of indigenous chicken attributes on price

The results of F-test for live(F = 2.31significant at one percent) and dressed (F = 2.10 significant at 5%) indicates that the independent variables as a set significantly affect the dependent variable(Price of I.C). The R-square (0.26 and 0.5183) indicates that 26 and 51% of the variability in live and dressed I.C price is explained by the empirical model. Tables 4 and 5 show estimates of; coefficients, corresponding standard errors and marginal implicit prices for attributes of live and dressed IC. The model results for live indigenous chicken indicate that buyers are willing to pay premium prices for chickens with low fat content, yellow skin colour and either brown or mixed colour feather while for the dressed, premiums are paid for slightly mature (8-20 weeks) chickens with either red or White meat colour. With regard to live indigenous chicken, the black plumage

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Table 4. Kendall ranking for live and dressed indigenous chicken attributes.

Attributes	Ranks		Sum of ranks	
	Live	Dressed	Live	Dressed
Price	2	1	417.5	210
Size	1	2	382.5	264
Plumage color	5	—	791	—
Skin texture	7	9	877	386.6
Age	3	5	555.5	332
Tenderness	8	7	894.5	353.5
Fat content	6	4	860	319
Sex	4	6	571	346.5
Skin color	9	10	951	447.5
Meat color	—	8	—	375.5
Freshness	—	3	—	268.5
N	140	60		
W	0.32	0.14		
F – calculated	67.43	9.79		
F - critical	1.94	1.89		
Significance level	1%	1%		

has a significant and negative influence (P< 0.01) on the chicken price compared to the mixed colour type (reference groups). *Ceteris paribus*, the price of a black chicken tends to be 25% (Ksh. 101/kg) less than that of mixed colours. This is probably because black chickens are perceived to be used in magic. On the other hand, white and brown plumage colour had positive signs implying premium price for chickens with such colours. However their effects were not significant on prices (P>0.10) when compared with chickens of mixed colours. This result corroborates with the findings of other researchers. Sodijnou et al. (2014) found that buyers paid premium for white and red colours while discounted chickens with black plumage colour. The discount prices received for black plumage by farmers could be contributing to the scarcity of such chickens as farmers fear raising such chickens due to lower profit margins with respect to escalating production costs (Aklilu, 2007; Vidogbena et al., 2010). Following this authors, farmers believe that they lose utility when keeping chickens with black colour as compared to chickens of white, mixed or Brown colours. This study also found that only 6% of black plumed chickens were bought perhaps indicating their scarcity.

Regarding to sex of indigenous chicken, male chickens do not significantly (P>0.10) affect the price of both live and dressed chicken compared to their female counterparts. However males had an expected positive sign indicating price premiums over females. This indicates that consumers are indifferent to chickens sex when they buy. In another study, Sodjinou et al., (2014) found that sex of the chicken and guinea fowl in Benin did

not influence their respective prices. Skin colour significantly influences the price of both live and dressed chicken. For the live IC, yellow colour had a positive significant (P>0.10) effect on price compared to the white colour (default case). *C. paribus*, the price of live I.C with yellow skin tends to be 7% (ksh.30/Kg) higher than that of white colours. This is due to believe by most consumers that yellow skin colour is associated with more nutrients (Vitamins) available in the I.C. From the animal science literature, yellow colour is an indication of presence of carotenes which are precursors for vitamins in the chickens. This is an incentive for farmers to enhance yellow skin in their flock through appropriate feeding and management practices. This however is profitable to farmers if the marginal cost associated with producing yellow skin colour is less than the marginal implicit value for the yellow skin that is Ksh. 30/kg, otherwise the decision to enhance yellow skin can result into a loss to the farmer. On the other hand, yellow skin in dressed chickens received significance (p<0.01) price discounts compared to the white skin. *C. paribus*, the price of dressed indigenous chickens with yellow skin colour tends to be 20% less than that of white skin chicken. This is contrary to our expectation since farmers incur additional cost to produce chickens with yellow skin colour only to receive discounts rather than premium in the market. This study also found that majority of consumers (83%) bought dressed chickens with yellow skin compared to 17% who bought white skinned dressed chickens. With regard to age, results indicated that live indigenous chickens less than two months old (<8 weeks) received significant (P<0.10) price discounts when

Table 6. Estimation of hedonic price model for dressed indigenous chicken.

Variable	Coefficient	Standard error	Relative impact	Implicit price
Meat color (yellow)	Default	-	-	-
Red	0.1465*	0.0732	0.1546	62.30
White	0.1053*	0.0609	0.1089	43.89
Skin texture (rough)	-0.0027	0.0693	0.000299	0.12
Skin color (yellow)	-0.1844***	0.0617	0.29	80.64
Age 8 – 20 weeks	Default	-	-	-
21-28weeks	-0.0139	0.0640	0.0119	4.8
>28 weeks	-0.4294***	0.1403	0.5212	209
Sex (Male)	0.0485	0.0501	0.0483	19.48
Tenderness(v.tender	Default	-	-	-
Tender	0.1252	0.1091	0.1266	51.01
Hard	-0.1027	0.1491	0.0959	38.63
Fat content (low fat)	Default	-	-	-
Moderate	-0.0311	0.0576	0.0298	12.03
Packaged	-0.0310	0.0663	0.02922	11.7
Sub county Makueni	Default	-	-	-
Westlands	0.1185	0.0883	0.1214	48.90
Starehe	0.1870**	0.0783	0.2019	81.33
Kaiti	-0.1201	0.1329	0.1176	47.4
Gender	-0.0350	0.0484	0.0344	13.85
Age	-0.0052**	0.0024	-	2.09
Marital status	-0.0192	0.0467	0.01878	7.56
House hold size	0.0185*	0.0104	-	7.49
Monthly income	-0.0222	0.0146	0.0223	8.99
Constant	5.8867	0.2120		
F	2.10**			
R^2	0.5183			
Adjusted R^2	0.2712			
N	60			

