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A Study on Meat End Market Trends in Kenya





Table of Contents

A STUDY ON MEAT END-MARKET TRENDS IN KENYA.....	
TABLE OF CONTENTS	i
ABBREVIATIONS.....	iv
DEFINITION OF TERMS	iv
FOREWORD	v
ACKNOWLEDGEMENTS.....	vi
EXECUTIVE SUMMARY	vii
KEY FINDINGS.....	1
1 Consumer Segments.....	1
2 Consumer Preferences.....	1
3 Per Capita Meat Consumption	2
4 Decision Making at Household Level.....	3
5 Trends in Red Meat versus White Meat Consumption.....	3
6 Utilization of Fifth Quarter	4
7 Out of Home Meat Consumption Patterns	5
8 Preference for Cold versus Hot Chain Meat	5
9 Communication.....	6
10 Key Policy Issues and Recommendations	8
1. BACKGROUND AND CONTEXT	10
1.1 Background	10
1.2 About the Study	10
1.2.1 Study Objectives	10
1.2.2 Scope of the Study.....	10
1.2.3 Organization of the Report.....	11
3. LITERATURE REVIEW.....	12
2.1 An Overview of Livestock Sub-sector in Kenya.....	12
2.2 An overview of Meat Sector in Kenya	14
2.3 Market Segmentation.....	14
2.4 Global Meat Consumption Patterns.....	14
2.5 Kenya versus Ethiopian Meat Sector	15
4. METHODOLOGY	16
3.1 Secondary Data Collection	16
3.2 Primary Data Collection.....	16
3.2.1 Household Survey.....	16
3.2.2 Retail Survey.....	18
3.3 Qualitative Data Collection	19
3.3.1 Key Informant Interviews:.....	19
3.3.2 Focused Group Discussions (FGDs):	20
3.3.3 Observations and photography:.....	20
3.3.4 Design and Implement a pilot Study:.....	20
3.4 Data Cleaning/Debugging and Analysis:	20
3.5 Limitations to the Study	20



3.6	An Overview of the Respondents.....	21
3.6.1	Consumer Survey Respondents.....	21
3.6.2	Retail survey respondents.....	21
3.7	Response Rate.....	22
4.	OBJECTIVE 1 - CURRENT MEAT CONSUMPTION PATTERNS AND PREFERENCES IN KENYA	23
4.1.	Consumer Segmentation.....	23
4.1.1	Approach to Segmentation.....	23
4.1.2	Profiles of the Consumer Segments.....	23
4.2	Types of Meat Consumed in the Households.....	28
4.2.1	Types of Meat Consumed in Households.....	28
4.2.2	Factors that Determine Preference for Different Types of Meat and Meat Products:	29
4.2.3	Reasons for not Consuming Different Meat types.....	30
4.3	Attributes that Consumers use to define Quality of meat.....	31
4.3.1	Leanness/absence of fat:.....	31
4.3.2	Fresh meat (slaughtered the same day):.....	32
4.3.3	Taste:.....	32
4.3.4	Challenges Experienced in Accessing Quality Meat by Consumers	34
4.4	Frequency of Consumption of Different Meat Types.....	35
4.4.1	Factors that determine when to buy meat.....	37
4.5	Per capita Meat Consumption.....	38
4.5.1	Market Share of Different meat each of the Consumer Segment	39
4.5.2	Factors that determine the quantities of meat consumed.....	40
4.6	Seasonality in Demand.....	42
4.7	Preferred Channels for Buying Meat.....	43
4.7.1	Reasons for purchasing meat in the preferred outlets.....	43
4.8	Decision Making on Purchase of Meat at Household level.....	45
4.9	Trends in Red Meat Consumption.....	47
4.10	CONSUMPTION PATTERNS FOR FIFTH QUARTER.....	50
4.10.1	Overview.....	50
4.10.2	Proportions of Households consuming Different fifth quarter components	50
4.10.3	Frequency of sale of Fifth quarter components in the retail outlets	52
4.10.4	Consumption patterns for Intestines and Stomach (Matumbo) for cattle, sheep and goats	53
4.10.5	Consumption of Liver from Cattle and Shoats.....	55
4.10.6	Consumption Pattern for Gizzards.....	58
4.10.7	Consumption Patterns for Kidneys (cattle, sheep and Goats)	59
4.10.8	Consumption Patterns for other fifth quarter components:.....	60
4.10.9	Prices of Fifth quarter components in different markets.....	64
4.10.10	Summary:.....	64
4.11	Consumption Patterns for Processed and Value Added Meat	65
4.11.1	Overview of Meat Processing and Value Addition in Kenya.....	65
4.11.2	Level of Awareness of Different Products in the Market.....	65
4.11.3	Proportion that consume different processed and value added product	66
4.11.4	Sources of processed and value-Added Products.....	68
4.11.5	Why Some Households do not consume some Processed and Value Added Products	72
4.12	Preference for out of Home Versus Home Prepared Meat.....	73



4.12.1	Reason for preference of out of home meat	74
4.12.2	Age bracket with highest preference for out of home meat	75
4.12.3	Out of Home Meat Consumption for 12-19 years age bracket	77
4.12.4	Out of home consumption patterns for 20 and 35 years age bracket	79
4.12.5	Out of home consumption for people in the 36 - 60 age bracket	80
4.12.6	Out of home meat consumption patterns for adults above 60 Years of age	82
4.12.7	In Summary:	82
4.13	Utilization of Home Delivery services	82
4.13.1	Utilization of Home delivery services by consumers	82
4.13.2	Utilization of home delivery services by retailers	83
5	OBJECTIVE 2 AND 3: CURRENT KNOWLEDGE LEVELS, GAPS AND INFORMATION AWARENESS ON COLD MEAT PRACTICES IN KENYA	85
5.1	Meat Preservation at the Household Level.....	85
5.2	Proportion of Households with Cold Storage Equipment	86
5.3	Preference for Cold and Hot Chain meat by Consumers	87
5.4	Consumer Perceptions on Cold Chain Meat	89
5.5	Utilization of Cold chain in the Meat Retail.....	91
5.5.1	Level of investment in Cold Chain in the Meat Retail.....	91
5.5.2	Reason for lack of cold chain equipment.....	91
5.5.3	Supported required for retailers to acquire cold chain equipment	91
5.5.4	Type of Cold Storage/Transportation Equipment owned.....	92
5.5.5	Primary purpose of owning the cold chain by Retailers	93
5.5.6	Frequency of Utilization of the Cold Chain by Retailers	93
5.5.7	Reason Cold Chain is Currently Not In use – Retailers Perspective	94
5.5.8	Reasons why consumers were not buying meat from cold chain	94
5.5.9	Challenges Experienced by Retailers when Using Cold Chain	95
5.5.10	Spoilage of Meat and Meat Products.....	95
5.5.11	Retailers’ Perception of Effect of Cold Chain on Quality of Meat	96
5.6	Communication Messages Related to meat and meat products	97
6	OBJECTIVE 4: CRITICAL ANALYSIS ON THE MARKET INTERVENTION, NEED FOR A SUSTAINABLE COLD CHAIN RETAIL AND CONSUMPTION PRACTICES IN KENYA	99
6.1	A Summary of the Key characteristics of each consumer segment	99
6.2	Analysis of Factors limiting meat and fifth quarter consumption	104
6.3	Opportunities in the Meat Sector	106
6.4	Market interventions to Address key issues in meat consumption trends in Kenya.	106
7.0	POLICY AND LEGAL FRAMEWORK GOVERNING THE MEAT INDUSTRY IN KENYA	109
7.1	Legal and Policy Provisions	109
7.2	Gaps in the Legal and policy framework	110
7.2.1	Kenya Livestock Breeding Policy and National Beef Breeding Program Not Finalized	110
7.2.2	Strengthening Meat Inspection Services:	111
7.2.3	Regulation of the Meat Sector.....	113
7.2.4	The law does not explicitly link cold chain with quality enhancement, but instead it is recommended for meat preservation.....	113
8.	REFERENCES	115
9.	LIST OF ANNEXES.....	116
9.0	ANNEX 1: Kenya Generalized Livelihood Zones 2010	106



Abbreviations

ADC	Agricultural Development Corporation
ANOVA	Analysis of Variance
AHA	Animal Health Assistant
ASALs	Arid and Semi-Arid Lands
CAPI	Computer Assisted Personal Interview
EPZA	Export Processing Zone Authority
FEWSNET	Famine Early Warning System Network
FGDs	Focused Group Discussions
GDP	Gross Domestic Product
GPS	Global Positioning System
HH	Households
ILRI	International Livestock Research Institute
KALRO	Kenya Agriculture and Livestock Research Organisation
KFC	Kentucky Fried Chicken
KII	Key Informant Interview
KMT	Kenya Markets Trust
KNBS	Kenya National Bureau of Statistics
KSB	Kenya Stud Book
KVB	Kenya Veterinary Board
MoARD	Ministry of Agriculture, Rural Development
MT	Metric Tonnes
MTI	Meat Training Institute
QMP	Quality Meat Packers
SMEs	Small and Medium Sized enterprises
SPSS	Statistical Package for Social Sciences

Definition of Terms

<i>Fifth Quarter</i>	The parts of a slaughtered animal other than offal that supplement the four quarters. These include the innards in poultry, head, tail, hide, horns, hoofs, fat, tallow, tongue, heart, and liver in cattle, goats and sheep
<i>Matumbo</i>	Intestines and Tripe
Meat Ball	A meatball is ground meat rolled into a small ball, sometimes along with other ingredients, such as bread crumbs, minced onion, eggs, butter, and seasoning. Meatballs are cooked by frying, baking, steaming, or braising in sauce. There are many types of meatballs using different types of meats and spices.
Mshikaki	Piece of meat roasted on a skewer
<i>Mutura</i>	Usually made out of minced meat, onions, and intestines cooked and then stuffed inside the intestines, making a product that looks like a sausage.
Nyama Choma	Barbecued meat
Omena	Lake Victoria Sardines /silver cyprinid (<i>Rastrineobola argentea</i>) or dagaa.
Samosa	A small triangular pastry case containing spiced vegetables or meat and served fried.
Shoats	Sheep and Goats
Red Meat	In this report, red meat is basically meat from beef, sheep and goat meat
Employment:	Any work done for pay, both formal and informal
Self-Employment	Includes any formal and informal businesses/enterprises



Foreword

Livestock is an important sector for the Kenyan economy. It has significant potential to increase competitiveness and benefit millions of people. Domestic demand for meat has been historically strong, driven by urbanization, a growing middle class and exports which create demand for product differentiation, safety and quality.

Kenya's meat sub-sector is hugely informal and fragmented. Livestock trade is dominated by middlemen with very few organised processors buying directly from livestock producers. Nairobi and Mombasa cities remain the key terminal markets for meat, accounting for 75% of country's consumption. With an annual meat deficit of 300,000 metric tonnes¹, Kenya's meat industry still largely operates sub-optimally, with huge post-harvest losses, low value addition, poor processing skills and low capacity for quality and safety standards. Lack of accurate information on meat consumption patterns and segmentation has been a major barrier to strategies that are designed to develop and transform the livestock and meat industry in the country. For example, meat traders seeking to target specific consumer cohorts haven't been able to do so due to the absence of information on consumption patterns, demographics, preferences as well as demand profiles.

This study is the first step towards understanding the meat consumer market in Kenya in terms of trends, preferences and purchasing patterns, alongside meat retail practices. The findings reveal an increasing number of consumers demanding for quality meat, accounting for an additional 54,000mt for beef in the market. This shows that investment in modernization of the meat industry would add value to the meat processing, product differentiation, food quality and safety and in turn enable the industry to meet the increasing demand for quality meat up from the current 66,000mt to 240,000mt. With better sector and industry coordination, these investments will translate to increased profitability, jobs and wealth creation as well as a larger contribution of the sector to Kenya's GDP.

At the Kenya Markets Trust (KMT), a local Kenyan organization, we work in partnership with the private sector, counties and national government to unlock large scale, sustainable market growth by addressing the underlying constraints, capacities and rules that shape how markets work. Our focus on markets is premised on a firm understanding that they are the main mechanism through which wealth is created and growth occurs. KMT works in collaboration with the private sector and the state to facilitate an enabling environment for improved and reliable production, processing and retail of differentiated, affordable and safe livestock products in Kenya.

Charles Warria

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Kenya Markets Trust.

¹ I-Dev report – Meat Sector in Kenya 2014



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Executive Summary

KMT livestock sector program seeks to facilitate an enabling environment for improved and reliable demand for differentiated, affordable and safe livestock products by retailers. Lack of accurate information about size and composition of the consumer meat market is a major barrier to recommending strategies to meat traders and consumer voice groups seeking to diversify their marketing strategies. This study is the first step towards understanding meat consumer market hence development of strategies towards investing in innovations shifting from low value addition to a more organised, inclusive and efficient meat chain.

Data to answer the research questions was collected from both primary and secondary sources, with meat retailers and consumers as the main respondents. Detailed literature review was undertaken to provide documented information on different study variables and to guide sampling of study sites and people to be interviewed. Primary data was collected through a mix of methods, utilizing both qualitative and quantitative approaches. Quantitative data was collected through a consumer and retail survey while qualitative data was collected through Focused Group Discussions and Key Informant Interviews.

The target respondents for the household survey came from different consumer segments in the country. A multi-stage stratified sampling approach was used to select the study sample which led to selection of urban towns of Nakuru, Eldoret, Kakamega, Nairobi, Mombasa, Makueni, Kisumu and Garissa. A sample (n) of 990 was determined by sampling each of the 5 sub zones (Mixed farming, Pastoral, Lake Victoria, Urban 1- Nairobi and Urban 2- Mombasa) at 95% confidence level and 7% confidence interval using Fisher's random sampling formula. The study achieved 87% response rate for the consumer survey and 95% for the retail survey.





Key Findings

Key findings under objective 1: What is the current meat consumption patterns and preferences in Kenya (choice of meat, demography, location, socio-economic status?)

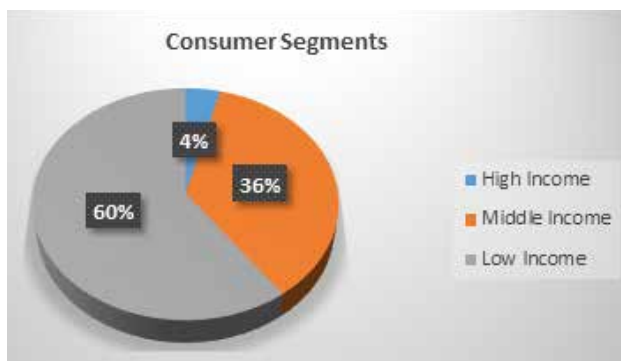
1. CONSUMER SEGMENTS:

Analysis of household expenditure data (as a proxy indicator for incomes), age of household heads, household size and age structure of the households revealed significant difference in the mean expenditures [$F_{2, 828} = 382.777$, $p < 0.05$] and no statistical significance with the other variables. This led to the conclusion that there were only three distinct income segments as follows;

- a) **High income:** with at least 4% of the total sample falling in this segment, mean expenditure of KES 119,305 per month; food expenditure constituting 16.6% of the household expenditure.
- b) **Middle income:** with at least 36% of the total sample falling into this segment, mean of KES 40,984 monthly expenditure; food expenditure constituting 28.8% of the total household expenditure

Low income segments: This constitutes 60% of the total sample mean household expenditure of KES 21,777 per month, with food expenditure constituting 41.8% of the total household expenditures

2. CONSUMER PREFERENCES;



- a) Majority of consumers of chicken are from high income (96%), followed by middle and low income with 88% and 82% of households consuming chicken respectively. However, the budgetary share for red meat (when beef, goat meat and mutton are combined) is highest

among the high-income households estimated at 14% of all household food expenditures for the high-income segment, 13% of household food expenditures in the middle income and 10% in the low-income segments.

- b) Based on the proportion of households that consume different meat types in the three segments and using the 2009 KNBS census data, the market potential for meat is estimated at 977,205 MT with high income presenting a potential of 53,967 (5%) MT while the medium and low-income segment presents a potential of 416,495 (43%) and 506,743 MT (42%) respectively.
- c) There is significant correlation between Income level of consumers and frequency of consumption of Beef, $r(712) = 0.128$, $p = 0.001$, Chicken, $r(728) = 0.375$, $p < 0.05$ and Goat meat, $r(593) = 0.118$, $p = 0.004$, indicating that the high-income households are likely to buy meat. However due to the demographics, the middle- and low-income segments remain the largest consumers of meat.
- d) Health concerns (drug residues, fear of lifestyle diseases, products not handled hygienically, fear of consuming meat from game animals, uninspected stolen animals and dead carcasses) is a major consideration on the type of meat consumers in the high income and middle-income segments buy while low income segment largely consider price. Consumption of mutton is limited by its accessibility to middle- and low-income segments, while goat meat is limited by prices among the low- and medium-income segments.
- e) Attributes that are used to define quality by consumers include: taste, freshness / slaughtered the same day and leanness/ absence of fat. The study considered



these to be quite subjective as there was a mismatch between what retailers report as the quality attributes demanded by the consumers and what the consumers actually defined as quality. Meat safety is largely defined by shelf life, such that meat consumed immediately after slaughter is considered to be safest compared to meat consumed after overnight stay.

- f) Statistical analysis shows fluctuation in meat quality and limited diversified products in the market are the significant challenges experienced by the high- and middle-income consumers. In the low-income segment, meat not being fresh always, fluctuation in price and affordability were found to be statistically significant challenges. Availability of cold/frozen products as well as meat being fresh always were not statistically significant in the high-income segment.
- g) There is a certain level of differentiation at the butchery and slaughterhouse level to meet the needs of different consumer segments. Meat from animals slaughtered from the maasai ecosystem, ranches, Northern Tanzania, Uganda and feedlots are most preferred by butchers because they served the needs of the middle-income segment and the nyama choma market; lean animals, which are largely sources from all other pastoralist's markets in the country, are used to serve the low-income segments and institutions like schools and hospitals.
- h) There is limited awareness among majority of consumers especially in the middle- and low-income segments on differentiated products like aged meat, ranch meat, pure grass-fed meat, and special meat cuts, and therefore do not consider these when buying meat
- i) Estate butchereries are the preferred outlets by majority of the households (65% in the high income, 90% in the low and 70% in the middle-income segments). The malls are more utilized

by the high-income consumers usually in the supermarkets and butchereries in the malls, as indicated by 38% and 35% of the households in this segment respectively.

Convenience¹ is an important factor for selecting the meat buying points across all the income segments, followed by cleanliness and hygiene of the premises. The high-income segment was found to be keener on quality related factors.

3. PER CAPITA MEAT CONSUMPTION

- a) In high income segment, per capita consumption was estimated at 17.37kg per capita per year for all meat types, excluding camel meat and 18.2 kg per capita per year for red meat (beef, goats and mutton)
- b) In middle income segment, per capita consumption is estimated at 14.66 per capita per year for all meat types except camel meat and 16.43 kg per capita per year for red meat (beef, goat and mutton)
- c) In low income segment, per capita consumption is estimated at 13.2kg per capita per year for all meat types except camel meat and 10.61 kg per capita per year for red meat (beef, goats and mutton). This presents an increase by 7% from the 9.9kg per year reported by Idev (2014).
- d) Overall the per capita meat consumption for red meat for the three-segment combined is estimated at 15.08 kg per capita per year
- e) Per capita consumption for red meat in Nairobi and Mombasa were estimated at 17.37kg per capita per year and 15.60kg per capita per year respectively
- f) Using the 2009 household census data from the KNBS and the estimated per capita meat consumption, the total red meat consumption is estimated at 648,252 MT with the high-income

¹ Convenience was defined as ease of accessing the meat outlet as defined by parameters such as nearness, availability of parking space and how the location of the outlet allows the consumer to integrate their other shopping activities.



segment, consuming 32,760 MT (5%), while middle- and low-income segments are consuming 171,882 MT (27%) and 443,610 MT (68%) respectively. The projected market potential presented earlier reflects the effects of expanding middle class appear to potentially take 43% of total red meat market share and the low income taking a 52% market share with little difference on the high income segment whose potential market share remains at 5%.

Market share for red meat (beef, mutton and goat meat) in high end segment is at 43% of the total meat consumed in the high income segment, followed by fish, at 29%; in the middle income, red meat takes a share of 49% of the total meat consumed followed by fish which take 28% of the total meat consumed; in low income segments market share for red meat is 34% of the total meat consumed, coming second after fish which takes 51% of total meat consumed. Consumers in the low-income segment prefer fish because of the ability to buy cheap portions and products like omnia and fish remains that can be stretched to feed more people than the smallest units of red meat.

4. DECISION MAKING AT HOUSEHOLD LEVEL

- a) Generally, there is disconnect between the decision makers (on quality of meat, where to buy, how much), the buyers of meat those who cook meat and consumers especially in the middle- and high-income segments, as shown by the following findings:
- (i). Decisions on where to buy meat, quality of meat and who is responsible for purchasing meat
- In majority of households in high income segment, this is mainly the female gender either as household head or spouse of household head in the female and male headed households respectively

- In majority of households in medium and low-income segments, this is mainly the female and male gender either as household head or spouse of household head in the female and male headed households respectively
- (ii). Who prepares and cooks meat?
- In majority of households in high income and middle-income segments, this is mainly the responsibility of the house managers and female gender as HH head or spouse in the female and male headed households respectively
 - In majority of households in low income segment, this is mainly the responsibility of the female gender as HH head or spouse in the female and male headed households respectively.

Hence while the spouse and the household heads should be the people to target with any efforts to influence on consumption of meat in all the income segments, there will be need to educate them to engage with house managers and the rest of consumers of meat in the household to understand their experiences when preparing and consuming meat.

5. TRENDS IN RED MEAT VERSUS WHITE MEAT CONSUMPTION

- a) In all the 3 segments, proportion of consumers that reported to have an increased trend in consumption of white meat in the three income segments, is relatively higher than those who reported increase in red meat consumption. On the other hand, the proportion of consumers who reported a reduction in the consumption of white meat in the three segments is much lower compared to the proportion that has reduced red meat consumption.



- b) There was a statistically significant difference between households in the three trends of white meat consumption in the last three years, ANOVA ($F(2,747) = 6.031, P = 0.03$). Households that increased their consumption ($M = 1.7513, SD = 1.105$) were significantly different from those that remained the same ($p = 0.012$) and those that reduced ($p = 0.002$).
- c) This implies that the increase in white meat consumption is significantly impacting on the red meat consumption by consumers.
- d) A test on the association of the trend in red meat consumption and location of the consumer revealed a significant difference, $X^2(12, N=857) = 43.784, p < 0.05$. Mombasa consumers had the smallest change in consumption with most having the same trend of consumption (71.4%) Garissa, Eldoret/ Nakuru and Nairobi significantly reduced their consumption of red meat, 33.3%, 27.3% and 26.1% respectively.
- e) Health related concerns were rated as the most important factors behind reduced red meat consumption in the high-income segment as represented by 57% of all the responses. This was followed by uncertainty of the genuineness of the product² (19%), quality and safety (10%) and reduction in household size (10%).
- f) In the low-income segment, those who had reduced red meat intake cited reduced incomes (41%) as the major reason, followed by health-related concerns (27%).

Majority of those who had reduced consumption of red meat in the middle-income segment (46%) cited health related concerns as the major reason followed by reduced incomes (15%) and uncertainty of genuineness of the product (10%).

² Uncertainties in genuineness of the product was based on suspicion of whether meat is from wild animals, donkeys etc.

6. UTILIZATION OF FIFTH QUARTER

- a) Fifth quarter, in all the market segments is mainly consumed as a delicacy, to meet nutritional needs and in low income segment, as a substitute for meat due to relatively lower prices compared to meat especially among the low-income segments. There is also a growing perception among consumers that unlike red meat, these products do not contribute to lifestyle diseases.
- b) The fifth quarter component most consumed in the high income and middle-income segments include liver, kidney, gizzards and Matumbo. The main products consumed in the low-income segment on the other hand, include other products like fish remains, chicken legs and intestines in addition to Matumbo, gizzards, kidney and liver. These products are relatively cheaper, do not take a lot of time (hence fuel) to prepare and a small portion can be served to many people (a small piece in a soup bowl) than meat.
- c) There is no value addition of the fifth quarter components, as majority of the consumers use it as a basic food source. There is however potential to create more value by making quality and hygienically prepared products accessible to high income segment at premium prices. Traders interviewed through KII Indicated that while the entire stomach plus intestines of goat is sold at KES 400-500, there are some buyers from neighbouring countries who buy the same a KES 1500.

Demand for fifth quarter especially Matumbo in the low-income settlements in cities like Nairobi and Mombasa is higher than supply. There is over supply in the local markets around busy slaughterhouses in urban areas that do not have a large population of low-income people to consume these products, especially Matumbo. Value addition processes for extending the shelf life of these products are needed to allow them be delivered to cities like Mombasa, Kisumu and Nairobi which have relatively higher demand for the same.



7. OUT OF HOME MEAT CONSUMPTION PATTERNS:

- a) In all the income segments, the 20-35 age category constitute the majority of people who go out of home to eat meat and meat products; the main reasons for going out to eat meat is mainly to socialise and also as an opportunity to eat products not prepared at home. This category mainly prefers to go to nyama choma joints in all the three categories. Nyama choma beef and chicken (boiled or fried) is the most preferred by this category of respondents. The implication for this to meat traders is:
 - (i). Meat traders and processors should target nyama choma joints in their promotional activities, in order to tap into this market
 - (ii). The nyama choma joints are the main drivers of out of home meat consumption for this age bracket and should therefore create conducive environment for socialization while also coming up with unique products to meet the needs for going out;
- b) In the high-income segment, children under 12 -19 years were also ranked second as far as preference for out of home meat consumption is concerned. Fast food outlets are most preferred by this group. Fast food outlets should be targeted with promotion of products for this age group.
- c) The relatively low proportion of people of other age brackets (below 12 years, between 36 and 60 years and those over 60 years) who go out to eat meat, means that there is a market that can be reached through differentiated products while exploring home delivery services to reach the same.
- d) There is need for nyama choma operators, or the fast food restaurants to package nyama choma for home delivery targeting those people in the high- and middle-income segments who are not able to go out for some reasons. This will require coming up with standard pieces for specific prices, to enable ordering.

Key findings under Objective 2 and 3

8. PREFERENCE FOR COLD VERSUS HOT CHAIN MEAT

- a. Hot chain meat is preferred by majority of consumers in all the consumer segments with the low-income segment reporting the highest proportion of those who prefer meat from hot chain (85.7%) compared to the middle income (59.8%) and high-income segment (46.5%).
- b. Two main reasons for preference for cold chain
 - i. Assurance of safety (meat has drained blood and water hence does not cause lifestyle diseases) as reported by 45% of consumers in the high-income segment, 69% in the low income and 58% in the middle-income segment respectively.
 - ii. Quality of meat (defined by tenderness, extended shelf life) is maintained after passing through or storing in cold chain as expressed by 55% of the consumers in the high income, 31% in the low and 42% in the middle-income segments
- c. Main reasons for not preferring cold chain meat
 - (i). Lack of awareness on the benefits of the cold chain was ranked as the main reason for not consuming meat from cold chain as shown by 58%, 50% and 46% of the responses in high, low- and middle-income segments
 - (ii). Consumer perception that meat stored in cold storage has lost its taste as shown by 17%, 23% and 22% of responses in high, low- and middle-income segments respectively.
 - (iii). Majority of consumers especially in the middle- and low-income segments agreed while others



were undecided on a number of statements that depicted the negative perception in cold chain such as ‘cold storage affects taste and nutritional value of meat, and that the benefits of freezing/chilling meat are not known in all the market segments. This shows that there is a knowledge gap regarding the benefits of cold chain, beyond preservation. This necessitates consumer education, to change these perceptions and enhance their level of understanding of meat quality.

- (iv). Among the retail outlets interviewed, 86% (n=21) serving high end markets, 75% (n=116) serving middle income segments and 62% (n=117) serving the low-income segments have some cold chain equipment. This equipment is however used for preservation of meat and not quality enhancement.

While majority of retailers who were interviewed are somehow aware of other benefits of cold chain beyond meat preservation, the practice is to give what the customer wants and that is ‘fresh meat’/meat slaughtered the same day.

9. COMMUNICATION

- a) At least 39% of consumers in the high income, 34% in the middle income and 36% in the low-income segments could recall having seen an advertisement concerning meat and meat products.
- b) Main information source for high income segment was found to be social media as shown by 28% of the responses, followed by retail outlets (24%). Others include relatives and friends (21%) and TV (20%).
- c) In the low-income segment, the major channel was reported to be relatives and friends (32%), TV (18%) and radio (16%).
- d) The main channel used by consumers in the middle-income segment include

relatives and friends (25%), retail outlets (23%), social media (14%) and radio (11%).

Findings under Objective 4: Recommendations and market interventions to address the key issues limiting meat consumption.

The study identified 4 key issues limiting consumption of meat in the 3 segments. These include consumer safety and health concerns, pricing, limited differentiation of products and information and knowledge gaps among the industry actors.

1. Recommendations: Market interventions to address the issue of consumer safety and health concerns

- a) Review policy and legal framework to enhance safety and address quality concerns
- b) Butcheries serving the high-income consumers should innovate and come up with hygienically produced fifth quarter components and other value-added products.
- c) Support entrepreneurs to engage in livestock finishing in order to produce animals that meet market needs. Also address health and safety concerns.
- d) Government to strengthen meat inspection (ante and post mortem) and explore adoption of effective traceability systems.
- e) Enforcement of regulations on meat handling from slaughter to the retail outlets.

Research institutions like KALRO and ILRI to come up with innovative technologies that can help in detection of drug residues in source markets.



2. Recommendations: Market interventions to address the pricing issue among the low-income consumers

Meat traders and processors to come up with meat products for low income segments that can effectively compete with low cost fish, at the current price of KES 20-30 per units

3. Recommendations: Market interventions to address limited product differentiation

- a. There is need for increased focus by the processors to produce value added products for the local markets given the current closure of European Union market to Kenyan meat and the potential competition in the available export markets like Middle East and other African countries.
- b. KMT to come up with a program to support innovations in value addition of meat and fifth quarter, in order to diversify the product offering for different market segments. This means supporting the process of proof of concept and later commercialization of such products
- c. Train the meat traders on meat grading, meat cutting and pricing to enable them come up with differentiated products (meat and fifth quarter). This will enable consumers get value for money.
- d. Support the meat traders to come up with standard grading system (mainly adopt the KMC grading system) and thereafter

form a body for self-regulation.

- e. Support the industry to come up with differentiated meat products for instance the branding certain products like ranch meat or range /grass fed meat from a certain region as a unique product in the market; butchereries could also be branded based on specific products they retail. This enhances targeting and addresses the consumer health and safety concerns.
- f. Support the nyama choma operators to come up with standard units of nyama choma, of specific characteristics, targeting the food delivery system of meat ordering

Explore technologies for adding value to the fifth quarter to extend its shelf life

4. Recommendations: Market interventions to address knowledge and awareness gaps

- a. Review of policies to and regulations in order to explicitly link use of cold chain with meat quality
- b. KMT to support a program of educating consumers on nutritional and health benefits of red meat and the relationship between meat handling and health, in order to counter the ongoing negative publicity

Promote the use of cold chain along the meat supply chain as a way of improving the safety and quality of meat through education of consumers and meat traders



10. KEY POLICY ISSUES AND RECOMMENDATIONS

A. Policy issues on Beef Cattle breeding

- a) Kenya has no livestock breeding policy³ or a national breeding program for beef animals to provide guidelines on improvement of beef cattle in the country.
- b) There is very limited institutional framework in place, to support beef cattle breeding in the country.

Recommendations: There is need for:

1. The Ministry of Agriculture, Livestock and Fisheries to bring stakeholders together in order to finalize and operationalize the breeding policy and thereafter develop a national beef breeding program to guide beef breed improvement agenda.
2. Increased engagement of relevant institutions in the development of national beef breeding program. These include the Kenya Stud Book, the Livestock Recording Centre, Livestock Breeders Association and the national Sahiwal / Boran Studs.
3. Undertake a comprehensive study on the breed societies in Kenya, review their structure, mandate and capacities and recommend strengthening strategies.
4. Devolve the Kenya Stud Book and Livestock Recording Centre services to the county level (47 counties).
5. Train beef breed inspectors at County level (47 Counties) on animal registration and performance evaluation.

³ The current livestock breeding policy and bill and livestock feeds policy and bill are in draft form awaiting presentation to stakeholders.

B. Loopholes in the regulation of meat Industry

The study established that there are loopholes in the legal framework created by a disjointed regulatory mechanism where: Live animal, slaughter process and meat inspection is regulated by department of Veterinary Services in the Ministry of Agriculture Livestock and Fisheries through the Kenya Meat Control Act (2012). Thereafter, once in the butchery, the Ministry of Health take over the regulation of meat through the Public Health Act (2011). This creates a loophole through which unscrupulous traders have managed to bring meat from wild, dead and uninspected carcasses in the butchereries.

The veterinary professionals have the capacity to detect meat from different carcasses in butchereries. However their mandate is limited to the slaughterhouses. At the butchery, they rely on the cooperation of public health officials to prosecute anyone found selling unsuitable meet.

Recommendations

To effectively regulate the meat sector the following is recommended

- (i). There is need for the government to review the existing legal framework, i.e. Meat Control Act CAP 356 and the Public Health Act CAP 242 to remove the ambiguity and the existing loopholes in the law.
- (ii). There is need to review the two Acts and have the entire meat chain regulated by the Ministry of Agriculture, Livestock and fisheries through the Meat Control Act.
- c) The law does not explicitly link cold chain with quality enhancement, but instead it is recommended for meat preservation. Consumption of red meat has been associated with the high incidences of lifestyle diseases in the country. As a result a lot of negative publicity is going on, led by proponents of health and wellness and medical personnel. This study has clearly shown that consumers are responding to this by reducing intake of red meat, in favour of white meat. Consumers are not getting full information



on reasons behind association of red meat with lifestyle diseases which is all about post slaughter meat handling, use of cold chain, consumption of fresh /meat consumed immediately after slaughter among others.

Recommendations

To fill this knowledge gap, the following recommendations have been made:

- (i). Review the Meat Control Act and explicitly include the use of cold chain as a quality enhancement measure.
- (ii). Undertake consumer education on meat handling so that they can develop a preference for cold chain meat, which is much safer for their health
- (iii). Undertake massive promotion of health benefits of red meat consumption being a source of high quality protein in order to counter the negative publicity
- (iv). Enhance consumer education on meat quality and safe handling in order to demand quality meat from the retailers, while lobbying for enforcement of the existing legal framework
- (v). Capacity build other meat handlers, including traders on meat safety
- (vi). Lobby the government to Zero rate meat handling equipment in the interest of consumer protection. This will ensure traders buy recommended meat handling equipment thus improving meat hygiene.

C. Inadequate staffing for thorough meat inspection;

The following issues were raised regarding meat quality which are mainly attributed to limited number of meat inspectors deployed in slaughterhouses and lack of trace back systems:

- a) Concerns by consumers on safety of meat in the market, citing the likelihood of drug residues in meat, game meat in butcheries and butchereries selling meat from dead carcasses.

- b) Pastoralists on the other hand have limited access to animal health care services and therefore administers drugs to sick animals by themselves or through unqualified health professionals. In most cases, animals that do not show signs of recovery after treatment are taken to the market for slaughter, to avoid losses.

Recommendations

Lack of consumer confidence in safety of red meat will continue to undermine the efforts to promote the industry. Hence the following actions have been recommended:

- (i). The department of Veterinary Services to increase the number of meat inspectors to ensure that at least one inspector in the slaughterhouses handles not more than 60 carcasses in a day, to ensure a thorough ante and post-mortem examinations
- (ii). Enrol Vets and AHA's who have gone into private practice or joined the private sector into meat inspection.
- (iii). Provide more refresher courses to meat inspectors (especially certificate holders), with greater emphasis on detection of drug residues in meat.
- (iv). Explore the possibilities of research institutions like KALRO and ILRI to come up with innovative technologies to detect drug residues in live animals. This technology could be applied to live animals in the source markets, to ensure that the producers take responsibility.
- (v). Kenya Veterinary Board (KVB) to crack down on quacks who have invaded meat inspection. KVB should also issue all meat inspectors with badges for identification.
- (vi). Station licenced meat inspectors at the livestock markets to conduct ante mortem.

1. Background and Context

1.1 BACKGROUND

Kenya's meat sub-sector is fragmented and informal (about 96%). Interviews with live animal and meat traders during this study revealed that livestock trade is dominated by middlemen with very few organized producers organizations or processors who buy directly from livestock producers. Nairobi and Mombasa cities remain the key terminal markets accounting for 75% of country's meat consumption. As a country, Kenya has a supply deficit of approximately 300,000 metric tons (I Dev report – Meat Sector in Kenya 2014). Besides, the industry is very inefficient with high post-harvest losses occasioned by hot meat retail chain, low value addition, poor processing skills and worst of all wanting food safety standards.

The growing population has not triggered the market system transformation to incentivize actors to take advantage of the demand. Consumer's perception on meat quality, hygiene and use is changing with more preference to cold versus hot meat (KMT Livestock Deep Dive report 2016).

KMT livestock sector seeks to facilitate an enabling environment for improved and reliable demand for differentiated, affordable and safe livestock products by retailers. Lack of accurate information about size and composition of the consumer meat market is a major barrier to recommending strategies to meat traders and consumer voice groups seeking to diversify their marketing strategies. For example, meat traders seeking to target specific consumer types cannot do so because in the absence of information on consumption patterns and related demographics, consumer preferences and demand profiles, investment in diversification is highly risky. This study is the first step towards understanding meat consumer market and hence development of strategies towards investing in innovations shifting from hot chain to cold chain.

1.2 ABOUT THE STUDY

1.2.1 Study Objectives

This study aimed at achieving the following objectives that are critical to establishing and understanding consumption preferences and retail practices for livestock products in Kenya.

1. To establish with probable accuracy, current meat consumption patterns and preferences in Kenya (choice of meat, demography, location, socio-economic status)
2. To establish the current knowledge levels and information awareness on cold meat consumption among Kenyan meat buyers.
3. To establish current knowledge levels and gaps in cold chain practices in Kenya.
4. To generate a critical analysis on the market intervention, need for a sustainable cold chain retail and consumption practices in Kenya.

1.2.2 Scope of the Study

This was a countrywide study conducted in clusters around regions representing the old Kenyan provinces which were represented as follows;

1. Rift Valley – Eldoret, Nakuru and Kajiado as part of Nairobi metropolis
2. Western – Kakamega
3. Eastern – Makueni and Machakos as part of Nairobi metropolis
4. North Eastern – Garissa
5. Central – Kiambu as part of Nairobi Metropolis
6. Coast – Mombasa metropolis including Kwale and Kilifi
7. Nairobi
8. Nyanza - Kisumu



A sampling frame that incorporated an urban-rural demographic balance incorporating retailer and consumer characteristics was developed. To realize study objectives, we employed a mix of methods to adequately capture both qualitative and quantitative aspects related to the study objectives. An in depth review of existing literature and program documents was undertaken, this involved working with KMT stakeholders.

1.2.3 Organization of the Report

The report is organized into four main chapters. The first chapter highlights the background and the context of this study, clearly presenting a justification for the study. In addition, this chapter presents the objectives of the study and the key deliverables. The second chapter is a brief literature review report. This presents a deeper understanding of the context and the

existing information on meat consumption patterns globally. The chapter on methodology reports on methods and approaches used in data collection, sample sizes and names of counties where data as collected from.

The study findings are presented in chapter 4 to 6. The findings are structured around the study objectives, with chapter 4 presenting findings for objective 1, chapter 5 presents the findings for the objective 2 and 3 while chapter 6 presents objective 4 which is an analysis of objective 1-3 to determine the key issues that limit the consumption of meat across different categories and the recommendations in terms of market based interventions to address any gaps observed. The final chapter presents analysis of the policy and legal framework in which the meat industry operates, providing recommendations on the policy level interventions to address the gaps in regulation of meat industry.

2. Literature Review

2.1 AN OVERVIEW OF LIVESTOCK SUB-SECTOR IN KENYA

The idea by Delgado et al. (1999), on livestock revolution 2020, has generated significant interests in terms of research and policy debates on livestock sector during the last 17 years or so in sub-Saharan Africa. Alongside the population increase, urbanization and increased incomes, the demand for livestock products is on the rise (Delgado, et al., 2005). Thus, the projected increase in demand on livestock products is tied to the growth in human population, increased incomes among the middle class, urbanization and changing food preferences (Regmi & Meade, 2013). For example, the projected consumption of meat in Africa is expected to hit the 13.3 million metric tons by 2025 (Delgado, 1999; Rosegrant, et al., 2005). What that means, production has to match this increased demand while at the same time protecting the environment and it's sustainably (Tilman, et al., 2002).

In Kenya, the livestock sector contributes about 12% of the Gross Domestic Product (GDP), 40% to the agricultural GDP and employs about 50% of the agricultural work force and about 90% of the ASAL workforce and contributes 95% of household income for people living in the ASAL areas. (Ministry of Livestock Development, 2010; Ministry of Agriculture, Livestock and Fisheries (MAL&F), 2015). The Pastoralists in ASAL areas keep about 70% of the national livestock herd. Kenya's livestock population is estimated at 3,355,407

exotic cattle, 14,112,367 indigenous cattle, 17,129,606 sheep, 27,740,153 goats, 2,971,111 camels, 1,832,519 donkeys and 31,827,487 poultry (KNBS, 2009).

In Kenya, the meat sub-sector is operated informally to about 96%, urban based and fragmented along income lines with the middle and low income segments accounting for the majority of meat consumers. The meat and livestock trade are dominated by middlemen with very few organised processors buying directly from livestock producers. The cities of Nairobi and Mombasa are the key terminal markets accounting for 75% of country's meat consumption with an average of 25.8 kg and 21.2 kg per person respectively. Nairobi city alone requires monthly supply of approximately 27,839 head of cattle, 71,555 sheep and goats, and 685 camels. Mombasa requires a monthly supply of about 8,178 head of cattle, 21,021 sheep and goats and 201 camels (MUHORO, 2014). In 2016, a total of 568,264 cattle, 656,727 sheep, 1,232,392 goats, 262,074 pigs, 9,503,536 poultry, 2,270 rabbits, 8,828 camels and 20,786 donkeys were slaughtered in 37 counties, as presented in table 5.



Table 5: Total number of livestock slaughtered in Kenya in 2016

County	Cattle	Sheep	Goats	Pigs	Poultry	Rabbit	Camels	Donkey
Mombasa	642	0	0	25	360,638		-	
Machakos	23,434	4747	36,179	225	32,588		1,677	
Nyamira	3,398	1,512	7,671					
Nakuru	16,679	58,094	18,507	1,005	85,371			2,156
Mandera	2,676	2,708	51,122				3,703	
T/Nithi	7,206	7,362	28,334	1,486				
Lamu	2,209	10,747	3,747					
E/Marakwet	2,173	9,605	5,497					
Kiambu	112,219	37,736	13,072	8,721	7,105,102	2,270		
Narok	11,588	14,640	6,688					
Turkana	441	3,073	7,531				143	
Kisumu	19,753	11,575	9,577	447	6,364			
Wajir	489	1,662	5,845				1,187	
Kajiado	31,300	39,591	47,239	1,956	140,257			
Makueni	13,332	6,313	53,262	84	1,096,200			
Murang'a	37,854	4,905	5,627	25,855				
Nairobi	67,381	113,683	600,536	200,297	571,695			
Siaya	20,270	1,230	2,352	1300				
Tana River	452	4,172	9,138				208	
T/Nzoia	8,624	22,522	5,631	256	16127			
Isiolo	2,422	5,582	7,877				562	
T/Taveta	1,600	2,854	750				43	
U/Gishu	13,879	29,313	15,118	1397				
Kisii	14,703	5,722	19,432					
Vihiga	10,170	1,759	1,554	1196	4175			
Baringo	8,118	15,411	40,416		108		342	18,630
Kericho	12,647	5,144	9,399					
Nandi	4,719	9,343	2,211					
Laikipia	6,127	33,102	12,102	1,210			351	
Nyeri	19,660	63,649	17,056	4,342	80,719			
Kirinyaga	15,521	2,428	8,671	6,427				
Marsabit	2,284	3,473	6,488				6	
Meru	39,295	46,687	56,439	3734			311	
Embu	9,840	7,064	21,909	1746				
Kitui	8,960	52,360	46,000	365				
West Pokot	620	868	1,531					
Kwale	15,579	16,091	47,884		4192		645	
Total	568,264	656,727	1,232,392	262,074	9,503,536	2,270	8,827	20,786

Source: department of Veterinary Services, 2017



2.2 AN OVERVIEW OF MEAT SECTOR IN KENYA

The red meat, comprising beef, mutton, goat and camel meat, accounts for over 80% of all the meat consumed in these cities and the country in general. The white meat from poultry and pork accounts for about 19% of the meat consumed (EPZA, Meat Production in Kenya, Export Processing Zones Authority, 2005). Approximately 80 to 90 % of the red meat consumed in Kenya comes from livestock raised by pastoralists under extensive production system within Kenya and neighboring countries mainly Tanzania, South Sudan, Ethiopia and Somalia (Mbwika and Farmer, 2012). Kenyan pastoralists accounts for 65-70 % of the Kenya red meat supply the remaining 20-25% comes from informal cross border trade with neighbouring counties. Private ranches contribute 2–3% of total meat production in Kenya, principally for the high-value market.