compared to those aged 28 weeks and above. The price of live IC aged less than 2 months tends to be 17% (Ksh.72/kg) less than that of live IC aged 28 weeks and above given other factors do not change. There was no significant different between prices of live indigenous chickens aged 8 - 20 weeks and 21 - 28 weeks with those of default age (>28 weeks). Descriptive results for live IC indicated that only 2% of the total indigenous chickens bought were less than 8 weeks while 80% were aged between 8 - 28 weeks. This implies that farmers fear bringing young chickens to market due to low prices. On the other hand, dressed indigenous chickens aged 28 weeks and above significantly (P<0.01) attracted less price compared to those aged between 8 and 20 weeks. The price of an older indigenous chicken (>28 weeks) tended to be 52% (Ksh. 209/kg) less than that of a mature dressed chicken (8 - 20 weeks) as long as the other attributes are not changing. Older chickens are perceived to have more fats and their meat tend to be

tougher therefore taking long hours to prepare. Farmers should endeavour to sell their chickens between ages 8-28 weeks in other to benefit from price premiums at this age. This results corroborates with the findings of other researchers; Aklilu, (2007) found that buyers look at the age of chicken when they buy them for different purposes. Sodjinou et al., (2014) found that consumers paid premium prices for chickens between 6 - 12 months.

With regard to fat content, live indigenous chickens with low fat significantly (P<0.10) attracted premium price compared to those with moderate fats. The price for a low fat live chicken tended to be 7% (Ksh. 30/kg) more than that of moderate fat content *C. paribus.* Preference for low fat chickens can be attributed to health complications associated with consuming meat with high fat content. For the dressed chickens, fat content did not significantly (p>0.1) influence price (Table 6). The size and tenderness of indigenous chickens' *ceteris Paribus* do not significantly (p>0.10) affect the prices of both live and

dressed chickens. Regarding meat colour of dressed IC both white and red meat when compared to the yellow meat (default colour) received significant (P<0.1) price premiums Table 6. Presence of white meat over yellow meat had price increase by 10% (Ksh. 43/kg) whereas the presence of red meat over the default meat (yellow meat) led to a price increase by15% (Ksh. 62/kg). This implies that compared to the white meat colour, red meat attracted an additional 5% increase in price. This is contrary to our expectation in which white meat was expected to attract more premium price than red meat. This introduces an aspect of consumer awareness while making purchase decisions for dressed indigenous chickens. From the animal science literature, red meat has more iron but posses health risks compared to white meat. This study also found that 62% of the sampled respondents showed preference for white meat compared to 19% red meat.

The present study also sought to establish the influence of socio demographic characteristics on chicken prices. Results revealed that gender, age, household size and Sub County had significant impact on the price of either dressed or live chickens. For the live indigenous chickens, gender of the respondent significantly (P<0.01) influenced price of live I.C. Male respondents paid higher prices (9%) than their female counterparts. This could be probably due to the fact that females take time to bargain for their chicken products than Male who bargain less. This indicates imperfection in chicken markets. On the other side, older respondents paid less (P<0.05) on dressed chickens compared to the younger generations. Age was a continuous variable in the model indicating that older members of the society paid Ksh. 2/kg less than younger members. Alternatively, households with bigger family members paid price premiums (P<0.10) for dressed chickens than those who had less family members. Prices between the two households differed by approximately 2%. With regard to region of purchase, consumers in Starehe pays significant (P<0.05) price increases for the dressed chickens compared to those in Makueni (default sub county). The prices in Starehe tended to be 20% (Ksh. 81/kg) higher than those in Makueni. However, there was no significant price difference between dressed chickens in Makueni, Kaiti and Westlands. This significant price differences in starehe is attributed to geographical distance between farmers and consumers which increases due to transport costs.

CONCLUSION AND RECOMMENDATIONS

The newly released IIC have better production traits, however as this study has showed consumers considered consumption attributes and not production traits when making chicken choices. The attributes which IC possessed include; plumage colour, skin colour, age, fat content and meat colour. This means these attributes

were the drivers of consumer preference. Furthermore, the study indicated that despite these attributes, socio-demographic characteristics of the respondent such as gender age, house hold size and region (sub-county) influenced prices of indigenous chicken.

The study made the following recommendation; first, Farmers in the study region and beyond should strategize their chicken production practices by enhancing the above attributes so as to benefit from high revenue realized from premium prices paid for these attributes. Traders needs to stock chicken types with preferred attributes to facilitate accessibility of desired types as a short term intervention. This would possibly enhance utilization creating an agribusiness opportunity for both producer and trader. Size was ranked as one of the most important attribute influencing choice and consumption. This information is fundamental to traders who can strategize accessibility of physiological mature (8-28 wks) and not younger (<8weeks) and older (>28 weeks) chickens to the market. Breeding institutions should be strengthened through government and private sector support to focus and incorporate final consumer preference attributes in their research work to enhance acceptability of the final product. Finally, there is need to enhance information dissemination on quality attributes through the ministry of Agriculture home economics department and nutritionist in the ministry of health. A case in point was minimal information among consumers of dressed IC on the distinction between white meat and yellow skin colour which received price discounts against our expectation of price premiums due to their nutritional importance.

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