In Kenya, an average per capita consumption of red meat is about 15.5 kg with an annual production of about 600,000 metric tons (MUHORO, 2014). Despite the seemingly abundant meat and consumer markets, Kenya is a meat deficit country to the tune of 300,000 metric tons (I Dev report – Meat Sector in Kenya 2014). At the same time, the industry is very inefficient with huge losses occasioned by hot meat retail chain, low value addition, poor processing skills and worst of all, the food sanitary risks due to lack of bio security, cold chain and access to water and poor hygiene and inspection practices (Carron et al. 2017).

The potential of the Kenyan market seemingly is increasing along with the population of about 44.6 million with a culture of meat consumption (Kenya Market Trust 2014). However, the growth in population and middle class has not effectively triggered the meat market system transformation to incentivise actors to take advantage of the demand. This is also happening when the consumer's perception on meat quality, hygiene and use is changing with more preference shifting to cold versus hot meat (KMT Livestock Deep Dive report 2016).

2.3 MARKET SEGMENTATION

According to the study on beef consumption among the households in Nairobi, consumption varied with income category with those in the highest quintile consuming nearly three times more beef than those in the lower quintile (Gamba, 2005). According to this study, income is the primary determinant of the type of beef products the consumer can buy. The consumers from the high-end market are willing to pay a premium for quality and also for the safety products. Majority of the butcheries in the low-end market offer little product differentiation, but the high-end butcheries offer beef cuts that are of significantly higher quality. In the low-end market, the customers are low-to medium-income earners who buy meat on bone, liver and tripe and the meat is openly displayed without refrigeration. They also buy meat at point of sale eatery in form of Choma, boiled or fried.

The middle segment of the meat market offers boneless steaks, liver and stripe. The retailing of these products is done under refrigeration overnight. The medium income earners are consumers of these products and the butcheries are located in the medium-income residential estates. They also buy meat as take home as well as point of sale /eatery. The high-end segment of meat market is characterized by high-quality meat and high-income consumers who like to buy value added from high-end markets such as supermarkets and high-end butcheries. The consumers place value on product labelling and presentation as criteria for quality. They rarely specialize in point of sale eatery.

2.4 GLOBAL MEAT CONSUMPTION PATTERNS

On the globally scale, the livestock sector contributes to 17% and 33% of the kilocalorie and protein consumption respectively with different production and consumption patterns between the developed and industrial countries (Rosegrant et al. 2009). Globally there has been on a steady increase, from 233 million metric tons (Mt) in the year 2000 to over 300 million Mt in 2020 (Delgado, 1999). This is linked with meat production and demand



in these countries. According to the World Bank (2009), the total meat production in the developing world tripled from 45-134 million tons in the period 1980 and 2002. The poultry meat production has steadily increased by factor nearly 10 from 9 million Mt in the 1960s to over 60 million Mt in 2000 (FAO, 2010).

Based on the OECD (2018) indicator, the growth in meat consumption pattern is closely linked to the country's GDP, living standards, dietary practices, livestock production and consumer prices. The pattern is measured in terms of thousand tons of carcass weight and in kilograms of retail weight per capita. The annual per capita meat consumption in both the industrial and developing countries is projected to increase from 25.5-37 kg and 88-100kg respectively from the year 1997 to 2030. Over the same period, milk and dairy products consumption will increase from 45 -66 kg in developing countries, and from 212 - 221 kg in industrial countries. Whereas, eggs consumption will grow from 6.5- 8.9 kg in developing countries and from 13.5-13.8 kg in industrial countries (Bruinsma and Food and Agriculture Organization of the United Nations, 2003). The poultry meat production is higher than beef due to intensive production system and active role of the smallholder and indigenous chicken production systems (Kitalyi, 1998).

Despite such impressive projections, the FAO (2005) report gives an indication that, during the last 2-3 decades, meat per-capita demand and supply have significantly declined in some of the developing countries. This is linked to the poor economic performance and inefficiencies in the institutional infrastructure. Such factors include; poor governance of the cooperative agricultural institutions, lack of comprehensive legal framework to guide the policy formulation process, low capacity of private sector to take up roles previously undertaken by the state, incomplete markets and weak marketing systems, heavy taxes and levies by the local administrations, corruption and lack of investment and research on appropriate technologies. Also the lack of data and information on consumer demands on meat is not well quantified

2.5 KENYA VERSUS ETHIOPIAN MEAT SECTOR

In Ethiopia, there are 9 abattoirs which are privately owned and are able to process over 150MT of carcasses of sheep and goats on weekly basis for export to Middle East countries. The operations are occasionally affected by seasonal supply of livestock, high transport and infrastructural challenges of accessing the supply regions. The high meat prices in Addis Ababa have implications on the livestock export business. This is because, the good market prices in Addis Ababa which is about 5 USD is lucrative and likely to divert attention from the export business. Such high prices are either linked with demand and supply dynamics or cartel-complex or the cross-border trade of live animals with Kenya. This is attractive prices can as well contribute the shortage of livestock in Kenyan market if traders would divert sales to Addis market. Generally, Ethiopia exports over 150,000 animals (cattle, goats, sheep and camels) annually to Yemen, Egypt, and Jordan as compared with the informal cross-border trade with other East African countries, Kenya, Sudan, Somalia and Kenya.

Market stratification in Kenya is ranch based whereas in Ethiopia is feedlot based. In Kenya there are about 450 ranches majority are in the category of ranches as private company ranches, cooperative ranches, group ranches and Agricultural Development Corporation ranches (ADC). In Ethiopia, there are about 200 feedlots scattered in and around Addis Ababa which manage about 100-500 head of cattle at a given time. They are mainly used for fattening livestock which are sold to the exporters or to the lucrative meat businesses in Addis.

Kenya and Ethiopia can share these experiences on ranching and feedlots which are fewer in either country. The constraints mainly as a result of high costs of commercial feeds could be addressed by introducing mixed cropping systems for fodder production either under rain fed or irrigation. This will encourage fattening on small scale stall feeding/zero grazing cattle feeding targeting export and local lucrative markets.

3. Methodology

3.1 SECONDARY DATA COLLECTION

Data to answer the research questions was collected from both primary and secondary sources. Detailed literature review was undertaken to provide documented information on different study variables and to guide sampling of the study sites and people to be interviewed. Preliminary consumer segments were derived from the secondary information to inform stratification of the target study sites. Information generated from secondary sources was subjected to further refinement during the primary research phase.

3.2 PRIMARY DATA COLLECTION

Primary data was collected through a mix of methods, utilizing both qualitative and quantitative approaches. Quantitative data was collected through a consumer and retail survey while qualitative data was collected through Focused Group Discussion and Key Informant Interviews.

3.2.1 Household Survey

The target respondents for the survey were consumers from different consumer segments in the country. A multi stage stratified sampling approach was used to select the study sample. The first level was to stratify the country into 5 zones, based on livelihood activities, demography, social economic, geographic and cultural patterns, which potentially affect consumer behaviours. In the stratification process reference was made of livestock trading routes as documented by Akiilu et al 2006. There was also reference to consumer segments as strata, based on segmentation in the Kenya Livestock end Markets Study by ACIDI Voca (2012) and the KMT I Dev report – Meat Sector in Kenya 2014).

Below is a brief description of the sampling process.

- 1) **First level stratification:** The first stratification divided the country into 5 main strata, based on livelihood zoning (annex 1). People within a similar

livelihood zone often have some common characteristics which determine their income sources and food consumption patterns. In most rural areas, most people in the same livelihood zone often have common social cultural orientations which influences their beliefs, value systems as well as food consumption patterns. The major livelihood zones derived from FEWSNET, (2011) include the pastoral zone, Mixed farming system; Lake Victoria fishing zone, and urban clusters in which Nairobi Metro 4 was stratified as Urban 1 and Mombasa Metro as Urban 25. Counties which belong to each of these livelihood zones were grouped as one stratum.

- 2) **Second Level Stratification:** To ensure proportionality, a second level of stratification and sampling was employed, which involved creation of a substrata made of counties within the same sub livelihood zone. This was used to increase homogeneity among the samples within one stratum. Using the livelihood zone maps, the following strata were established:
 - a) **Mixed farming system:** This was stratified into the following sub zones:
 - (i). Small holder mixed farming systems in the central highlands and western high potential areas. These included: Nyeri, Embu, Meru, Kirinyaga, Nyandarua, Muranga, Tharaka Nithi, Kisii, Nyamira, Nakuru, Uasin Gishu, Trans Nzoia, Nandi, Kericho, and Bomet, Kakamega, Vihiga, Bungoma and Busia

4 **Nairobi Metro is the Nairobi County and the towns with the metropolitan areas of Nairobi, which are hived from the counties of Kajiado, Kiambu and Machakos**

5 **Mombasa Metro comprises of Mombasa County and the surrounding towns which make the metropolitan area of Mombasa, hived from Kilifi and Kwale Counties.**



- (ii). South Eastern marginal to medium mixed farming systems: These include Taita Taveta, Kitui and Makueni

Counties with the highest urban populations, based on the 2009 national census, in each of the sub zones were selected to participate in the survey. In this regard, Nakuru, Eldoret and Kakamega were selected to participate in the study under smallholder farming systems. In the South Eastern Marginal mixed farming system, Makueni County was selected purposively to capture the dynamics around the poultry consumption, being one of the largest producer of indigenous chicken in the region.

- b) Pastoral:** The pastoral system is predominantly a supply zone, and largely dominated by pastoral communities. Out of all the pastoral counties, Garissa County was selected, based on the urban populations and also being one of the major market supplying the Nairobi and Mombasa meat markets.
- c) Lake Victoria fishing Zone:** This was found to be large consumer market for red meat as well as source of most of the fresh water fish consumed in the country. The city status of Kisumu and the growing private sector, infrastructural development all create a large market for meat. The city was therefore selected as one of the data collection sites to represent this livelihood zone.
- d) Urban 1 -Nairobi and Urban 2-Mombasa:** these, being 100% urban, were not stratified further at this level, but rather taken as metropolis.

After this stratification, urban centres with the highest population were selected in all the selected counties, except Nairobi and Mombasa Metros. In these metros, being 100% urban households were sampled from wards within the cities plus at least one or two main urban centres of the neighbouring counties which form the respective metropolis.

Sampling of Households

(i). Sample size determination

Multi stage sampling technique was used to come up with the sample size. In the first stage Fisher’s random sampling formula was used to calculate the nationwide sample size from the Population of Household numbers in Kenya based on the 2009 KNBS census. A sample (n) of 990 was determined by sampling each of the 5 sub zones (Mixed farming, Pastoral, Lake Victoria, Urban 1- Nairobi and Urban 2- Mombasa) at 95% confidence level and 7% confidence interval. The next stage involved proportionate distribution of the sample among the regions with respect to Household size of the respective regions. This helped reduce biasness by making sure the enumerators went to diverse set of locations. Table 1 below presents the actual number of the households sampled in each of the selected counties.

Table 1: Sample size per urban areas

Urban Areas	Sample Size	Proportion to total sample size
Kakamega	90	9%
Eldoret	71	7%
Nakuru	144	15%
Garissa	36	4%
Makueni	60	6%
Kisumu	73	7%
Mombasa	180	18%
Nairobi	336	34%
Totals	990	100

After selection of the major urban areas for data collection, households were segmented according to 5 consumer segments in the Idev Report⁶. The total number of households that were interviewed in each segment in each of the counties was determined by multiplying the percent contribution of each segment with the sample size for each of the counties. Based on the relative proportion of households in each segment to the total sample size, the number of households that were interviewed was derived by multiplying the percent of

⁶ Kenya Livestock and Meat Market analysis, for cattle goats and Sheep, I-Dev International, 2014.



each market segment to the sample size for each of the counties. This was done to ensure proportionate representation of all the income

categories. The breakdown of the sample size interviewed per region in each market segment is shown in table 2 below:

Table 2: Number of HH interviewed in each consumer segment per county

Segment	* % of Population	% of sample	NRB	NKR	MBS	MAK	GSS	KSM	KKG	ELD
Low income	50-60%	55%	139	79	96	33	19	40	48	40
Working families	20-30%	25%	63	36	45	15	9	19	23	17
Rising Savers	10-16%	13%	33	19	24	8	5	9	12	9
Cosmopolitan Professionals	2-3%	4%	10	6	9	2	1	3	4	3
The Affluent	1-2%	2%	5	3	4	1	1	1	2	1
Expert/Tourist	0.1-1%	1%	3	1	2	1	1	1	1	1
Total			253	144	180	60	36	73	90	71

NRB – Nairobi; NKR – Nakuru; MBS – Mombasa; MAK – Makeni; GSS – Garissa; KSM – Kisumu; KKG – Kakamega; ELD – Eldoret

*- percentages are derived from Idev, 2014

A list of all the wards in each of the urban towns was developed and thereafter categorized according to the 7 consumer categories. The average monthly rent in residential areas within the wards was used to categorize the wards into the 7 consumer categories. Thereafter the wards with the highest populations were selected ensuring that not less than 30% of the wards were sampled per segment.

A systematic sampling process was used to select households to participate in the survey from the selected wards. In the systematic sampling process, a random starting point was determined from where the study households were sampled after a sampling interval. The sampling interval was determined by dividing the population size by the sample size. The large sampling intervals were applied to the low-end segments where households tend to be close to one another while the smaller SI was applied in the high-end settlements where the houses are far apart.

3.2.2 Retail Survey

The retail survey was conducted, targeting the retail outlets for different types of meats. The aim of the retail survey was to collect information on meat consumption trends from the perspective of retailers, perception and utilization of cold chains, policy related issues as well as other factors related to supply and demand. Based on the secondary information, the following are the main categories of retail outlets that were interviewed;

1. Butcheries serving all the market segments
2. Fast food outlets especially those that offer home deliveries
3. Nyama choma joints popular in the major urban centres and the peri urban areas.
4. Wholesale meat and fifth quarter traders based at the slaughterhouses
5. Meat retailers and offal fifth quarter traders based in the meat markets



6. Hawkers of cooked meat, meat by-products and fifth quarter products in the major urban areas
7. Supermarkets

The outlets that were targeted by the survey are largely those that serve the consumers interviewed under the household consumer survey. This approach allowed for triangulation of information from the household survey as well as collecting key variables that were specific to retail outlets. In addition, some outlets, which were found to be unique and not within the sampled wards were purposively identified and interviewed. These include slaughterhouses, fast food outlets, nyama choma joints and hawkers of various cooked meat and by products. A structured questionnaire was administered to the sampled retail outlets. Some of the outlets were also interviewed as key informants in order to provide the qualitative information to help interpret the qualitative data. Sampling was done through purposive sampling of the retail outlets that serve the households in a given household survey site.

Survey data was collected using both qualitative and quantitative approaches. For the retail and households survey, the consultants developed structured questionnaires which were administered by trained Field Interviewers (FI). Once approved by KMT, the paper-based questionnaire was converted into electronic form by coding and uploading into Kobo collect7, a Computer Assisted Personal Interview (CAPI) software.

3.3 QUALITATIVE DATA COLLECTION

3.3.1 Key Informant Interviews:

Key Informant Interviews were conducted, targeting other actors in the meat value chain

who were not practically reached through the surveys. These included the meat processors, hawkers of meat products, meat transporters, department of veterinary services, department of livestock production, managers of the slaughterhouses and department of public health among others. These were interviewed at their premises, using checklists. This method was used to collect qualitative information from consumers in market segments where focused group discussions and surveys were not practical. List of Key Informants include but not limited to the following;

- Slaughterhouse managers (for livestock from pastoral systems)
- Live animal traders from source markets who bring livestock to terminal markets
- Hawkers and street vendors of meat-by products
- Government officials (Departments Of Veterinary Services, Department of Livestock Production, Public health and County Revenue office)
- Kenya Stud Book and Kenya Livestock Breeders Organization
- Processors (Farmers Choice, Quality Meat Parkers etc.)
- Supermarkets
- Meat trading companies
- Meat and fifth quarter traders operating in slaughterhouses, meat markets, and butchereries
- Meat processors
- Meat transporters
- Fast food outlets
- Nyama choma outlets
- Individual consumers in all market segments
- Individual retailers serving different market segments



3.3.2 Focused Group Discussions (FGDs):

FGDs were used to gather qualitative information on consumer perspectives and opinions regarding the key study variables. A total of 7 FGDs were conducted in Nairobi, Mombasa and Nakuru. These targeted consumers, meat traders and live animal traders at the slaughter houses. The information from FGDs was used to triangulate the HH survey data and also being qualitative in nature, was used to interpret the findings from the structured survey.

3.3.3 Observations and photography:

Observations were made all along to validate some of the information collected from other data sources and also to acquire better perspectives on the situations. Photographs were also taken to bring out some key observations that enhance the understanding of some of the situations in the study areas.

3.3.4 Design and implement a pilot study:

A pilot was implemented covering 100 households in Nairobi, following the sampling methodology described above. The purpose of the pilot was to test the sampling process and the data collection tools. Data from the pilot study were analysed studied and thereafter used to inform the refinement of the study design and data collection tools.

3.4 DATA CLEANING DEBUGGING AND ANALYSIS:

Data cleaning and debugging was done continuously during data collection stage. The CAPI system was set up in a manner that any errors detected in the course of data collection were fed to the supervisors and correction made in liaison with the concerned field interviewers. Data was downloaded from the central server, cleaned and analysed. Both descriptive and inferential analysis of data from the surveys were carried using SPSS7.

7 SPSS – is acronym of Statistical Package for the Social science. SPSS is one of the most pop-

Final figures generated were compared with secondary data and thereafter integrated and interpreted along with the qualitative data from Key Informants interviews and Focused Group Discussions to generate observations and conclusions.

3.5 LIMITATIONS OF THE STUDY

The following were some of the limitations experienced during the study.

- i) **Restricted access:** the high-end income segment and majority of middle-income households largely live in highly secured homes either in own compounds or in gated communities. As a result, it became quite challenging for the field interviewers to access these residential areas. The team however managed to use a number of methods to access such residential areas, such as seeking permission from estate management, use of the snow ball process of identifying the households among others.
- ii) **Availability of the respondents:** Most of the respondents from middle- and high-income segments are mainly out of home since most of them are day time workers. In addition, most of these households are a busy people, occupied by their day time jobs. This necessitated a lot of replacements of the sampled households. In addition, the fields interviewers were flexible to extend the working hours in the evening and work on weekends
- iii) **Security Issues:** This was a problem in the low-income areas, especially in the slums. Walking around with tablets posed a security threat to the field interviewers in some of the slums. Where the enumerators experienced such challenges, the supervisors were quick to provide guidelines on replacement. In some cases, some local people were paid to provide security to the team.

ular statistical packages which can perform highly complex data manipulation and analysis with simple instructions.



- iv) **Data on expenditures:** A few of the households that were interviewed did not have figures on their expenditures, while others could not recall the prices of various commodities. Errors arising out of this were reduced through cross-checking during FGDs and literature review. In addition, the field interviewers were thoroughly trained on probing and triangulation skills.
- v) **Expectations of hand-outs by respondents:** To some limited extent, some respondents had expectations of support from the field interviewers. To cope with these demands, enumerators took time to read the informed consent and explain the purpose of the survey and how the results would be utilized, which seemed satisfactory to those interviewed.

Overall, these limitations did not have any significant effect on the quality of data obtained as well as the findings of this study.

3.6 AN OVERVIEW OF THE RESPONDENTS

3.6.1 Consumer survey respondents

The respondents were mainly people in authority at the household level with 48.3% being household heads and 36.3% were spouses of the household heads. Only a minority of the respondents were other members of the household (5.9% daughter of the HH, 1.5% house managers, 4.2% other relatives and 3.8% son of the HH head. The respondents were adults with 56.1% falling within the 18-35 age categories followed by the 36-50 age categories who constituted 35.2% of the respondents.

Those above 51 years were the minority (8.7%). Majority of the respondents were female (59%) while majority of the households were male headed as shown by 74% of the respondents.

3.6.2 Retail survey respondents

Results from analysis shows that meat retails businesses investors were both male and female with male dominating the industry at 84.5% while women were 15.5%. Majority of the respondents who participated in this study were employees working in the various business visited at 60.4%. About 2.8% were daughters or sons of the business owners, 4.7% were in partnership form of business while 29.6% were sole owners of the business. Most of the persons who participated in key informants interviews and Focused Group Discussions were business owners. The employees were also very knowledgeable about the meat industry since they were involved with dealing with customers daily. Christian community was represented by 81.1% while Muslims were 18.9%.

Majority of the respondents (62.3%) were attendant in the sampled retail outlets. They prepare meat for sale by performing various duties, such as weighing meat, wrapping it, and putting it out for display. About 18.3% were managers who were involved in marketing activities such as buying, selling, grading, and customer relations. About 7.9% were directors of the sampled business while 2.0% were accountants.

At least 95.6% had permanent trading premises of various sizes while 4.4% were mobile traders. The mobile traders included processed meat sellers which includes Farmer's Choice Smokies, Sausage and Hot Dogs while the permanent traders were butcheries located in higher, middle and lower income earners regions, hotels, institutions, supermarkets among others.



3.7 RESPONSE RATE

The response rates achieved are presented in table 3 and 4 below. On average, the study managed to achieve 87% response rate for the consumer survey and 95% for the retail survey

Table 3: Response rate for consumer survey

Town	N	Response	Response rate
Eldoret	71	71	100%
Garissa	36	36	100%
Kakamega	90	71	79%
Kisumu	73	72	99%
Makueni	60	60	100%
Mombasa metro	180	180	100%
Nairobi metro	336	232	69%
Nakuru	144	141	98%
Total	990	863	87%

Table 4: Response rate for retailers' survey

Town	Achieved n	Target n
Nakuru	29	35
Nairobi metro	99	98
Mombasa metro	61	70
Makueni	14	14
Kisumu	16	14
Kakamega	13	14
Garissa	7	7
Eldoret	14	14
Total	254	266
Response rate	95%	

Study Findings

4 Objective 1 - Current meat consumption patterns and preferences in Kenya

4.1. CONSUMER SEGMENTATION

4.1.1 Approach to Segmentation

To segment the consumers, data on the initial segments by Idev reports, which were used to sample the study households was subjected to statistical analysis by testing the differences in means across the 5 segments. This analysis revealed that some of the expenditure means as well as the meat consumption patterns and trends in the 5 segments in the Idev report were statistically insignificant for instance the working families and rising strivers were found to have insignificant differences and the Cosmopolitan professionals and the affluent had similar trends across all the variables tested. Further test also revealed there is no significant difference in household size composition in the five segments. Statistical tests also showed that the consumption patterns in most of the counties were not significantly different. Age was also subjected to a test to ascertain if it can be used to come up with distinct segments, there was no statistical significant difference in meat consumption patterns and perception across the age groups in the study.

The study narrowed to the three segments, i.e. High income, Middle income and Low income consumer segments. A one way between subject's ANOVA conducted revealed there is a significant difference in the mean expenditure of the three segments [$F_{2,828} = 382.777$, $p < 0.05$] which led to the conclusion that there were only three distinct segments as far as household expenditures and meat consumption patterns is concerned.

The proportions of each of these segments in the study population is as follows:

- 1) **High income:** This constitute the smallest consumer segment, with only 4% of the sample falling in this segment
- 2) **Middle income:** This segment constitutes 36% of the total sample.
- 3) **Low income segments:** This is the largest segment, accounting for 60% of the total sample.

According to a report from the Kenya Institute of Economic affairs in 2015, low income group constitute 74.4% of the total population while middle and high income groups constitute 23% and 3% of the total population respectively. Our results show a higher proportion of high-income segment, because after establishing that there was no statistical significance between the tourists/expatriate categories with the cosmopolitan profession, the three groups were put together as high-income segment. The findings from this study show a bigger proportion of middle class than the KNBS, which could be attributed higher representation of consumers in Nairobi, which is hosts the largest population of middle class (30.5%) in the country.

4.1.2 Profiles of the Consumer Segments

1) Incomes

Per capita income of a household can be considered as a measure of its welfare. However, this is found to be difficult because people are secretive in disclosing their levels and sources of incomes. As an alternative to reporting using household income, other indicators that are correlated to household incomes are reported. These include household per capita expenditure which is a proxy for income, based on the assumption that



increased expenditure is strongly related to increased income. According to Deaton (2003), expenditure data are less prone to error, easier to recall and more stable over time than income data. This approach has been used elsewhere for instance in KNBS in the determination of household inequalities in Kenya.

To understand the household expenditure in the households, both food and non-food items were factored in the analysis. The survey collected information on expenditures at the household level for food items and non-food items. Food expenditures and short-term non-food expenditures were collected using a one month recall period. The key food items that were factored in the analysis include; cereals, roots and tubers, poultry, red meat, fish, dairy products, eggs, cooking oils/fat, pulses, sugar, spices and other food items consumed in the households. For non-food items, the following were factored in the analysis: health and medical care, education, hired labour, clothing and software, entertainment, communication, rent, land lease, transport, personal care, domestic workers, electricity, water, motor vehicle/bicycle/motorcycle maintenance, amenities, toiletries, household operational

costs and any other household non-food items.

The mean monthly household expenditure for the high-income segment was found to be KES 119,305 per month, with food expenditure constituting 16.6% of the household expenditure. The mean expenditure for the medium income households on the other hand was found to be KES 40,984 with food expenditure constituting 28.8% of the total household expenditure. The mean monthly expenditure for the low-income segment was found to be KES 21,777 with food expenditure constituting 41.8% of the total household expenditures. These findings are within the range of the Kenya National Bureau of statistics which shows that the high-income groups earn over 100,000, while those in the middle segments have monthly income of KES 50,000 to KES 99,000. Monthly incomes for the lower income segment is reported by KNBS to be between 0-50,000. These finding compared closely with findings from a study by IPSOS (2015) which reported food expenditures to be approximately 49.2% in the low income and about 24.2% in the middle-income segments respectively.

Table 6: Mean monthly household expenditures

Segment	Statistic	Food expenditure	Non-food expenditure	Total
High income	N	42	42	41
	Mean	19,841	97,016	119,305
	Median	17,590	82,525	102,750
	Minimum	3,700	10,300	33,100
	Maximum	45,360	256,560	295,300
Middle income	N	273	290	288
	Mean	11,844	29,596	40,984
	Median	11,000	20,478	31,675
	Minimum	1,190	700	6,000
	Maximum	34,400	163,000	189,900
Low income	N	500	510	502
	Mean	9,108	13,741	21,777
	Median	8,195	11,100	19,730
	Minimum	400	1,200	2,500
	Maximum	43,100	81,190	58,060



2) Household Size:

The average number of household members is 5 for both low and high-income segments while the middle income had a mean of 4 household

members. This is comparable with the national average household size estimated at 4.0 members in the in KIHBS 2015/16 which was a decline from 5.1 members reported in 2005/06 KIHBS.

Table 7: Average number of household members for each market segment

Segment		Below 5 years	5 - 12 years	13 - 19 years	20 - 35 years	36 - 60 years	Above 60 years	TOTAL / HH
High income	N	28	32	34	38	35	30	43
	Mean	1.00	2.00	1.00	2.00	2.00	1.00	5
	Median	0.00	1.00	1.00	1.00	2.00	0.00	5
Middle Income	N	238	253	233	285	247	190	305
	Mean	1.00	1.00	1.00	2.00	1.00	1.00	4
	Median	1.00	1.00	1.00	2.00	1.00	0.00	4
Low Income	N	397	407	370	472	394	295	515
	Mean	1.00	2.00	1.00	2.00	2.00	1.00	5
	Median	1.00	1.00	1.00	1.00	1.00	0.00	4

3) Gender and Age of the HH Head

The three consumer segments are largely male headed households, with 75.5%, 75.9% and 72.2% of the households in the high, middle and low income consumer segments being male headed. The young families (where heads are in the 18-35 age cohorts) are the majority in the three segments, where 49% of households in the high income, 57% in the middle income and 56.3% in the low income segments belong to this age cohort. Results reveal that this cohort has the smallest household size in the three segments with an average of 3 members in the high and middle income and 4 in the low income segments.

The middle aged families (36-50 age cohort) is the second largest age cohort in the three segments with 40.8%, 36.4% and 34% of

households in the high income, middle income and low income segments falling into this cohort. This cohort has the largest household size, with an average of 6 members in the high income, 5 in the middle income and 6 in the low income segments.

These results shows that majority of the population is largely made up of young parent families and middle aged parent families who represent a combined total of 89.8% of all households in the high income segment, 93.4% in the middle income segment and 90.3% of all households in the low income segments. As such analysis of consumption patterns will largely focus on the young parent families and middle aged parent families while the remaining proportion will be grouped together as older parent families.



Table 8: Age of the household head

Segment	Age categories	Percent	Average members in HH	
High income	18 – 35	49.0	N	7
			Mean	3
	36 – 50	40.8	N	8
			Mean	6
	51 – 60	6.1	N	2
			Mean	4
	Above 60	4.1	N	1
			Mean	1
Middle income	18 – 35	57.0	N	71
			Mean	3
	36 – 50	36.4	N	58
			Mean	5
	51 – 60	4.0	N	4
			Mean	4
	Above 60	1.3	N	3
			Mean	2
	Below 18	1.3	N	
			Mean	
Low income	18 – 35	56.3	N	124
			Mean	4
	36 – 50	34.0	N	102
			Mean	6
	51 – 60	7.2	N	28
			Mean	6
	Above 60	1.2	N	6
			Mean	5
	Below 18	1.4	N	1
			Mean	4

4) Occupation

Majority of the high income segment households are in full time formal employment⁸ (42.9%), followed by 28.6% who are self-employed and 20.4% who are unemployed. A smaller proportion is on part time employment (2%) and other categories (6.1%). The proportion of households falling in the unemployed category is inflated by the high proportion of other household members who participated in the interview and were unemployed since only 5.6% of the heads of households from this segment who participated in the survey (n=1) are unemployed. Specifically 58% of the sons

⁸ Employment means paid work, formal or informal

and daughters of HH heads interviewed (n=4), 66.7% of other relatives living in the household who were interviewed (n=2) and 15% of spouses are unemployed (n=3) in this segment were an employed. Those in employment are mainly employed as managers (42.9%), professionals (38.1%), sales and service workers (9.5%) and technical/technicians (9.5%).

At least 41.3% of households in the middle income segment are in full time employment, 32.3% self-employment and 12.9% unemployed. About 9.6% are in part time employment while 4.0% are in other categories. Results show that only 4.4 % of the heads of households from this segment who participated in the survey (n=6) are unemployed; other unemployed members of the household include 17% of the sons and daughters of HH heads interviewed (n=5), 37.5% of other relatives living in the household who were interviewed (n=6) and 20.8% of spouses are unemployed (n=22) in this segment were unemployed. In this segment, those in employment are mainly employed as professionals (29.6%), sales and service workers (25.7%) and technical/ technicians (13.2%).

In the lower income segment, only 16.5% of the household are in full time employment, while majority (43.1%) are self-employed. At least 26.8% are unemployed, 9.9% in part time employment, 0.8% work as volunteers and 2.9% are in other categories. Results show that 15.3 % of the heads of households from this segment who participated in the survey (n=40) are unemployed, 51% of the sons and daughters of HH heads interviewed (n=24), 41.2% of other relatives living in the household who were interviewed (n=7) and 35.5% of spouses are unemployed (n=67) in this segment were an unemployed. Those in employment in this segments are mainly employed as sales and service workers (31.3%), technicians (14.9%), elementary and casual workers (19.4%) and craft and related workers (10.4%).

Majority of those involved in self-employment are operating as micro enterprises (defined as those with 1-9 employees), which was more pronounced by the middle and low income segments than the high income segment. At least 78.6% in the high income, 99% in the



middle income and 97.2% in the low income segment are operating businesses in the category of micro enterprises. At least 21.4% of

the self-employed in the high income segments are operating as medium enterprises which are defined as those with 10-50 employees.

Table 9: Types of employments across different segments

Segment	Type of Occupation	Percent
High income	Full time employment	42.9
	Part time employment	2.0
	Self-Employment	28.6
	Unemployed	20.4
	Others	6.1
Middle income	Full time employment	41.3
	Part time employment	9.6
	Self-Employment	32.3
	Unemployed	12.9
	Others	4.0
Low income	Full time employment	16.5
	Part time employment	9.9
	Self-Employment	43.1
	Volunteer	.8
	Unemployed	26.8
	Others	2.9

5) Expenditure on Red Meat, Poultry and Fish

Average monthly expenditure on different meat types by consumers from different market segments is presented in table 10 below. The overall budgetary share for all meat against the total food expenditure is 20% with high income having as share of 25%, 22% for middle income and 17% for low income segment respectively. Red meat (beef, mutton, goat meat) has the highest budgetary share with a combined average of 12% for the three segments, 14% among the high income, 13% in the middle income and 10% in the low income segments. Red meat is followed by poultry, with an overall budgetary share of 6% for the three segments, 10% in the high income segment, 7 % in the middle and 6% in the low income segments. The low income segment appear to have more expenditure on fish (3%) compared to the other segments, which could be attributed to higher consumption of fish, mainly the cheaper species like the Lake Victoria sardine commonly referred to as

omena (silver cyprinid).

When considering the expenditures of each meat type against the total money spent on meat only, red meat was found to have the highest household budgetary share of 57%, followed by poultry (32%) and fish with the least budgetary share of 11% of the total monthly expenditure on the 3 meat types. This is comparable with findings from Moni et al, 2016 which estimated budgetary shares of 60.2 % allocated to red meat (beef, goat meat and mutton), 25.5% allocation to poultry and 14.3% to pork in the urban towns of Mwea, Njabini and Ol-kalou in central Kenya.

Bett et al, 2016 however estimated a budgetary share of 70% allocated to poultry, 26% to red meat (Beef, mutton and goat meat) and 4% allocated to other types of meat, in a study conducted in rural and urban areas of 6 counties in Kenya namely, Kakamega, Siaya, West Pokot, Turkana, Bomet, and Narok. The difference may be attributed to the differences in location, since the latter study focused in the rural and urban areas, with Kakamega,



West Pokot and Bomet being high producers of poultry. This then implies that budgetary share on different meat types are likely to be affected by locations, given the significant

relationships between the given different preferences of meat across in different parts of the country.

Table 10: Average monthly expenditure on red meat and fish by different segments

Type of Meat	High income			Middle income			Low income			Combined		
	N	Mean	% *	N	Mean	%*	N	Mean	%*	Mean	%*	
Poultry	44	2,153.4	10%	242	965.3	7%	378	571.9	5%	664	820.1	6%
Red Meat	44	3,116.6	14%	243	1,800.0	13%	435	1,106.3	10%	722	1462.3	12%
Fish (and sea foods)	48	257.7	1%	241	265.2	2%	416	300.5	3%	705	285.5	2%
Total		1799			1012.3			669.2			861.6	

*: percent of total food expenditure

6) Consumer Segmentation from the perspective of the meat retailers

Interviews with butchers in the slaughterhouses revealed that animals that are brought for slaughter come from different parts of the country, and in different weight, age and therefore produce meat of different quality. Grading of animals and carcasses at the slaughterhouse is based on eye appraisal using their experience in meat trade. Based on this, they segmented the meat consumers as follows:

High income segments (Nairobi, this was likened to residents of Runda and Karen), prefer standard meat which does not have fat cover, prefer very red meat and rarely buys meat. They consider this segment to be having no impact on meat trade. This group was considered to be about 4% of the total consumers

The middle class was considered to be the largest consumer of meat. According to the retailers, they prefer meat with fat cover, eat meat daily and prefer high standard and standard carcasses. This group constitute about 25-28% of their consumers.

The low class, according to the meat traders are informed by pricing of meat and so they usually buy the cheapest meat, offal like matumbo are their delicacy and buy small quantities

of meat on a daily basis. As a result the meat that goes to this segment is from animals of poorest quality, usually the commercial grade.

4.1 TYPES OF MEAT CONSUMED IN THE HOUSEHOLDS

4.2.1 Types of Meat Consumed in Households

Majority of consumers in the high-income segments consume chicken (96%) followed by fish (90%) then beef (79%) and goat meat (73%) in that order. Pork and mutton are consumed by minority of consumers in this segment, as presented by only 35% and 23% of consumers in this category respectively. In the middle income, chicken is eaten by majority of consumers (88%) followed by beef (82%), then fish (76%) and goat meat (69%) in that order. Just like the high-income segment, pork and mutton is consumed by minority of the consumers in this segment as presented by 24% and 17% of the consumers in this segment. In the low-income category, majority of the households consume beef (84%) followed by chicken (82%) then fish (79%) and goat meat (70%). As with other segments, results show that pork and mutton is consumed by minority of the consumers as cited by 25% and 22% of the consumers in this segment respectively.

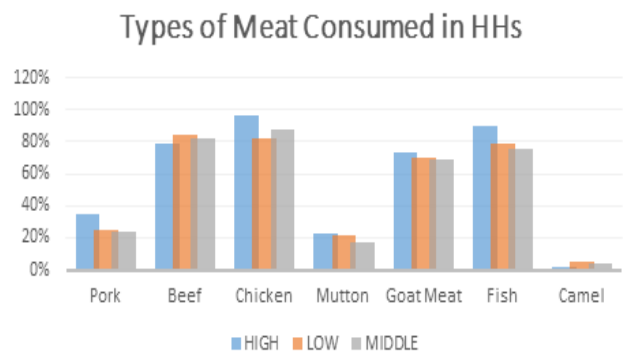


When comparing the three income segments for different meat types, the following patterns are observed (fig 1):

1. Majority of consumers of chicken are from high income (96%), followed by middle income (88%) while 82% of household in the low income segment do consume chicken.
2. The low-income segment has the majority consumers of beef (84%), followed by medium income segment (82%) while the high-end income segment has relatively lower proportion (79%) of consumers in the 3 segments.
3. The highest consumers of fish are found in the high-income segment (90%), followed by low income segment (79%) and lastly middle-income segments. The relatively higher proportion of consumers who eat fish in the lower income segment compared to those consuming in the middle income is explained by the low cost of certain fish types fish like Omena consumed in the low-income segments. According to the FGD, in Kibera, Nairobi, the Omena fish worth KES 30 can be served to a family of 4 while in Kaloleni, Kilifi, a small marine fish, sold at KES 20 can be served 8 persons when added salt and soup.
4. Pork and mutton are the least consumed meat types in the three consumer segments.
5. Based on the proportion of households that consume different meat types in the three segments and using the 2009 KNBS census data, the market potential for meat is estimated at 977,205 MT with high income presenting a potential of 53,967 (5%) MT while the medium and low income segment presents a potential of 416,495 (43%) and 506,743

MT (42%) respectively. This potential is an indication that the middle which is rapidly growing in the country has the greatest potential for red meat consumption in the country, and should therefore be most influenced by the traders and processors.

Fig 1: Type of meat consumed by households

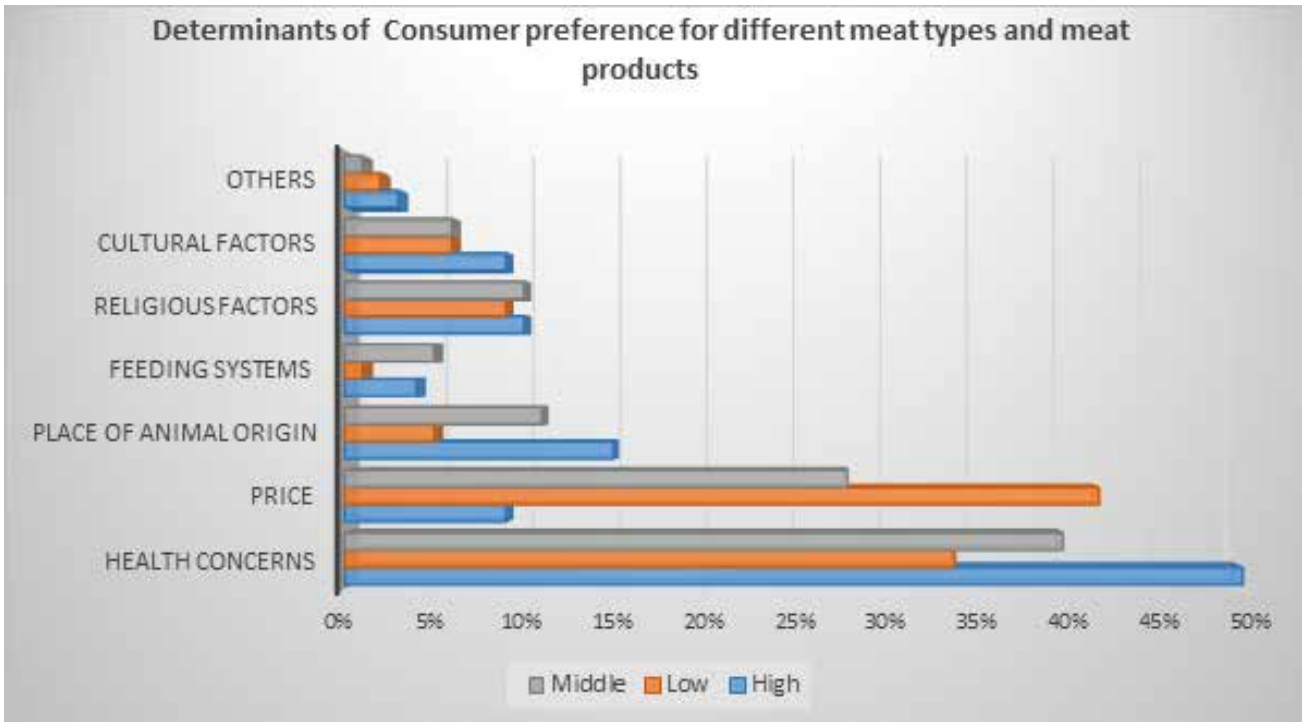


4.2.2 Factors that Determine Preference for Different Types of Meat and Meat Products:

Health concern is an important factor that influences the type of meat consumed by majority of consumers in the high and middle-income segments, as cited by 50% and 40% of consumers respectively. From FGDs, health concerns include drug residues, fear of lifestyle diseases, products not handled in hygiene ways as well as fear of consuming meat from game animals, uninspected stolen animals and dead carcasses. Price was considered important factor by majority of the households (42%) in the low-income segment. Results shows that at least 28% of the consumers in the middle-income segment also consider price when choosing the type of meat to consume. These results are in agreement with findings by Liang et al., (2014) who reported that price and incomes are key factors affecting meat consumption.



Fig 2: Factors that determine preference for different meat types and meat products



4.2.3 Reasons for not Consuming Different Meat types

Households that do not consume different meat types had various reasons which varied with income segments and the type of meat. The main reasons given for not consuming pork in the high-income segment were inaccessibility (35%), religious reasons (35%) and health concerns (23%). In the medium income segments, those who do not consume pork cited inaccessibility (28%), religious reasons (34%) and health reasons to a small extent (12%). For low income segments, pork is, largely not consumed for religious reasons (34%) and health concerns to a small extent (14%). Some consumers in the low income segment indicated that while at times they would like to eat pork, they are restricted by their Muslim landlords.

The main reason for not consuming beef in all the market segments, (though by a proportion of less than 21% in each segments) is mainly health concerns as cited by 50% of all responses in the high income, 39% in the low income and 41% in the medium income segments. The same trend was observed in all the other red meats. Those who do not consume mutton, in addition

to health concerns, cited that the meat type being not accessible as expressed by 39% of respondents in high and low-income segments and 42% of respondents from medium income segments. Affordability was found to limit consumption of goat meats in the low and medium-income segments as cited by 30% and 20% of the respondents respectively.

Majority of the households in the three segments cited affordability as the main reason for not consuming chicken, as shown by 50% of household in the high-income segments, 65% in the low income and 49% in the medium income households. Majority of the high-income segment cited accessibility being a reason for not consuming chicken. This could be explained by the demand for indigenous free-range chicken which are in high demand driven by health concerns over broilers. These are mainly sold in the live bird markets and estate kiosks mainly in the areas where the middle-income households reside, making them inaccessible to high-income earners who mainly shop in malls and high-end butcheries. There is need for meat traders to find ways of reaching the high-income earners with free range indigenous chicken.



Table 11: Reasons why some households do not consume some meat types

Type of meat	Segment	Not affordable	Not accessible	Religious reasons	Lack of preparation knowledge	Health concerns	Difficult to prepare	Lack of preferred cuts	Culture	Others
Pork	High	0%	35%	32%	0%	23%	0%	0%	0%	10%
	Low	5%	16%	34%	1%	14%	0%	0%	9%	22%
	Middle	7%	28%	31%	0%	12%	0%	1%	5%	16%
Beef	High	0%	10%	0%	10%	50%	0%	0%	0%	30%
	Low	11%	11%	0%	0%	39%	3%	0%	0%	36%
	Middle	4%	6%	0%	4%	41%	6%	0%	2%	39%
Chicken	High	50%	50%	0%	0%	0%	0%	0%	0%	0%
	Low	65%	6%	1%	0%	13%	1%	0%	0%	14%
	Middle	49%	11%	3%	0%	11%	3%	0%	3%	22%
Mutton	High	0%	39%	3%	0%	33%	0%	0%	8%	17%
	Low	12%	39%	3%	1%	22%	1%	0%	6%	16%
	Middle	5%	42%	3%	1%	20%	0%	1%	7%	20%
Goat meat	High	7%	29%	0%	0%	43%	0%	0%	0%	21%
	Low	30%	17%	2%	1%	23%	1%	1%	3%	23%
	Middle	20%	20%	2%	1%	29%	0%	2%	3%	24%

4.3 ATTRIBUTES THAT CONSUMERS USE TO DEFINE QUALITY OF MEAT

The main attributes that consumers use to define quality meat in the three segments include leanness/absence of fat, freshness (meat slaughtered the same day) and taste. Results show that only minority of consumers (less than 10 %) consider factors like special cuts, boneless meat and chilling/freezing. Each of these three factors have been discussed in details below.

4.3.1 Leanness/absence of fat:

This is the most considered attribute when selecting meat by all the three market segments. In the high-income segment, on average, this attribute is considered by 60.5% of the respondents when buying all the red meat types, but differs with meat type. It was established that leanness/absence of fat is preferred by 76.9% of high-income consumers when buying mutton, 61.1% when buying beef, 48.4% when buying goat meat and 55.6% when buying pork. In addition, leanness is preferred by 12.8% of high-income segment when buying chicken but not a factor when buying fish.

In the middle-income segment, leanness is considered by 42.7% when buying all the red

meat types with differences in proportions as far as each meat type is concerned. It was established that 44.7% prefer lean meat when buying pork, 48.1% when buying mutton, 61.1% when buying beef and 48.4% when buying goat meat. Leanness was not a factor determining the preference for chicken and fish among the middle-income segment.

On average, 43.2% of the consumers in the low-income segment prefer lean meat when buying all the red meat types. Specifically, 43.3% prefer lean meat when buying pork, 51.4% when buying mutton, 43.5% when buying beef and 34.3% when buying goat meat. At least 13% of low-income segments consider absence of fat when buying chicken, which was found not to be a factor when buying fish.

Majority of consumers rated fat marbling as a very important factor which they consider when buying meat as cited by 75% of consumers in the high income, 74.4% on the middle income and 68.2% in the low income segments. It was revealed during the FGDs that preference of lean meat by consumers in the three categories is mainly attributed to increased association of consumption of meat with fat to cardiovascular diseases among consumers. This as the data shows is more pronounced in the high-income segments and least important in the low-income segment.



Interviews with retailers show that the issue of leanness is determined by the utilization of meat. For instance meat for nyama choma is usually fatty while lean meat is preferred for fry, take home or boil. Ironically butchers reported that heavy animals, which yield more fatty meat are fast moving in the markets at the slaughterhouses. This implies that the market that is strict on lean market is small, dominated by the high income segment and that nyama choma market which prefer fatty meat is also taking a substantial amount of meat. Placing importance on both leanness of meat and fat marbling shows that there is need for development of differentiated meat products, based on fat distribution, in order to address specific consumer needs.

4.3.2 Fresh meat (slaughtered the same day):

On average 16.7% of households in the high-income segment prefer meat that is slaughtered the same day; specifically, 16.7% prefer freshly slaughtered pork, 13.9% consider freshly slaughtered beef and 19.4% prefer freshly slaughter goat meat. In addition, consumers in this segment prefer fresh chicken and fish as shown by 25.6% and 18.4% of consumers who cited freshness as an important consideration when buying chicken and fish respectively. On average, 21.95% of all respondents in the middle-income segment prefer fresh meat when buying all the 4 types of red meat types. Specifically, fresh meat is preferred by 19.7% of consumers in this segment when buying pork, 17.3% when buying mutton, 21.8% when buying beef, and 29% when buying goat meat.

In this segment, freshness is preferred by 35.4% and 40% of consumers of this category when buying chicken and fish respectively. At least 30.1% of consumers in the low income segment prefer fresh beef while 26% have a preference for fresh goat meat.

4.3.3 Taste:

Taste is a consideration for about 18.6% of consumers in the high-income segments when buying pork, mutton and goat meat, among the red meat category. Specifically, 16.7%, 23.1% and 16.1% consider taste when buying pork, mutton and goat meat respectively. Taste is not a factor of consideration for this segment when buying beef but is a consideration for 15.4% and 36.8% of the consumers in this category when buying chicken and fish respectively. Discussions with meat traders indicated that there is a segment of consumers that do not take goat meat and mutton due to the odours associated with the two products which isn't found in beef. This may be the reason for consumer's keenness on taste as far as these two meat types are concerned.

Only a minority of consumers in the middle- and low-income segments consider taste when buying red meat as shown by an average of only 1.6% of consumers in each of the two segments. Taste is not a consideration when buying chicken and fish in the middle-income segment, while in the low income, a small proportion of consumers do consider taste, as shown by 7% and 14.9% of consumers who consider taste when buying chicken and fish respectively.



Table 12: Attributes that consumers use to define quality meat

Meat Type	Segment	Boneless (%)	Dripping blood/ water (%)	Colour (%)	Fat marbling (%)	Chilled/Frozen (%)	Fresh/ hanged (%)	Leanness/No fat (%)	Taste (%)	Special cuts (%)	Taste (%)	Tenderness (%)
Pork	High	0	0	0	0	5.6	16.7	55.6	16.7	3.9	1.3	5.3
	Middle	6.6	0	1.3	17.1	0	19.7	44.7	0	0	0	0
	Low	3.2	0	1.6	16.9	0	18.5	43.5	0	5.6	0	5.6
Mutton	High	0	0	0	0	0	0	76.9	23.1	0	0	0
	Middle	1.9	0.9	3.8	15.4	17.3	0	48.1	0	0	0	0
	Low	1.9	0.9	0	16.8	0	19.6	51.4	0	3.7	0.9	3.7
Beef	High	2.8	2.8		5.6	0	13.9	61.1	0	2.8	0	11.1
	Middle	6.9	0.8	2.4	10.5	0.4	21.8	43.5	0	2.8	0.8	8.1
	Low	4.9	0.2	4.4	11.2	0.2	26	0	0	0	0	0
Goat Meat	High	0	0	0	6.5	0	19.4	48.4	0	0	16.1	6.5
	Middle	4.8	1	4.3	9.7	0.5	29	34.3	1.9	3.4	0	10.1
	Low	3.9	0.3	3.4	11	0.3	30.1	37.1	0	1.4	3.1	8.1
Chicken	High	0	0	0	2.6	2.6	25.6	12.8	0		15.4	23.1
	Middle	0	0	4.1	6.7	4.9	35.4	7.8	0	2.6	8.6	13.1
	Low	1.7	0	5.3	0	0.7	29.8	13	0	3.1	7	9.1
Fish	High	0	0		0	5.3	18.4	0	36.8	0	0	2.6
	Middle	0	0	8.3	0	3	40	2.6	0	1.3	14.3	2.1
	Low	0	0	7.7	0	0	48.8	4.5	0	0.2	14.9	2

IN SUMMARY

The above analysis shows there are no standard measures for meat quality used by majority of the consumers. They use subjective terms like no fat, fresh etc. to define meat quality. There exist meat grading system, which is however applied in the export markets only. For the majority of consumers, it becomes challenging to define what they really want in absence of a standard grading system. For instance they indicated that they like lean meat, yet according to retailers meat that has some significant amount of fat is fast moving and considered to be of high quality. According to the interviews with meat traders serving the middle income segment, there is a certain level of awareness of meat cuts which they have

learnt over time in the course of doing trade. Despite this knowledge, the traders go with what individual customers want, mainly fresh/hanged meat that is slaughtered same day.

These findings are in agreement with findings from other recent studies in other developing countries. For instance Li, (2012) and Zhang et al., (2014) reported that consumers are concerned about the safety of meat, but they have poor ability to differentiate meat quality. The same was echoed by Kiran et al., 2018 where majority of respondents judged freshness of meat based on its color (71.5%), which was primary factor consumer look in meat (Kiran et al., 2011). A study by Li, 2012 also established that most consumers can only judge meat safety from colour and appearance of freshness.



Going forward, there is need for meat retailers to be trained on meat quality and standards, how to make special cuts and pricing of the same, so that they can improve the product offering to the consumers. Likewise, consumers need to be sensitized on quality versus value for their money and safety. The myths around fresh meat being the safest need to be mystified through a well-planned consumer education program. There is need for traders to adopt standard grading systems from the Kenya Meat Commission to remove the ambiguity in defining meat quality.

4.3.4 Challenges Experienced in Accessing Quality Meat by Consumers

Based on their definitions of quality, the challenges that consumers face in accessing meat of good quality are presented on table 13. These challenges are based on their definition of quality as presented in section 4.2 above.

Among the challenges cited, the most important challenges experienced by the high income consumers is the fluctuation of meat quality (38%) and lack of diversified products. Among the middle income segment, fluctuation in quality (34%), meat that is not always fresh (18%) and lack of diversified products were cited as important challenges. In the low income segment, meat not being fresh always (26%) fluctuation in quality of meat available and good quality meat being unaffordable (22%) were ranked as important challenges in accessing quality meat. This segment also cited price fluctuations as factors affecting access to quality meat.

Chi square test was run to determine if there was an association between affordability of quality meat and the income level. A significant relation was found, $X^2(2, N = 345) = 8.10, P = 0.017$ showing that affordability indeed limits access to quality meat by low income consumers.

The relationship between the challenge of fluctuation of meat quality and income level of consumer was significant $X^2(2, N = 345) = 29.22, P < 0.05$. The high income consumers

(71.4%) are more likely to face the challenge of quality of meat fluctuation as well as the middle income consumers (63.9%) compared to the low income consumers (35.6%). The association between Income level of the consumers and meat price fluctuation was significant $X^2(2, N = 345) = 7.27, p = 0.026$. Low income consumers are more likely to face a challenge of fluctuation of price of meat (28.3%) while the middle income consumers (15.1%) and High income consumers (23.8%) are less likely to face the challenge.

A chi square test performed to test the relationship between the challenge of accessing fresh meat and the income level of the consumer was insignificant $X^2(2, N = 345) = 5.64, p = 0.060 > 0.05$. Consumers from the three income groups are likely to have the same chance of getting the challenge of accessing fresh meat with the low income consumers more likely to lack fresh meat supply (41.5%). A chi square test performed to examine the association between the challenge of accessing frozen meat and the income level of the consumer was also insignificant $X^2(2, N = 345) = 0.937, p = 0.626 > 0.05$. Consumers from the three income groups are likely to have the same chance of getting the challenge of accessing frozen (refrigerated) meat or face no challenge at all with only 4.8% (high), 2.4% (Middle) and 4.2% (Low) face the challenge of getting supply of frozen (refrigerated) meat.

The relationship between Income level of the consumers and supply of religious compliant products challenge was insignificant $X^2(2, N = 345) = 1.46, p = 0.483$. This also implies that consumers from the three income groups have the same chance of accessing religious compliant products. A small percentage of the consumers face a challenge in accessing the religious compliant products, 9.5% (High), 3.9% (Low) and 4.2% (middle).

The association between lack of diversified meat products and the income level was significant $X^2(2, N = 345) = 27.84, p < 0.05$. The low income earners are less likely to lack the diversified meat products (9.8%) compared to the high and medium income segments (38.1%)

**Table 13: Challenges experienced in accessing the quality of meat preferred**

Challenges Experienced	High	Middle	Low
Good quality meat is not affordable	8%	12%	22%
The quality of meat available keep fluctuating	38%	34%	23%
Meat is not always fresh	13%	18%	26%
Lack of supply of frozen meat	3%	2%	2%
Limited supply of religious compliant products	5%	2%	2%
Price fluctuations	13%	8%	18%
Lack of diversified products	23%	17%	6%
Packaging size not affordable	0%	5%	1%
Others	0%	1%	0%

4.4 FREQUENCY OF CONSUMPTION OF DIFFERENT MEAT TYPES

After determining whether different types of meat are consumed in different market segments and what proportion of households are consuming each type, the study went ahead to determine the frequency of consumption of these meat types in different market segments. While figure 1 above shows that beef is the third most consumed meat type after fish and chicken, results on the frequency of consumption shows that beef is the most frequently consumed meat type compared to fish and chicken. At least 47.2% of the households in the high-income segments consume beef once a week and another 33.3% do consume beef at least 3-4 days a week. Results show that 48.8% of the households in the high-income segment are consuming chicken once a week, 19.5% consumes 3-4 days a week, 24.4% consumes chicken once in 2 weeks, 19% and another 12.8% are consuming chicken once in a month. On the other hand, 17.9% of the households in this category are consuming fish 3-4 times a week, 56.9% consume once a week, 7.7% once in 2 weeks and 12.8% once in a month.

In the middle-income segment, 36.6% consumes beef once a week, 31.9% do consume at least 3-4 days a week and another 12%

consumes beef at least once in 2 weeks. On the other hand, 28.8% are consuming chicken at least once a week. 21.8% at least once in 2 weeks and 33.9% are consuming at least once in a month. At least 24.2% of households in the medium income segment are consuming fish at least 3-4 days a week, 31.6% are consuming at least once a week, 15.6 once in two weeks and 17.3 at least once in a month.

For low income segment, 41.2% are consuming beef once a week, 20.4% are consuming at least 3-4 days a week, 12.9% once in two weeks and 14.1% at least once a month. Only 11.7% consume chicken once a week while 13.4% once in 2 weeks, 37.8% are consuming once a month while 8.4% consume chicken during festive chicken only. 26.7% are consuming fish once a week, 26.5% are consuming 3-4 times a week, 19.3% cited once per week and 141% are consuming once in 2 weeks. Fig 3 summarizes these findings.

A correlation analysis revealed that there was no significant linear relationship between income level of the consumer and the frequency of consumption of Pork, $r(215) = 0.102$, $p = 0.133$, Mutton, $r(171) = 0.019$, $p = 0.803$, Fish, $r(672) = 0.041$, $p = 0.287$ and Camel meat, $r(34) = 0.312$, $p = 0.064$. The analysis however revealed correlation between Income level of consumers and frequency of consumption of Beef, $r(712) = 0.128$, $p = 0.001$, Chicken, $r(728) = 0.375$, $p < 0.05$ and Goat meat, r



(593) = 0.118, $p = 0.004$. Although the high income and middle income segments, shows a tendency to buy meat more frequently, their impact on meat retail is however low because of their low numbers (4%) compared to the low income segments (60%).

There is an insignificant linear relationship between frequency of meat consumption and the age of the household head. Further, there was an insignificant linear relationships between Size of the household and the frequency of meat consumption of the different meat types.

Fig 3: Frequency of consumption of different red meat types

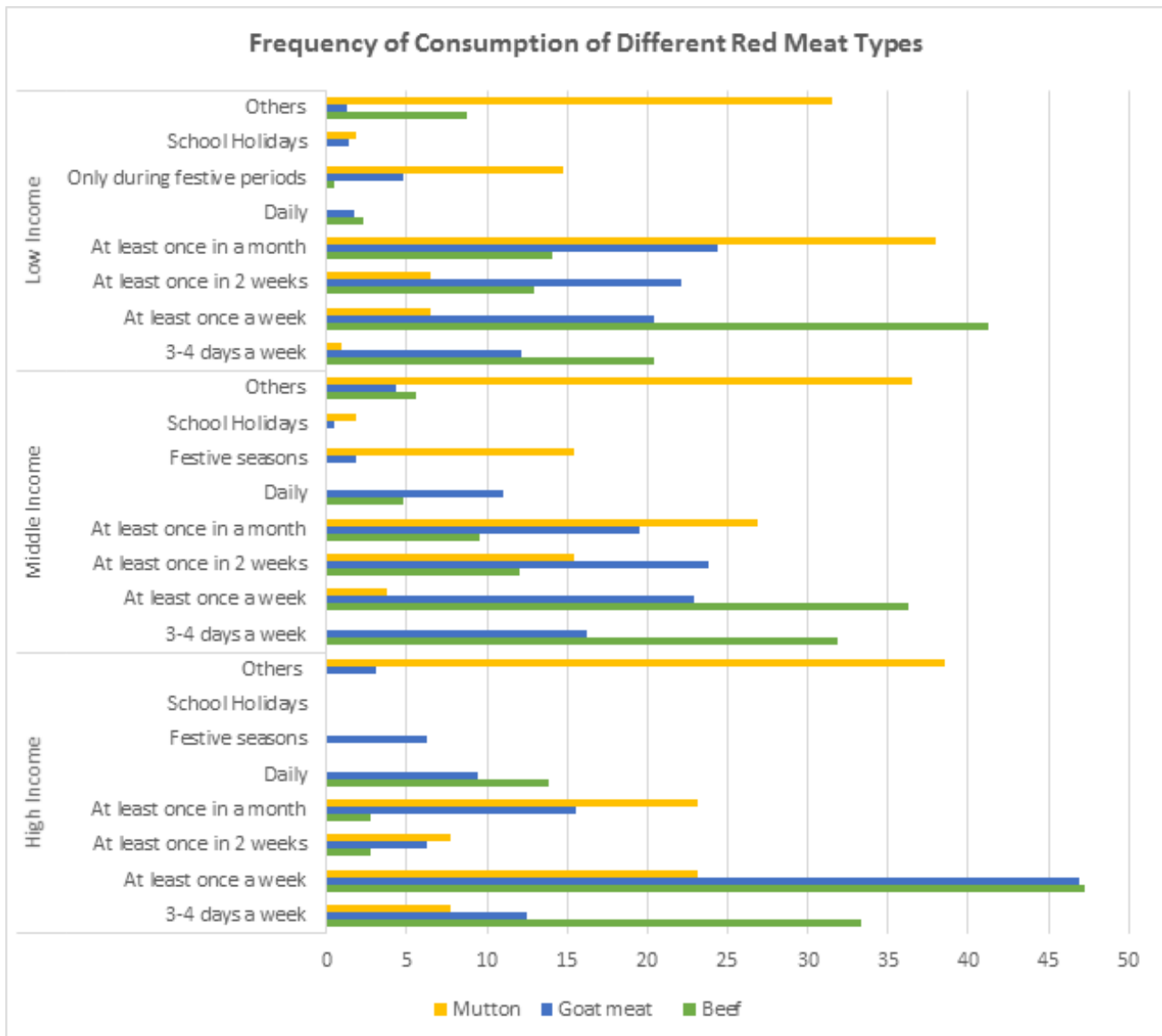




Table 14: Correlation analysis between income levels and frequency of consumption

		Frequency of consumption of Pork	Frequency of consumption of Beef	Frequency of consumption of Chicken	Frequency of consumption of Mutton	Frequency of consumption of Goat meat	Frequency of consumption of Fish	Frequency of consumption of Camel
Spearman's rho	Correlation Coefficient	0.102	0.128	0.375	0.019	0.118	0.041	0.312
	Sig. (2-tailed)	0.133	0.001	0.00	0.803	0.004	0.287	0.064
	N	217	714	730	173	595	674	36

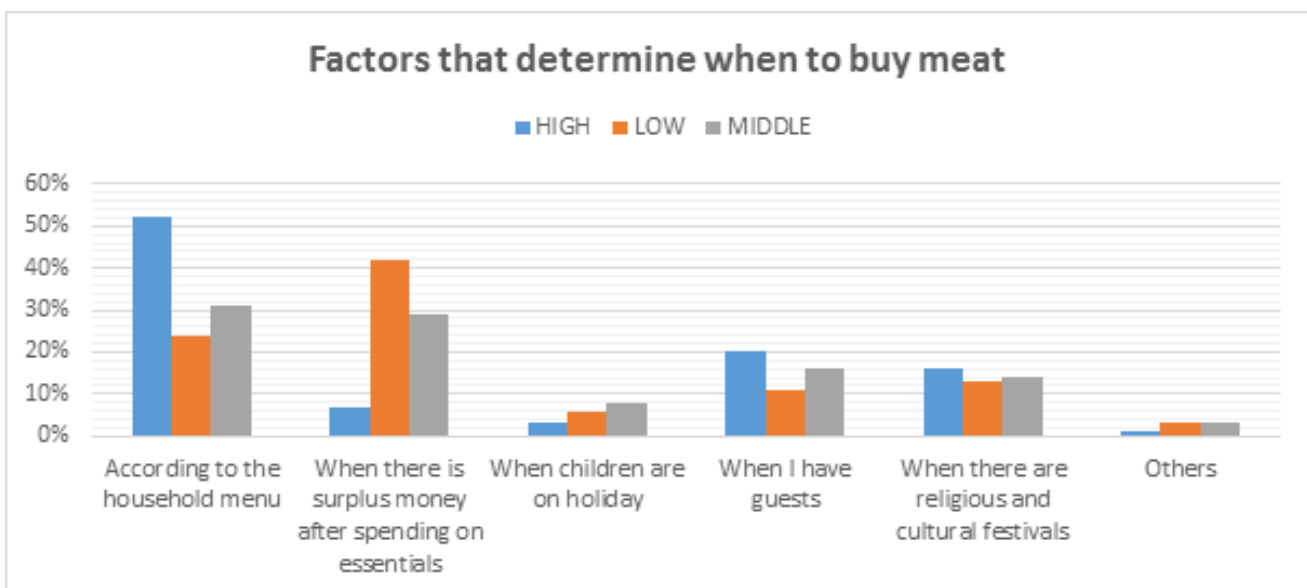
4.4.1 Factors that determine when to buy meat

Majority of the households in the high- and middle-income segments are guided by household menu in deciding when to buy meat as cited by 52% of households in the high income and 31% (middle income). In the low-income households, majority of the households buy meat when there is surplus money after spending on essentials as cited by 42% of the households in this segment. Results also show that 24% of households in the middle income are guided by menu while 28% in the middle income buy meat when there is surplus money

after spending on essentials.

When there are religious and cultural festivals or households have guests, the high income buys more meat, followed by middle and low. However, when children are on holiday, the middle income buys more meat more followed by low and high income segments respectively. The low expenditure for high income when compared to low and middle income when children are on holiday could perhaps be an indication that majority of children in high income attend day schools which means there isn't much change in consumption patterns in the household. Fig 4 below summarizes these findings.

Fig 4: Factors that determine when to buy meat





4.5 PER CAPITA MEAT CONSUMPTION

The average amount of meat consumed in each of the consumer categories is presented in table 15. The total amount of meat consumed per week per household in the high income category is estimated at 1.67Kg which amounts to 86.84 kg per year. Assuming an average household size of 5, this translates to a per capita consumption of 17.37 kg per capita per year for all meat types, excluding camel meat. The total amount of red meat consumed (beef, goats and mutton) is 1.75kg, which translates to 91 kg per household per year and 18.2 kg per capita per year.

Per capita consumption of red meat (Cattle, goat and mutton) is estimated at 18.20 kg per capita per year. The increase from 17.36 kg for all meat types is attributed to the lower means for pork which were used in the calculation of total for all meat types tended to bring down the average for all meat types while beef and goats had relatively higher means.

The weekly meat consumption in the middle income segment is estimated at 1.41 kg which translates to 73.3 kg per year. Assuming an average household size of 5, the per capita consumption is therefore estimated at 14.66 per capita per year. The total amount of red meat consumed (beef, goats and mutton) is 1.58kg, which translates to 82.16 kg per household per year and 16.43 kg per capita per year.

The weekly consumption of meat in the low-income segment is estimated at 1.26kg which translates to 65.52 kg per year and 13.2 kg per capita per year. Consumption of red meat (beef, goats and mutton) is estimated at 1.06 kg per week and 53.04 kg per year, which translates

to 10.61 kg per capita per year. These results show that there is an increase of 7% from 9.9 kg per year reported by IDev in 2014 for low income segment.

Per capita consumption of red meat (Cattle, goat and mutton) in the middle- and high-income segments was higher than the per capita for all meats combined. This is because the lower means for pork which were used in the calculation of total for all meat types tended to bring down the average for all meat types while beef and goats had relatively higher means. On the other hand, chicken, fish and pork, had a relatively higher means than goat and mutton, thus raising the mean for total meat types. Taking the average of the 3 market segments, the per capita meat consumption for red meat for the three segment is estimated at 15.08kg per capita per year.

Average weekly meat consumption in Nairobi for red meat was found to be 1.67kg; this translated to an average annual consumption of 86.84kg per household per year and a per capita consumption of 17.37kg per capita per year. Mombasa on the other hand has a total weekly consumption of 1.5kg per household per week, which translates to 78kg per household per year and 15.60kg per capita per year.

Using the per capita consumption of red meat and the 2009 census data, the total red meat (beef, mutton and goat meat) consumption is estimated at 648,252 MT. Out of this high income segment consumes 5% of total meat consumption estimated at 32,760 MT. Middle income consumes 27% of the total meat consumed estimated at 171,882 MT. The low-income segment is the highest consumer, talking approximately 68% of the total meat consumed, which is estimated at 443,610 MT.



Table 15: Average weekly meat consumption per income segments

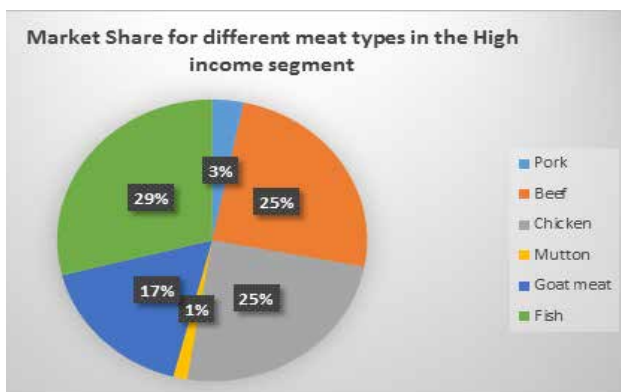
Segment	Statistic	Pork	Beef	Chicken	Mutton	Goat meat	Fish	Total week	Total Beef, goat, mutton
HIGH INCOME	N	8	27	35	4	24	36		
	Mean	0.91	2.05	1.57	0.81	1.58	1.80	1.67	1.75
	Minimum	.25	1.00	0.50	0.25	0.50	0.25		
	Maximum	2.00	5.00	4.00	2.00	4.00	5.00		
MIDDLE INCOME	N	20	99	114	6	100	136		
	Mean	0.99	1.67	1.19	0.58	1.55	1.37	1.41	1.58
	Minimum	0.25	1.00	0.25	0.25	0.25	.025		
	Maximum	2.00	4.00	5.00	1.00	7.00	6.00		
LOW INCOME	N	36	103	88	7	135	220		
	Mean	0.75	1.34	0.97	0.79	0.79	1.73	1.26	1.02
	Minimum	0.25	1.00	0.25	0.50	0.20	0.20		
	Maximum	3.00	3.00	4.00	2.00	5.00	12.00		

4.5.1 Market Share of Different meat each of the Consumer Segment

1) High income segment

The biggest proportion of meat consumed in the high-income segment is fish (29%), followed by beef and chicken each with a share of 25% with goat meat coming third. When taken in combination, goat meat, mutton and beef take 43% of the total meat consumed in the high-income segment, followed by fish, at 29%.

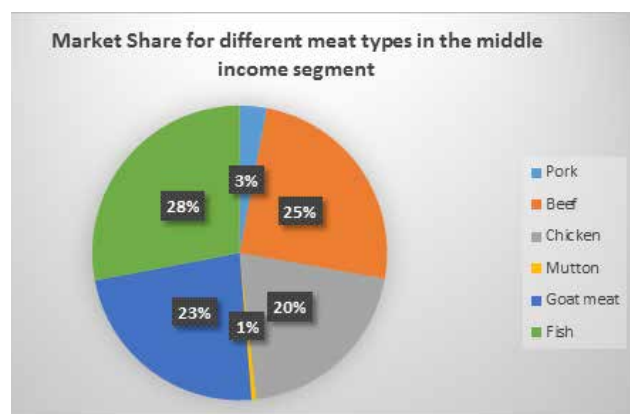
Fig 5: Market share for different meat types in the high income segment



2) Middle income segment

The share of different meat types takes a similar pattern as the high-income segment, with a slight increase in the share of goat meat. Red meat takes the largest share when beef, goat meat and mutton are put together, amounting to 49% of the total meat consumed in this segment. This is followed closely by fish which take 28% of the total meat consumed.

Fig 6: Market share for different meat types in the middle-income segment

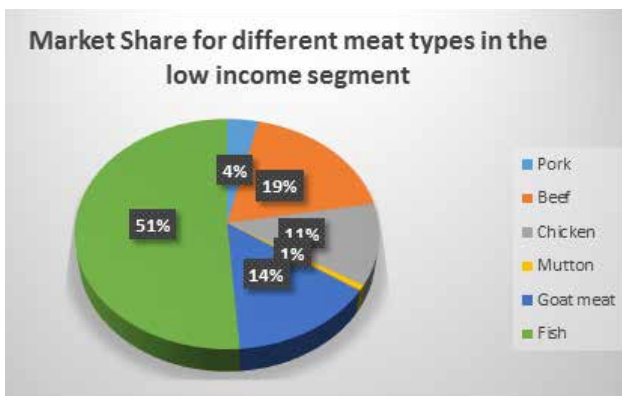




3) Low Income Segment

Fish takes the largest share of meat consumed in low income segments, which is estimated at 51% of the total meat consumed. This is followed by beef, with a total share of 19%. Putting together beef, goat meat and mutton constitute 34% of the total meat consumed in the low-income segment, coming second after fish. As indicated earlier, consumers in this segment prefer fish because of the ability to buy cheap portions that can be stretched to feed more people than the smallest units of meat. Key informants interviews with this consumer category indicated that they eat meat once or twice a week, when the household head comes back home. This indicates that with the current economic realities, red meat may be getting out of reach for many low-income households in the country.

Fig 7: Market share for different types of meat in the middle income segment



At least 97% of consumers in the high-income segments, 88.3% in the middle and 73.6% of the low-income segment reported that the amount of red meat and meat products currently consumed to be enough for their households. Reasons given by the small percentage that is not getting sufficient red meat in the low-income segment is affordability as cited by 78% in low and 62% in the low- and middle-income segments respectively. All the consumers in the high-income segment that reported not to be consuming enough red meat for their households attributed to inaccessibility of value-added products, which was also cited by 13% of consumers in the middle-income segments.

4.4.2 Factors that determine the quantities of meat consumed

In the low-income segment, majority of the households consider the amount of money available when making decision on the quantity of meat to buy. In the high-end segment, majority of the households are guided by the number of people to take the meal, when deciding the quantity of meat bought in the household. In the middle-income segment, majority of households (37%) are guided by amount of money available and the number of people to take the meal (37%). Similarly, in the low-income segment, majority are guided by the available money (49%) and the number of people to take the meals (31%). Figure 4 summarizes these findings.

A significantly weak linear relationship was detected in the amount of meat consumed and the total number of members in a household ($r = 0.146$, $p < 0.05$). The overall model fit was 0.021 ($R^2 = 0.021$), this suggests that only 2.1% of the amount of meat consumed was influenced by the number of members in the household, 98.9% of the meat consumed is influenced by other factors. Therefore, Amount of meat consumed in a week could be predicted by the formula;

$$\text{Total Amount of all meat Consumed in a week} = (2.53 * \text{Members in HH}) + 1.391$$

On the other hand, there was a moderate significant linear relationship between the amount of meat consumed and monthly household expenditure of a household ($r = 0.42$, $p < 0.05$). The overall model fit was 0.177 ($R^2 = 0.177$), this suggests that 17% of the amount of meat consumed was influenced by the amount of household income, 83% of the meat consumed is influenced by other factors. Therefore amount of meat consumed in a week per household could be predicted by the formula as determined by a regression of total meat consumed per week against total monthly expenditure;

$$\text{Total Amount of all meat Consumed in a week} = (0.00003020 * \text{Monthly Expenditure}) + 1.326$$

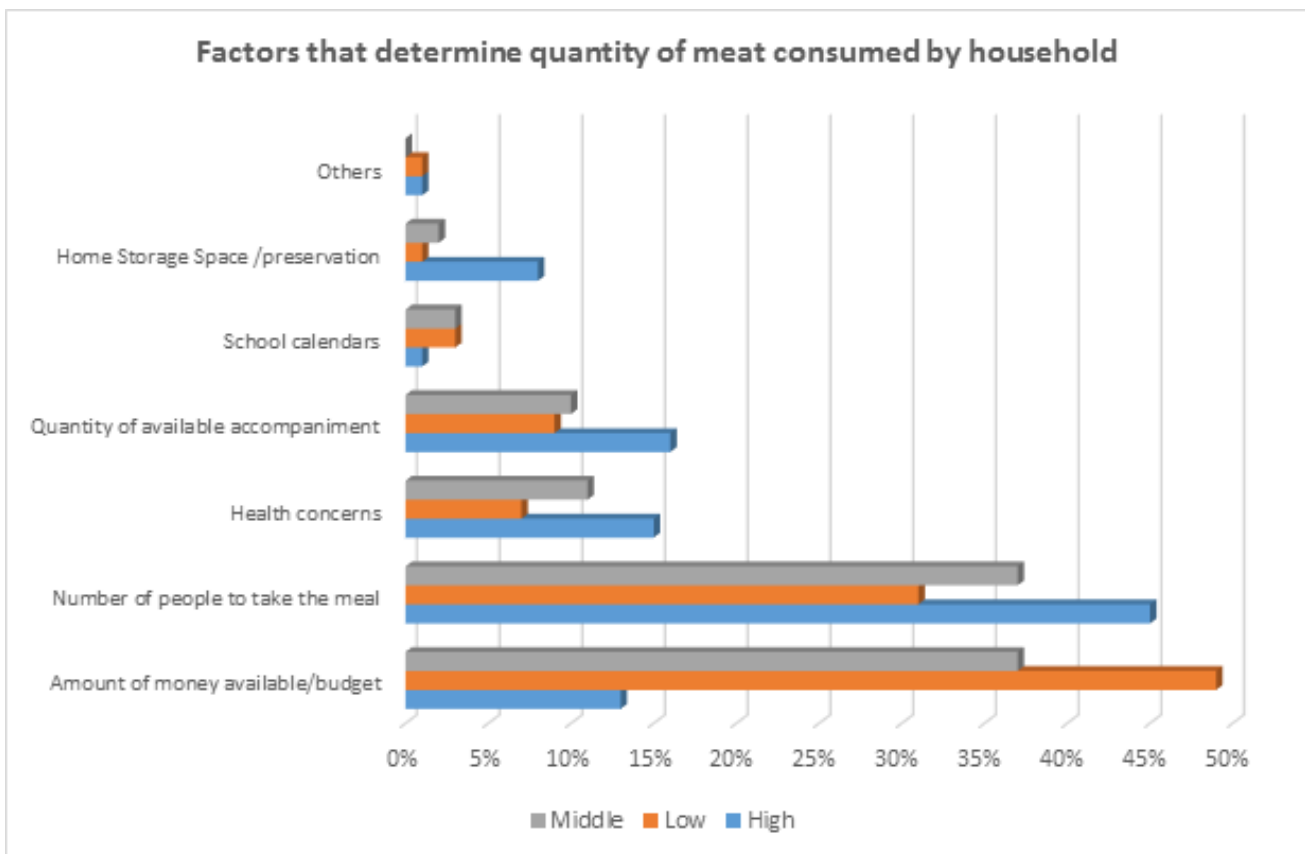


This correlation between the income and the quantity of meat consumed by the middle- and low-income segments was echoed by the retailers. Retailers reported that they are not able to pass any extra cost to the consumers when for some reasons they happen to buy meat at higher prices. This is because consumers will opt not to buy at the increased price. Retailers are forced to sell even at a loss, given that the product is also perishable. This also shows that consumers have options for substitution when money is not available for buying meat. One of the technologies that has enabled the market to beat this is availability of the digital machines, which enables consumers to buy meat for whatever amount of money they have, which can be as low as KES 20; thus, retaining the customers.

An analysis to test the relationship between age of the HH head and the amount of meat consumption revealed that there was no significant linear relationship ($\rho = 0.031$, $p = 0.746$, $N = 112$). The analysis of variance also reveals that there is no significant difference in the amount of meat consumed in the different family age groups of the HH, $F(3, 108) = 0.423$, $P = 0.737$.

There were no statistically significant differences between the means on meat consumed in the seven locations as determined by ANOVA ($F(6, 105) = 0.954$, $p = 0.460$). Makueni had the highest mean consumption of meat ($M = 1.78$) while Kakamega had the lowest consumption ($M = 1.20$).

Fig 4: Factors that determine the quantity of meat consumed by household





4.6 Seasonality in Demand

a) From the consumers perspective

Results show that majority of the households in the three income segments have no regular pattern as far as the amount of meat they consume is concerned, as cited by 56% of the households in the high-income segment, 41% in the low-income segment and 43% in the middle-income segment. Never the less, December appears to be the month when majority of households have high consumption of meat as shown by 23% of households in the high-income segments, 28% in the low-income segments and 25% in the middle-income segments. Very small proportions of 8-12% across the three segments cited the months of August and April as high meat demand seasons. The reasons for increased demands during these months was mainly associated with religious festivities during the said months, as shown by 50% of households in the high-income segment, 60% in the low income and 62% in the middle-income segments. The same periods were said to coincide with school holidays, as shown by 36%, 31% and 34% of households in the high, low and medium households respectively.

There was no regular pattern for months considered to be low demand season, as cited by 66%, 48% and 58% of households in

the high, low- and middle-income segments respectively. January however was cited as the month of lowest demand by 10%, 20% and 13% of households in the high, low- and middle-income segments respectively. This period coincides with school opening as reported by 75%, 48% and 44% of the respondents in the high, low- and middle-income segments respectively. The respondents also indicated there is no money to spend on meat during this period, as reported by 25%, 49% and 47% of the household in the high, low and medium income respectively. The lack of money during this month is attributed to heavy spending during the December festive season.

b) Seasonality from Retailers' Perspective

Trade in different meat types is conducted daily as was indicated by more than 85.2% traders. The fact that majority of consumers purchase meat 3-4 times a week means that they go shopping on different days in a week, this necessitating consumers to have adequate stock on a daily basis. More sales are however made over the weekends, according to the retailers, for two reasons; one because family members are at home over the weekend and secondly majority of *nyama choma* eaters patronize their preferred joints over the weekend.

Table 16: Frequency of selling meat

Frequency of selling	Pork (%)	Beef (%)	Chicken (%)	Mutton (%)	Goat meat (%)	Fish (%)
Daily	85.2	97.1	89.9	86.2	91.8	92.0
3-4 days a week	11.1	1.8	10.1	10.3	8.2	8.0
At least once a week	3.7	1.2	10.1	3.4		
Total	100.0	100.0		100.0	100.0	100.0

Retailers further reported that meat demand is seasonal, as it is more heavily consumed during certain holidays, school holidays as well as during certain time of month e.g. end month, meat consumption goes up. According to the traders, consumption tends to reduce as from 20th of every month and picks by the first day of the month, following the monthly pay cycles. The holidays that were reported to have increased meat consumption in Kenya

are during Christmas, Easter, Id al Adha (Islamic Festival of Sacrifice, Id al Fitr (The Festival of the Breaking of the Ramadan Fast) and Diwali. The average sale of different meat types was 177.9 units which reduced to 153.9 units (24.1 units) a reduction of 13.4% and increased to 244 units during festivity periods an increment of 43.9. Table 17 summarizes these findings.



Table 17: Changes in meat demand across different holiday and festive periods

Type of Meat	Units sold During school holidays	Units sold in a week When schools are opened	During festivity periods
Pork	166.56	124.42	236.58
Beef	377.33	318.84	566.83
Chicken	81.77	68.78	134.27
Mutton	118.86	95.89	147.24
Goat meat	133.40	105.56	180.93
Fish	254.92	250.16	375.32
Camel meat	112.65	113.33	66.67
Average	177.9	153.9	244.0

4.7 PREFERRED CHANNELS FOR BUYING MEAT

Estate butcheries are the preferred outlets by majority of the households as cited by 65% in the high income, 90% in the low and 70% in the middle-income segments. The malls are more utilized by the high-income consumers usually in the supermarkets and butcheries located in the malls, as indicated by 38% and 35% of the households in this segment respectively. Figure 8 below presents these findings.

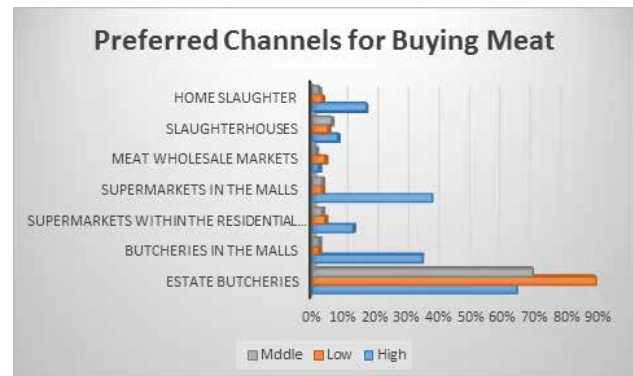
There is a significant linear correlation between the Location of the consumer and three channels (Supermarkets within residential areas $r = 0.094$, Meat wholesale markets $r = 0.102$, Home slaughter $r = 0.108$, $N = 854$, $p < 0.05$). The other channels of buying meat were not significantly correlated to the location of the consumer (Estate butcheries $r = -0.002$, Butcheries in the malls $r = 0.048$, Supermarkets in the malls $r = 0.055$, Slaughterhouses $r = 0.001$, $N = 854$, $P > 0.05$).

Income level of the meat consumer had a weak significant positive linear relationship with those who bought their meat from Supermarkets within the residential areas $r (854) = 0.122$, $P < 0.05$. The other channels of buying meat were insignificantly correlated to the income level of the consumer (Estate butcheries $r = 0.026$, Butcheries in the malls

$r = 0.016$, Supermarkets in the malls $r = -0.018$, Meat wholesale markets $r = 0.046$, Slaughterhouses $r = -0.042$, Home slaughter $r = -0.002$, $N = 854$, $P > 0.05$).

There is no significant correlation between the Consumers age and the channels of buying meat (Estate butcheries $r = -0.009$, Butcheries in the malls $r = -0.028$, Supermarkets within the Residential areas $r = -0.054$, Supermarkets in the malls $r = -0.053$, Meat wholesale markets $r = -0.036$, Slaughterhouses $r = -0.043$, Home slaughter $r = -0.004$, $N = 853$, $P > 0.05$).

Fig 8: Preferred channels for buying meat



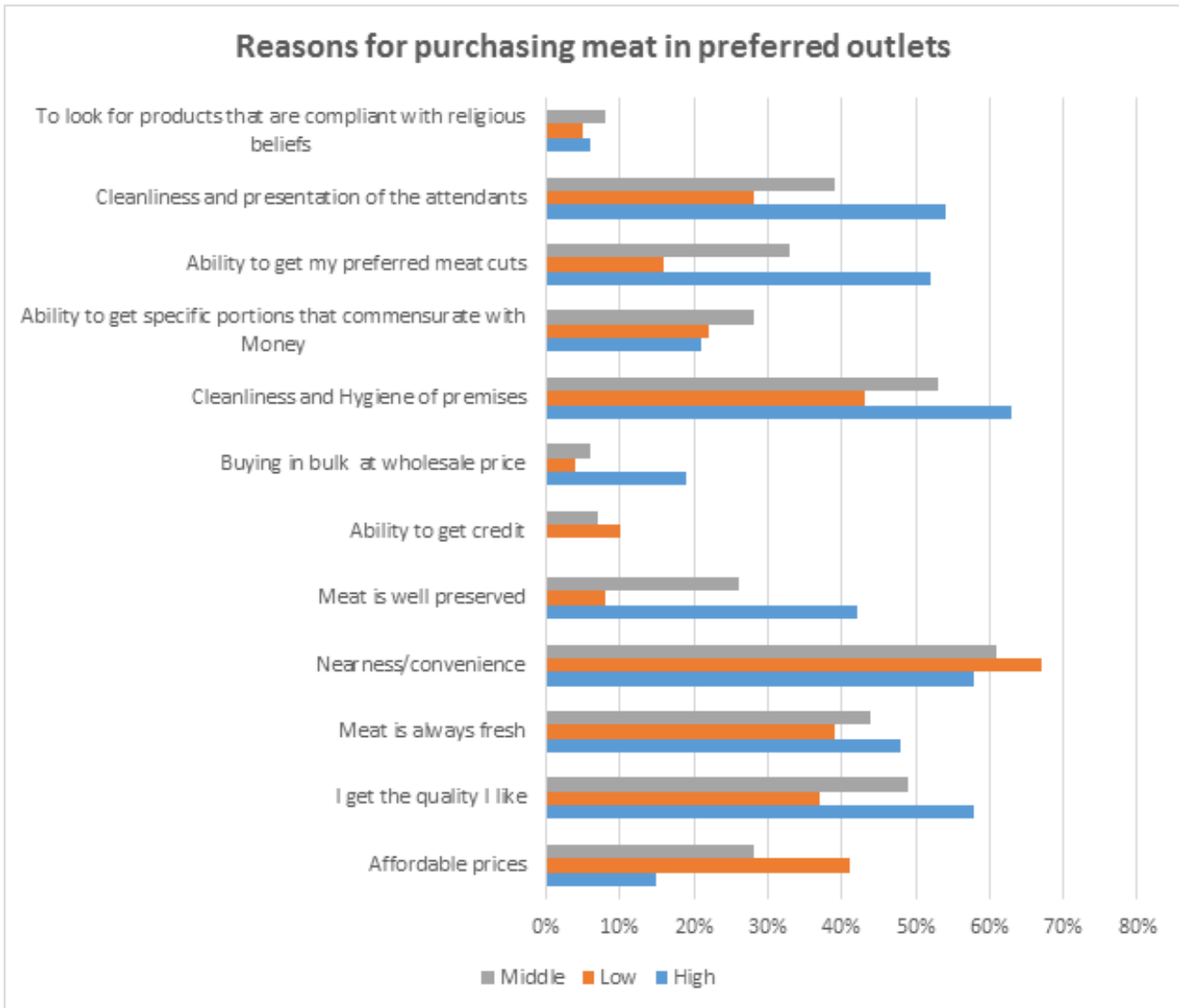
4.7.1 Reasons for purchasing meat in the preferred outlets

Reasons for buying meat in the preferred outlets were quite variable; In the high-income segments, majority of the households consider the hygiene and cleanliness of the premises (63%) followed by those who consider the nearness or convenience (58%), ability to get the desired quality (58%), cleanliness and presentation of the attendants (54%) and ability to get the desired meat cuts (52%). Consumers in the middle income on the other hand consider nearness /convenience (61%), cleanliness and hygiene of the premises (53%), freshness of the meat (44%) and ability to get the desired quality. In the low-income segment, majority consider nearness/convenience (67%), affordable prices 41%; cleanliness and hygiene of premises (43%).

These results show that convenience is an important factor across all the income segments, followed by cleanliness and hygiene of the premises. Secondly, it's the high-income segment that is keener on quality related factors.



Fig 9: Reasons for purchasing meat in preferred outlets



Factors that influence Consumers’ Choice on where to buy meat

Hygiene and cleanliness of the premises was ranked as an important factor considered when choosing where to buy meat as reported by 34% of the respondents in the high income segment. This is followed by cleanliness and good presentation of staff (26%). In the middle income segments, cleanliness and hygiene of the premises was also ranked with 26% of the responses, followed by cleanliness and good presentation of the staff. The same pattern was observed in the low income segments as can be seen in table 18 below;

Table 18: Factors that influence consumers’ choice on where to buy meat

Factors determining choice of buying point	High	Middle	Low
Price	2%	14%	21%
Having a government stamp	17%	14%	12%
Hygiene and cleanliness of the premises	34%	28%	26%
Cleanliness and good presentation of the staff	26%	21%	20%
Religious compliance	8%	6%	4%
Convenience	14%	16%	15%



4.8 DECISION MAKING ON PURCHASE OF MEAT AT HOUSEHOLD LEVEL

In high income segment, the female gender is the main decision maker (either as Household head or spouse) regarding where to buy meat, quantity of meat to buy, quality of meat and are also responsible for purchasing meat in both the female and male headed household. In medium and low-income consumer segment on the other hand, the male and female gender are the decision makers on where to buy meat, quality of meat and are also responsible for purchasing meat in almost equal proportion of households in the male and female headed households. The household heads, whether male or female are the main decision makers on the quantity of meat to be bought in the low- and medium-income segments.

Regarding preparation and cooking of meat, the household head in the female headed households (female gender) and the house managers are largely responsible for preparation and cooking of meat in the high-income consumer segment. In this case, 41.7% of households have household heads as responsible for cooking and another 41.7% still having house managers as responsible for preparation and cooking of meat. Cooking of meat is mainly the responsibility of the spouse of the household head (female gender) in the male headed households in the high-income segments (43.2%) followed by the house managers (29.7%). Cooking of meat is the responsibility of the female gender either as household heads or spouses of the household heads as well as the household managers in the high-income consumer segments

Cooking of meat is the responsibility of the spouse of the household head (44.4%), household head (31.9%) and the house manager (15.3%) in the female headed households in the

middle-income consumer segment. In the male headed households, the spouse of the household head (female gender) mainly responsible for cooking of meat as presented by 63.4% of the household in the middle-income segment followed by spouses (15%) and house managers (10%). A similar pattern was observed in the low-income segments, where the household heads are mainly responsible for cooking meat in the female headed households while spouses of household heads are mainly responsible for cooking meat in the male headed households.

In the middle and low-income segments, women are mainly responsible for cooking meat in male and female headed households either as household heads or spouses of the household heads) while house managers are playing this role in the minority of the households (15% of households and less).

In summary, in majority of the households in the three segments, the household head and spouse are the decision makers as far as choice of outlets, meat quality and quantity with household heads playing a greater role in majority in the households. On the other hand, preparation of meat, once it is bought in the three segments is mainly done by household managers and spouse of the household head (female gender in the male headed households), with the spouses (female gender) playing a greater role in the middle- and low-income segments for the female headed households. This may be based on the quality sensitiveness of the high- and middle-income segments as well as price sensitiveness of the low-income segments, when purchasing meat. Based on these observations, the spouse and the household heads should be the people to target with any efforts to influence the consumption of meat in all the income segments, including consumer education on the same.



Table 19: Decision making on purchase of meat at household level

Segment	Who is responsible/ makes decision	Decision on where to buy (%)	Decision on quantity to buy (%)	Decision on quality to buy (%)	Responsible for buying (%)	Responsible for Cooking (%)
HIGH INCOME	Daughter	2.3	2.3	2.3	4.7	2.3
	HH head	51.2	46.5	41.9	44.2	18.6
	House help/House manager	0	0	0	7.0	37.2
	Others	4.7	4.7	4.7	9.3	9.3
	Son	2.3	0	0		2.3
	Spouse	39.5	46.5	51.2	34.9	30.2
MIDDLE INCOME	Daughter	.3	.3	1.3	3.9	4.9
	HH head	57.9	52.0	46.4	41.1	19.3
	House help/House manager	.3	0	.3	3.0	11.5
	Others	6.9	6.6	5.3	11.8	5.2
	Son	1.0	.7	1.3	1.6	0
	Spouse	33.6	40.5	45.4	38.5	59.0
LOW INCOME	Daughter	2.2	1.4	2.0	4.9	6.9
	HH head	59.5	59.5	49.6	44.9	19.7
	House help/House manager	0	0	0	.4	1.2
	Others	4.7	3.9	4.1	9.6	5.3
	Son	0	0	.8	1.0	.8
	Spouse	33.7	35.2	43.5	39.2	66.1



4.9 TRENDS IN RED MEAT CONSUMPTION

Trends in the last three years

Table 20 shows the rating by consumers of red and white meat consumption trends in their households in the last 3 years. Results show that red meat consumption in the three segments has remained the same in the last three years. It was noted that at least 26.2%, 20.7% and 23. % of the households in the high, middle- and low-income segment reported that their consumption of red meat has reduced.

White meat consumption in the last 3 years has also remained the same in majority of the households as shown by 54.8%, 67.2% and 60.1% of consumers in the high, middle- and low-income segments. In the high-income segments, it is observed that the proportion that reported to have an increased trend in consumption of white meat, is relatively higher (40.5%) than those who reported increase in red meat consumption (21.4%). Similarly, the proportion of those who reported a reduction in the consumption of white meat are much lower (4.8%) for white meat compared to the proportion that has reduced red meat consumption (26.2%).

Similarly, proportion of consumers that has reported increase in white meat consumption in the last 3 years (25.9%) is higher than those who have increased consumption of red meat (17.4%); the proportion that has reduced consumption of white meat in the same segment is also much lower in this income segment compared to those who have the middle income segment, reported reduction in consumption in the same segment (20.7%)

In the low-income segment, the proportion that has increased white meat (23.1%) is also higher than those who have increased red meat (18.8%). Similarly, those who have reduced red meat (23.5%) in the same segment are more than those who have increased consumption of white meat.

Statistical analysis revealed that there was a statistically insignificant difference in amount of red meat consumed among those who said they had increased, reduced and those who did not change consumption pattern as determined

by ANOVA ($F(2,403) = 1.968, P < 0.141$). The households that increased consumption of red meat had an average of 1.58 Kilograms of meat ($SD = 1.188$), household that did not change their trend consumed an average of 1.35 Kilograms of meat ($SD = 1.0016$), the households that reduced intake of red meat consumed 1.297 Kilograms ($SD = 0.9904$).

Further, there was a statistically significant difference between households in the three trends of white meat consumption in the last three years, ANOVA ($F(2,747) = 6.031, P = 0.03$). Further comparisons reveal that there was an insignificant difference ($P = 0.065$) in amount of white meat consumed by the households that reduced their intake ($M = 1.104, SD = 0.967$) and those who did not change their pattern of consumption ($M = 1.455, SD = 1.154$). Households that increased their consumption ($M = 1.7513, SD = 1.105$) were significantly different from those that remained the same ($p = 0.012$) and those that reduced ($p = 0.002$). This implies that the significant increase can potentially have an effect on the consumption of red meat which the consumers are trying to reduce.

The correlation between the trend of consumption of red meat and age of HH head was insignificant $r(843) = 0.013, p = 0.705$. Equally there was an insignificant correlation between consumption of white meat trends and the age of the consumer, $r(846) = 0.014, p = 0.681$.

A test on the association of the trend in red meat consumption and location of the consumer revealed a significant difference, $X^2(12, N=857) = 43.784, p < 0.05$. Mombasa consumers had the smallest change in consumption with most having the same trend of consumption (71.4%). Garissa, Eldoret/Nakuru and Nairobi significantly reduced their consumption of red meat, 33.3%, 27.3% and 26.1% respectively. In Makueni county there is a significant proportion (39.3%) of the consumers who have increased their consumption of red meat.

A test on the association of the trend in white meat consumption and location of the consumer revealed a significant difference, $X^2(12, N=858) = 67.33, p < 0.05$. Mombasa consumers did largely maintain the same



trend in consumption (73.1%). Eldoret/Nakuru and Nairobi significantly reduced their consumption of white meat, 20.9% and 14.3% respectively. Makueni (57.4%), Kakamega (35.2%) and Kisumu (25%) revealed a significant increase in consumption of white meat. This reflects a pattern of comparative

advantage of the three counties as far as production of white meat is concerned, with Kisumu being the main producer of fish, while Makueni and Kakamega are main producers and culturally have a high preference for chicken.

Table 20: Trends in the consumption of red and white meat in the last 3 years

Segment	Trend in the last 3 years	Red Meat (%)	White meat (%)
High income	Increased	21.4	40.5
	Reduced	26.2	4.8
	Remained the same	52.4	54.8
Middle income	Increased	17.4	25.9
	Reduced	20.7	6.9
	Remained the same	61.8	67.2
Low income	Increased	18.8	23.1
	Reduced	23.5	16.8
	Remained the same	57.7	60.1

Reasons for observed trends in consumption of white and red meat

Table 21 below presents the reasons given by consumers for increasing white meat consumption and reducing red meat consumption. Health related concerns were rated as the most important factors behind reduced meat consumption in the high-income segment as represented by 57% of all the response. This was followed by uncertainty of the genuineness of the product (19%), quality and safety (10%) and reduction in household size (10%). In the low-income segment, those who have reduced red meat intake cited reduced incomes (41%) as the major reason, followed by health-related concerns (27%). As with the high-income segment, majority of those who have reduced consumption of red meat in the middle-income segment (46%) sited health related concerns as the major reason followed by reduced incomes (15%) and uncertainty of genuineness of the product (10%).

These findings are consistent with results from other studies. Becker et al, 2000 reported that behaviour of consumers towards food, especially meat, is characterized by changing preferences. Monson et al 2005 and Muchenje

et al., 2012 reported that consumers consider several characteristics in order to determine the acceptance of food products including sensory characteristics, nutritional value, convenience, and its impact on their health. If consumers have a negative perception of any meat product, their purchasing behaviour will be affected negatively (Troy and Kelly, 2010). Besides the price of the product, factors such as appearance, convenience, and perceived quality as well as safety (Vimiso et al, 2012 and Liana et al 2010), social, individual, economic, and cultural aspects influence decisions made in the market place. Hence, consumers are leaning towards food products that benefit their well-being. Consumers are now demanding food products that are safe and are of good quality at a reasonable price (Liana et al 2010).

KII and FGD with consumers and meat traders cited a lot of negative publicity on red meat by proponents of lifestyle changes and medical practitioners. These proponents, have associated the increased incidence of non-communicable and lifestyle diseases in Kenya like cancer, cardiovascular diseases, autoimmune conditions such as gout and arthritis to consumption of red meat. Doctors and nutritionists in hospitals have been



advising patients to reduce or completely stop consuming red meat and substitute with white meat. The results of this survey confirms that such publicity is now impacting on the consumption of red meat, negatively in favour of white meat.

Consumption of red meat dates back in the hunting and gathering, when people fully depended on meat and wild fruits. Some

communities in Kenya have been consumers of red meat as sole diet with no adverse effects on their health. While positive results are seen when patients stop or reduce red meat, consumers need to be educated on the actual factors that are contributing to health issues associated with meat eating. The whole picture showing the impacts of emotional state, food combinations and meat handling should be brought to the fore.

Table 21: Reasons for reduced consumption of red meat and increased consumption of white meat

Reasons for reduced consumption of Red meat	High	Middle	Low	Reasons for increased consumption of white meat	High	Middle	Low
Health related concerns	57%	46%	27%	Improvement in incomes	3%	17%	19%
Red meat is becoming more expensive	0%	5%	8%	Increased awareness of health benefits of white meat	47%	34%	42%
Other meat product are becoming more affordable	0%	5%	6%	The household size has been growing	19%	13%	23%
Reduced incomes	5%	15%	41%	The cost of red meat has been on the increase	0%	0%	1%
The household size has reduced	10%	4%	4%	Increased advertisement of white meat	0%	1%	2%
Dwindling supply	0%	0%	0%	Packaging and selling in small package sizes that are affordable	3%	6%	3%
Uncertainty of genuineness of the product	19%	15%	9%	Quality and safety of red meat is not assured	16%	16%	6%
Quality and safety	10%	10%	5%	No trust on genuineness of red meat	13%	14%	4%

Meat Prices

After buying meat from wholesale points, the butchers usually meet the cost of transporting meat from whole sale outlets and offloading upon arrival at the retail outlet. Meat is thereafter retailed at small units measured in Kilograms. The price of meat at the retail end depends on the location of the outlets. Table 22 presents the prices of meat for different

market segment. It was observed that in low- and middle-income segments, the consumers sometimes do not know the price of meat per unit but rather ask for meat that is equivalent to the cash that they have, thanks to the digital machines. This may increase accessibility of meat to many consumers but can be abused by retailers taking advantage of the consumer ignorance.

**Table 22: Retail price of red meat in different retail outlets in Nairobi**

Name of the Market	High Quality Beef	Low Quality Beef	High Quality Goat/Sheep	Low Quality Sheep/ Goats
City Market	450-500			
Burma Market	300-400	240-260	NA	NA
Nakumatt (different cuts)	550 -650	NA	560-600	NA
Gourmet Butchery in Yaya (different Cuts)	620 - 800	500	540-800	350
KASAP Butchery located in Nakumatt Prestige	600 -1000	500	470-800	350
Happy Butchery, Lavington (650-1000	500	500-1000	300
Tuskys	470-550	NA	500-600	NA
Naivas	420-550	NA	450-600	NA
Kenyatta Market	500	480	300	250
Butcheries in Middle class Estates	440-450	370	560	560
Butcheries in slums e.g kibera	400	300	500	500
Butcheries in Kwangware	380	280	280	200
Nyama Choma (Ngong rd)	600	NA	620	NA
Nyama Choma (Choma zone Thika rd)	560	NA	600	NA

4.10 CONSUMPTION PATTERNS FOR FIFTH QUARTER

4.10.1 Overview

Fifth quarter comprises of organs, intestines, tripe, the head and hooves. The supply of the fifth quarter components for cattle and shoats starts at the slaughterhouses with the main suppliers being meat traders who buy and slaughter live animals. After slaughter, the liver, lungs, kidneys, intestines and stomach are immediately collated ready for sale to retailers and wholesalers. In many cases traders of fifth quarter have established relationships with live animal/meat traders to ensure their orders are not diverted to other buyers due to fifth quarter high demand at the slaughterhouses. Intestines, stomach, liver kidneys, heart and lungs, commonly referred to as *Matumbo* are sold as a single unit which the retailers later partition for retail purposes. For cattle the stomach, intestines and lungs are sold as one unit at whole sale usually on weight basis; the heart, liver and kidney are sold together with the carcass. For shoats the lungs, intestines, kidney and stomach are sold as one piece at KES 400 to KES 500. Retailers thereafter partition liver, kidney, stomach and

intestines and the heart (for cattle) and sell as separate products.

Fish remains on the other hand are bought from fish fillet exporting factories for example Pêche foods fish processing factory in Kisumu and capital fish Kenya limited in Homa Bay on the shores of Lake Victoria. Likewise, chicken heads, legs and intestines are mainly found in bulk from processors like Quality Meat Packers and Ken-chick among others.

4.10.2 Proportions of Households consuming Different fifth quarter components

The proportion of households that consume different fifth quarter components are presented in table 23. Results show that intestines and stomach for cattle and shoats, gizzards, liver kidney, heads and hooves are consumed by a majority of respondents in all the three segments, while other components like chicken heads, and intestines, pork skins and fish remains are consumed by the minority. The sections that follow present an analysis of the consumption patterns for each of these components across different market segments.



Table 23: Proportion of households in different segments who consume fifth quarter;

Type of Fifth Quarter	High	Middle	Low
Intestines/Matumbo (Goat/Sheep)	19%	29%	36%
Intestines/Matumbo (Cattle)	21%	44%	50%
Gizzards	25%	29%	29%
Liver (Cattle)	54%	56%	53%
Liver (Goats, Sheep)	40%	32%	28%
Kidneys	17%	17%	21%
Chicken Heads	6%	10%	15%
Chicken legs	2%	14%	18%
Chicken Intestines	0%	6%	7%
Pork skins	0%	1%	1%
Fish remains	0%	6%	17%
Head, Hooves	4%	16%	19%
Combined (Liver/Kidney/Intestines)	8%	12%	9%

A comparison was made between the consumers of fifth quarter components in Nairobi metro, Mombasa metro and other regions (Kakamega, Kisumu, Makueni, Eldoret and Nakuru). Results show that biggest proportion of consumers of goat *Matumbo* are households in the low (43%) and medium income (36%) segments. For cattle *Matumbo*, Mombasa metro had the majority of consumers (67%) of the low income and 51% of the middle income, followed by other counties where 48% in low income and 44% of the middle income are consuming the largest proportions. For Nairobi, the cattle *Matumbo* are consumed by all the 3 income segments i.e. 33% in the high income, 44% in the low income and 35% in the middle-income segments.

Gizzard consumption was at 33%, 34% and 38% of households in the high, low- and middle-income segments respectively. In Nairobi metro, the largest consumers of the gizzards is the high income segment, which, as indicated earlier follows the chicken consumption patterns in the household.

Unlike all the other fifth quarter segment, liver for cattle is consumed by more than half of the consumers in the three consumer segments. The biggest proportion of consumers are found in the high income segment of Nairobi metro

(67%), followed by high income segment of other regions and low income segment of Mombasa metro. This is an indication that unlike other components, cattle liver is a product for all market segments. This could be attributed to the health benefits associated with liver which nutritionists prescribe as an iron booster to anaemic patients. Table 24 summarizes the consumption of other fifth quarter components per region and per income segment.

The demand for heads and hooves was observed to be very high in Nairobi and Mombasa metros. Some of the traders have supply orders which necessitates them to spend nights in the slaughter houses purchasing available units so that they can buy enough to meet the numbers needed. The price for a head of cattle and hooves (for one cow) in coast region ranged between KES 1,000 to 1,500. Likewise, the price in Nairobi was KES 1,500. Those who buy the heads and hooves uses them to make soups which is retailed at night along the drinking joints and low income settlements. A cup of soup is sold at KES 10 while head meat is sold in small portions. Discussions with traders revealed that they make about KES 5,500 per head per day.



Table 24: Comparison of proportion of HH consuming fifth quarter per region and income segments.

Type of Product	Mombasa metro			Nairobi			Others		
	High	Low	Mid- dle	High	Low	Mid- dle	High	Low	Mid- dle
Shoats Intes- tines	8%	20%	19%	17%	35%	24%	23%	43%	36%
Intestines (Cat- tle)	17%	67%	51%	33%	44%	35%	20%	48%	44%
Gizzards	0%	28%	20%	33%	22%	15%	33%	34%	38%
Liver (Cattle)	33%	59%	57%	67%	54%	52%	60%	51%	56%
Shoats Liver	25%	24%	33%	17%	22%	23%	50%	32%	36%
Kidneys	8%	31%	9%	33%	16%	11%	17%	20%	23%
Chicken Heads	0%	8%	4%	0%	14%	3%	10%	18%	16%
Chicken legs	0%	7%	7%	0%	19%	2%	3%	22%	22%
Chicken Intes- tines	0%	6%	4%	0%	6%	2%	0%	8%	8%
Pork skins	0%	0%	3%	0%	1%	0%	0%	1%	1%
Fish remains	0%	11%	4%	0%	22%	3%	0%	17%	8%
Head, Hooves	0%	2%	10%	0%	20%	6%	7%	24%	22%
Combined (LIV- ER/KIDNEY/ INTESTINES)	33%	10%	14%	0%	0%	0%	0%	13%	16%

4.10.3 Frequency of sale of Fifth quarter components in the retail outlets

Trade in offal is integrated with sale of other meat types and offal types. Results from analysis shows that an average of 65.3% of traders interviewed are able to sell fifth quarter components on a daily basis while 29.0% participated in it for 3 to 4 times per week. About 4.9% manage to sell at least once

per week and 0.8% only during festive periods. Discussion with offal traders revealed that most of them do not get adequate supply of the products throughout the week. Other traders reported that during end month, the sales reduce as consumers buy other meat types. In coast region, traders cited that majority of their customers prefer fifth quarter components due to relatively lower prices compared to other meat types.

**Table 25: Frequency of sale of fifth quarter components by the retail outlets**

Type of fifth quarter	Daily (%)	3-4 days a week (%)	At least once a week (%)	Only during festive periods (%)
Intestines/Matumbo (sheep, goats. Cattle)	73.3	22.8	4.0	0
Gizzards	58.8	23.5	11.8	5.9
Liver (sheep, goats. Cattle)	66.0	26.9	6.4	0.6
Kidneys sheep, goats. Cattle)	64.0	27.9	7.0	1.2
Chicken legs	50.0	50.0	0.0	0.0
Chicken Intestines	100.0	0.0	0.0	0.0
Chicken heads	50.0	50.0	0.0	0.0
Pork skins	40.0	40.0	20.0	0.0
Fish remains	75.0	25.0	0	0.0
Head, Hooves (cattle, sheep, goats)	76.2	23.8	0.0	0.0
Average	65.3	29.0	4.9	0.8

4.10.4 Consumption patterns for Intestines and Stomach (Matumbo) for cattle, sheep and goats

The biggest proportion of respondents that consume *matumbo* for cattle (50%) and shoats (36%) is found in the low-income segments. This is followed by the middle income segment with 44% and 29% of the households consuming cattle and shoaat *matumbo* respectively. Those who consume *matumbo* in the high-income segment are the minority as shown by 21% and 19% of respondents who consume cattle and shoaat *Matumbo* respectively. Those who consume *Matumbo* cited the following reasons/benefits:

a) Traditional delicacy: This is the most common reason for consuming the product across the 3 income segments as shown by 62% of consumers for cattle *Matumbo* and 38% for shoats *matumbo* in the high-income segment; 37% of consumers for cattle *matumbo* and 40% for shoats *matumbo* in the medium income segment and 48% of consumers for cattle *matumbo* and 36% for shoats *matumbo* for low income segments. This indicates that consumption of *matumbo* is not likely to shrink as people graduate from one social economic status to

another because it is anchored in their meat consumption culture. Traders therefore have a foundation upon which to build their market expansion plans for this product.

b) Saving money: The price of *matumbo* is relatively lower than that of meat, with *matumbo* costing almost half the price of beef, depending on the market segment. At least 30% and 35% of consumers of shoats and cattle *matumbo* respectively in the low market segments indicated that they consume it because of the need to save money; in the middle income, this proportion reduced to 26% of shoaat *matumbo* consumers and 30% of cattle *matumbo*. Compared to the middle-income segment, the high income had a relatively higher proportion of households that consume *matumbo* because of the need to save money as cited by 27% of shoats *Matumbo* consumers and 31% of cattle *matumbo* consumers. Information from KII revealed that for low income segments, one gets a lot more with KES 100 buying *matumbo* than meat, since *matumbo* has no bones added during weighing, there are no lifestyle diseases associated with it like it is the case with red meat. As a result, they consume *matumbo* at least 3 times a week while beef is consumed once in a week.



c) **Nutritional benefits:** A few respondents indicated that they consume *matumbo* to get vitamin and mineral as cited by 10% for shoats' *matumbo* and 15% of the cattle *matumbo* on the high-end market segment; 19% of shoats' *matumbo* and 18% of cattle *matumbo* in the low-income segments and 27% of shoats' *matumbo* and 8% of cattle *Matumbo* in the high-income segment. Key informants and FGDs indicated that this is a product largely sold in the low-income segments. The demand is higher than supply in these segments such that *Matumbo* are the first to clear in the butcheries.

Reasons for not Consuming Matumbo

The main reasons for not consuming *matumbo* by some of the consumers are presented in table 26 below. The reasons given by majority of the consumers are health related. According to the consumers interviewed through FGD and KII, this is mainly because of issues related to cleanliness of the product and fear of getting worms if they are not well cleaned. Accessibility was also raised as an issue which

can be attributed to the fast-moving nature of the product in the low-income areas. Secondly, retailers usually order smaller quantities because the product is highly perishable. Some of the traders in Nairobi and Mombasa indicated that they do not get enough *matumbo* for both cattle and shoats to meet the demands from their customers, which may explain the reason for limited accessibility.

In high income market segments, it was reported that there are few butcheries in the malls and high-end markets that sell *matumbo*, claiming that it is highly perishable and releases unpleasant smells in the shop. They however supply on order. Shoats' *matumbo* is particularly not accessible in many outlets as indicated by the consumers. Most of the consumers from the high end markets usually get shoats' *matumbo* after they slaughter goats or buying in bulk in slaughterhouses. Other reasons are people disliking the products and difficulties in preparation. Some of the consumers indicated that they have to clean and boil for some time, which delays the preparation time.

Table 26: Reasons for not consuming *matumbo* by some of the consumers

Reasons	Type of product (%)	High Income (%)	Medium Income (%)	Low income (%)
Not accessible	Shoats Matumbo	3	21	20
	Cattle Matumbo	8	21	10
Health Concerns	Shoats Matumbo	35	22	23
	Cattle Matumbo	28	44	26
Does not like	Shoats Matumbo	25	24	26
	Cattle Matumbo	20	22	28
Not easy to prepare	Shoats Matumbo	20	8	8
	Cattle Matumbo	23	12	11



Frequency of consumption of the cattle and shoats Matumbo

In low income segments, consumers buy one quarter at least two to 3 times a week, which amounts to about 0.5 to 0.75 kg per week per household. In the middle income and high income segments, average consumption per week, was found to be 0.4 and 0.5 respectively. The low consumption is attributed to infrequent consumption by consumers in these segments which was reported to be at least once or twice in a month.

4.10.5 Consumption of Liver from Cattle and Shoats

About half of the consumers in all the income segments take liver from cattle and shoats. At least 54% of consumers in the high income, 53% in the low income and 56% in the middle-income segment consumes cattle liver. A smaller proportion consume goats' liver as cited by 40% of consumers in the high income, 28% in the low income and 32% in the medium income categories. It was reported during the FGDs that shoat liver is mainly consumed from animals slaughtered at home and not necessarily from the butchereries especially in the middle and high income segments. It was reported that liver for cattle and shoats are mainly consumed by all members of the households.

Why is liver preferred?

a) **Nutritional benefits:** Vitamins and minerals supplementation is considered a great benefit for consuming liver across all the three segments, as cited by 65% of respondents from high, 49% from low and 57% from the middle-income segment for the cattle liver. Similarly, 67%, 54% and 60 % of the consumers in the high, low and medium income segment cited supplementation with vitamin and minerals as the reason they consume shoats liver.

A small proportion of respondents further indicated that liver for cattle and shoats have healing properties. In this regard, 15%, 14% and 13% of the households in the high, middle and low income segments respectively cited healing property as the reason that they buy cattle liver, while the same benefits from shoats' liver were reported by 13%, 14% and 13% of the households in the high, middle and low income segments respectively.

b) **Traditional delicacy:** Cattle and shoat liver is a traditional delicacy for some of the consumers across the three income segments. At least 15%, 26% and 22% of the respondents in the high, low and medium income segments prefer liver for cattle as a traditional delicacy. Similarly 13%, 22% and 19% of the households prefer shoats liver as a traditional delicacy.



Table 27: Why liver is preferred in many households

Product type	Segment	Vitamins and minerals Supplementation	Healing properties	Saves money	Traditional Delicacy	Ease of preparation	Others
Liver (Cattle)	High	65%	15%	0%	15%	3%	3%
	Low	49%	14%	5%	26%	3%	3%
	Middle	57%	13%	1%	22%	6%	0%
Liver(Goats, Sheep)	High	67%	13%	0%	13%	8%	0%
	Low	54%	14%	5%	22%	3%	3%
	Middle	60%	13%	2%	19%	5%	1%

Why Liver is not preferred by some consumers

Some consumers indicated they do not consume cattle or shoat’s liver due to:

- a) **Affordability:** This was mainly cited by consumers in the low income segments. Results show that 34% and 28% of low income segment do not consume cattle and shoats liver respectively because they cannot afford; A small proportion of middle income also cited affordability as a limiting factor, as cited by 18% and 15% of the respondents regarding cattle and shoats liver respectively. Affordability did not limit the consumption by the high-income segments for either cattle or Shoats liver.
- b) **Accessibility:** This factor was found to affect the middle- and low-income segments. Results shows that 18% and 27% of the households in the low and middle income segments respectively consider accessibility as a factor limiting consumption of shoats liver. Similarly, 28% and 38% of the households in the low and middle income segments respectively indicated that consumption of cattle liver is limited by accessibility. It was reported during the FGDs that shoats’ liver in many cases is sold together with intestines. In addition, majority of the high income and the middle income households often slaughter goats and therefore do not necessarily depend on butcherries for shoats’ liver.

- c) **Health concerns:** this factor was cited by majority of respondents in the 3 segments, as the limiting factor in the consumption of cattle and shoats liver. About 41% of the consumers in the high income, 18% in the low income and 38% in the middle income segments are not consuming cattle liver because of health concerns. Similarly, 19%, 48% and 15% of the consumers in the high income, low income and middle income segments respectively cited, health concerns as the factor limiting consumption of shoats liver. The health concerns cited by consumers during FGD and KII were associated with drug residues, stemming from the facts that majority of pastoralists administer drugs to sick animals without any supervision by professionals. The consumers therefore argue that as a detoxifying organ, liver is likely to be loaded with drug residues. The other dimension of the health concerns was fear of consuming worm and cysts, which they claim are largely found in the liver.
- d) **Dislike of liver:** Some of the consumers, indicated that they dislike liver from cattle and shoats. This was cited by 14%, 17% and 16% of the respondents in high, low and medium segments respectively, with respect to cattle liver. Similarly 14 % of respondents in high, low and middle income segments respectively indicated that they do not like shoats liver.



Table 28: Reason why household do not consume cattle and shoat's liver

Reasons for not consuming	Cattle Liver			Liver (Goats, Sheep)		
	High	Middle	Low	High	Middle	Low
Not affordable	5%	18%	34%	3%	15%	28%
Not accessible	9%	27%	18%	10%	38%	28%
Religious reasons	0%	2%	0%	0%	1%	1%
Lack of preparation knowledge	0%	3%	0%	0%	2%	1%
Health concerns	41%	19%	18%	48%	17%	15%
Not easy to prepare	5%	3%	1%	3%	1%	1%
Do not get the quality I like	18%	10%	8%	10%	6%	7%
cultural reasons	9%	3%	4%	10%	3%	3%
Does not like	14%	16%	17%	14%	17%	17%

Frequency of consuming liver in the households

While there is a relatively high proportion of households that consume liver from shoats and cattle, results show that majority do not consume the products frequently. Majority of the respondents in the high income segment are consuming cattle liver at least once in a week (38.5%), with another 34.6% consuming cattle liver at least once a month. For shoats' liver, majority of the high income segments indicated that they consume after more than a month (33.3%) followed by those who consume at least once a month (22.2%).

The middle income segments are more infrequent in consumption of liver as shown in the data that majority 36.1% consume cattle liver at least once in a month and another 27.7% are consuming after more than a month. For shoats' liver, majority of the households are

consuming at least one in a month (37.5%) and another 31.3% are consuming after more than one month.

The low income segment is the most infrequent as far as consumption of the two types of liver are concerned. According to the results, majority of the respondents are consuming cattle liver after more than a month (43.5%) followed by those who consume the same type of liver once in a month. Similarly, 49.6% of the consumers in the low income category are consuming shoats liver after more than a month, followed by a 20.9% of the households that consume at least once in a month. In all the segments, proportion that consume both types of liver at least once a week or 3-4 days a week are the minority, with the proportion of respondents in both cases being less than 15%. Table 29 summarizes these findings.



Table 29: Frequency of consuming liver from cattle and shoats

Frequency	Cattle liver (%)			Shoats Liver		
	High Income (%)	Middle Income (%)	Low Income (%)	High Income (%)	Middle Income (%)	Low Income (%)
3-4 days a week	0.0	0.6	0.4	16.7	5.2	2.9
At least once a week	11.5	15.1	6.3	16.7	9.4	10.8
At least once in 2 weeks	38.5	19.9	14.8	11.1	15.6	7.9
At least once in a month	34.6	36.1	31.7	22.2	37.5	20.9
After more than a month	15.4	27.7	43.5	33.3	31.3	49.6
Only during festive periods	0.0	0.6	3.0	0.0	1.0	7.2
Only during School Holidays	0.0	0.0	0.4	0.0	.0.0	0.7

4.10.6 Consumption Pattern for Gizzards

Gizzards are consumed by 25% of households in high income as well as 29% of households in the low and middle segments. Results show that gizzards are liked by everyone in the family in 49% of the households, while in 24.7% and 16.9% of the households, they are liked by adult men only and adult women only, respectively. In terms of frequency of consumption, majority of the household in the high income segment consume gizzards at least once in a week, 27.3% consume at least once in 2 weeks while another 27.3% consume at least once in a month. In the middle income households, majority of the households consume gizzards at least once a month. Followed by those who consume after more than a month (27.7%) and lastly those who consume at least once in two weeks.

The frequency of consumption of gizzards is much lower in the lower income segment, with majority consuming after more than a month, followed by those who consume at least once a month while those who consume weekly being the minority. This shows that unlike other fifth quarter components where the low-income segments are the majority of

consumers, gizzards are more consumed by the high income and middle-income segments. This follows the consumption pattern for chicken, as most households indicated that they prefer to slaughter chicken more than buying. As such the frequency of slaughtering chicken will determine the frequency at which they eat gizzards.

The two main reasons for consuming gizzards according to the respondents were:

- a) **Traditional delicacy:** At least 57% of consumers in the high end, 56% in the low income and 64% in the middle income segments indicated that they prefer chicken because it's a traditional delicacy.
- b) **Nutritional benefits:** results show that 21% of households in high income and low income, as well as 20% of households consume gizzards for vitamins and minerals supplementation. In the high income segment, 14% of the households further cited healing properties as the reason for consuming gizzards.



The following are the reasons why some households do not consume gizzards:

- a) **Not affordable:** This was cited by 12% the consumers in the low income segment while only 6 and 7% of consumers in high and middle income segments cited affordability as a limitation
- b) **Not accessible:** This was mainly cited by the consumers in the low income (29%) and middle income households (35%) while only 9% of consumers cited accessibility as a limitation. This can be explained by the fact that most gizzards are sold as part of the dressed chicken while other consumers buy live chicken. It was also observed that 18% of respondents in the high income segment indicated that they do not get the quality they like when buying the gizzards.
- c) **Health concerns:** A small proportion of consumers cited health concerns as limitations to consumption of gizzards as shown by 12%, 13% and 12% of consumers in the high, low and middle income segments respectively. According to the FGDs, the health concerns are mainly associated with cleanliness and hygiene in handling, and not necessarily concerns related to lifestyle diseases.
- d) **Dislike of the commodity:** This is the reason given by majority of households that do not consume gizzards, especially in the high income segment. At least 42%, 23% and 16% of the households in the high, middle and low income segments do not consume gizzards because they do not like the product at all.

4.10.7 Consumption Patterns for Kidneys (cattle, sheep and Goats)

Results shows that kidneys are consumed by a small proportion of households in the three segments. The proportion that consume kidneys were found to be 17% in high income and middle income segments and 21% in the low income segments. According to consumers and retailers, kidney from shoats are sold together with the intestines and stomach, while kidneys from cattle are sold separate from other fifth quarter components. The study shows that kidneys are liked by everyone in the household, as cited by 67.1% of the respondents.

The households that consume kidneys cited two main benefits:

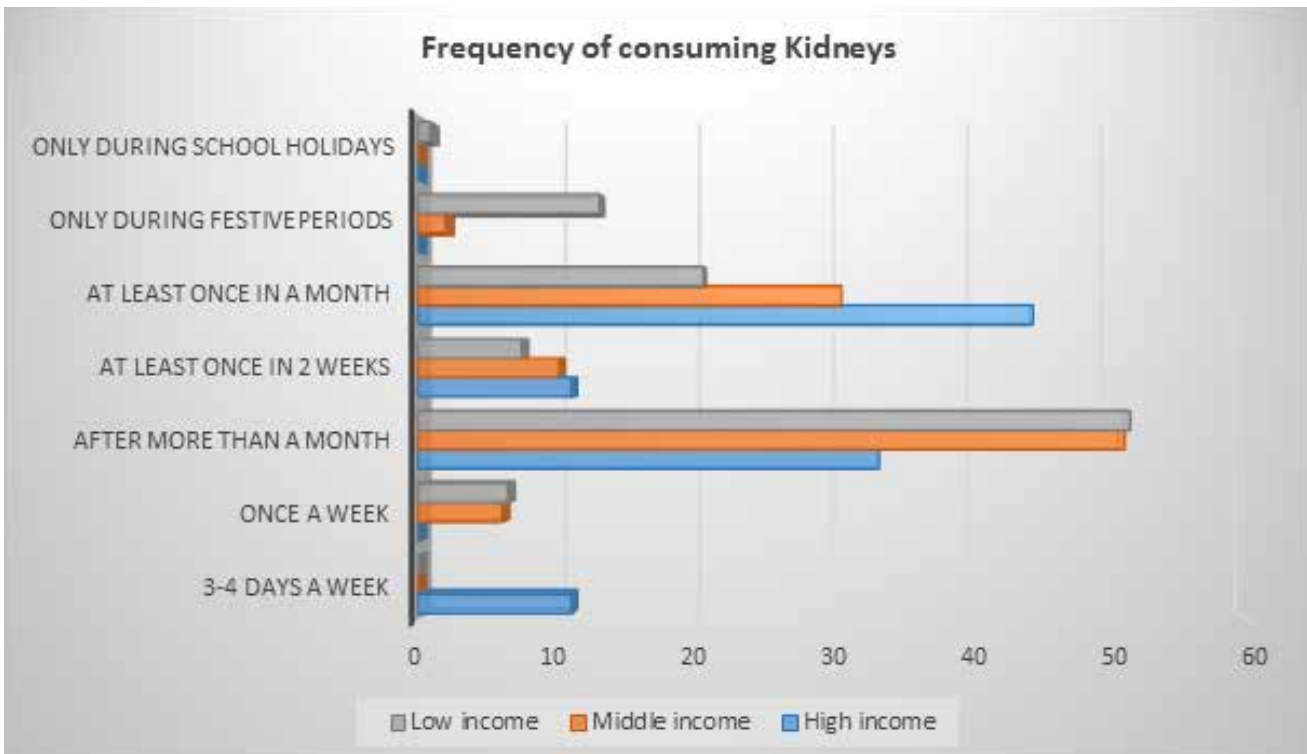
1. **Nutritional benefits:** At least 50% of households in the high income and low income segments as well as 63% in the middle income segment indicated that they consume kidneys because it provides vitamins and minerals to the body.
2. **Traditional delicacy:** Results show that 20% of household in high income, 28% in the low income and 24% in the middle income segments consume kidneys because it is traditional delicacy.

Frequency of consumption of kidneys:

Majority (44%) of the consumers in the high income segment consume kidneys at least once a month followed by 33.3% of the households who consume kidneys after more than a month. In the middle income majority of the households (51%) consume kidneys after more than a month, followed by 30.6% who consume at least once a month. As with the middle-income segments, 51% of the households in the low-income segment are consuming kidneys after more than one month, followed by 20.6% who consume at least once a month.



Fig 10: Frequency of consuming kidneys



Households that do not consume kidneys on the other hand had the following reasons:

- a) **Not affordable:** Affordability was a limiting factor in 26% of the households in the low-income segments. The proportion of households that consider affordability as a factor limiting consumption were the minority in the high income (9%) and middle income segments (14%).
- b) **Not accessible:** the middle income segment had the largest proportion of households that considered accessibility as a limitation to consumption (35%) followed by the low income segment (29%) while the high income segment had the minority (16%). As with the other fifth quarter components, the demand for these components is higher than supply, given that production is restricted to the number of cattle slaughtered.
- c) **Health concerns:** Majority of the consumers during the FGD indicated that the health concerns of kidneys are mainly associated with fear of consuming drug residues and concerns related to handling. Among the three segments,

this is a concern to 23% of the households in the high income, 10% in the low income segments and 13% of households in the middle income segments.

- d) **Dislike of the product:** As with other fifth quarter components, dislike of this product was cited as the reason for not consuming by majority of the respondents. At least 30% of the households in the high income segment indicated that they do not like the product, while 21% in the low and 23% in the middle income segments indicated that they dislike the products.

4.10.8 Consumption Patterns for other fifth quarter components:

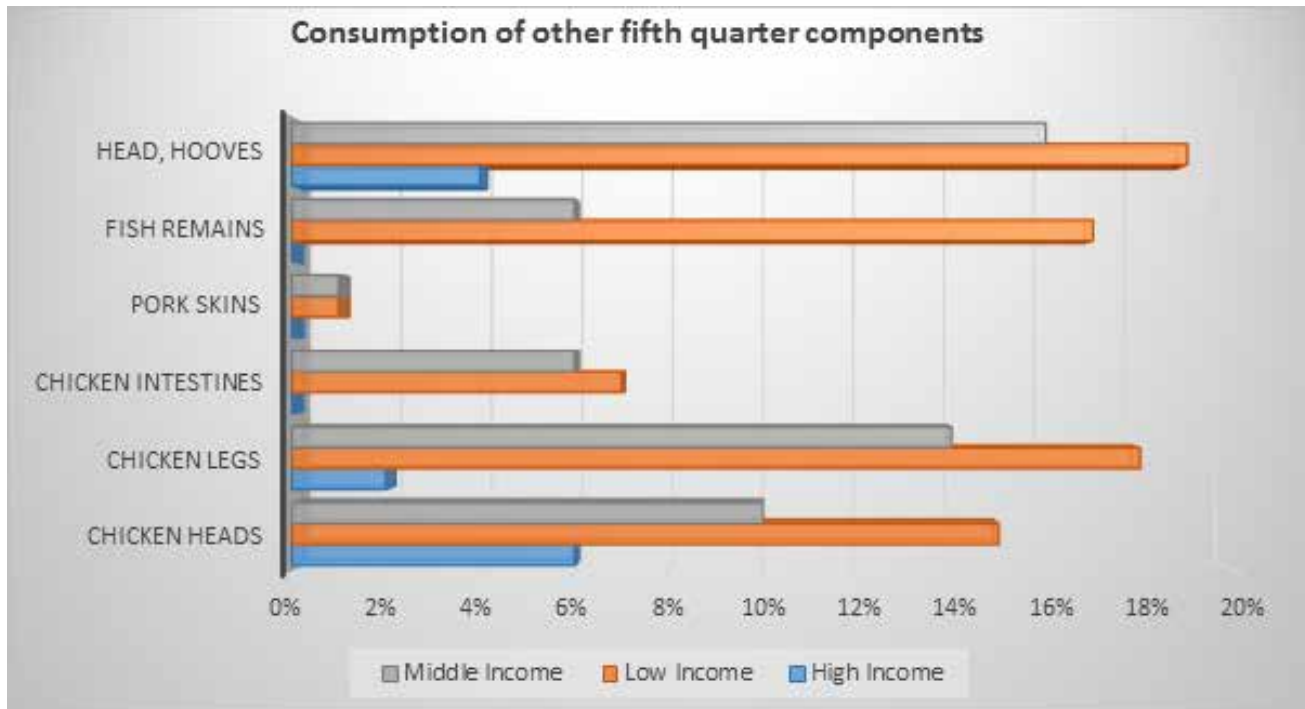
These products include chicken heads, legs, and intestines; pork skins, fish remains, head and hooves from cattle sheep and goats. Results show that only 6% of households in the high income segment are consuming chicken heads, 2% are consuming chicken legs and 4% are consuming head and hooves. None of the households in the high-income



segment consume chicken intestines, fish remains and pork skins. In the middle-income segment, 10% of households consume chicken heads, 14% consume chicken legs, 6% chicken intestines, 1% pork skins, 6% fish remains and 16% head and hooves. The low-income segment has more households consuming these components of the fifth quarter, where

15% consume chicken heads, 18% chicken legs, 7% chicken intestines, 1% pork skins, 17% fish remains and 19% head and hooves. It was reported during the FGD that for high and medium income segments, these products are consumed by households after slaughter, while the low income households usually buy these products.

Fig 11: Proportion of households that consume other components of the fifth quarter



The frequency of consumption of other components of the fifth quarter was found to be quite low, with majority consuming after more than a month in all the consumer segments, except for the pork skins. Consumption of chicken heads and legs in the high and middle income segment is closely related to the frequency of consumption of chicken. The second category is the one that consumes at least once a month, in all types of fifth

quarter and by the low and middle income segments. Table 30 below presents frequencies of consumption of these products. Discussion with consumers in the low income segments during FGD and KII indicated that they mainly alternate consumption of chicken heads, fish (*omena*) intestines with other products like Matumbo in the course of the week, which may explain the seeming infrequent consumption patterns



Table 30: Frequency of consumption of other fifth quarter components

Frequency	Chicken Heads (%)			Chicken legs (%)			Pork Skins (%)			Head and Hooves (%)		
	High	Middle	Low	High	Middle	Low	High	Middle	Low	High	Middle	Low
3-4 days a week	0	0	1.3	0	0	1	0	0	0	0	0	0
After more than a month	33.3	39.3	49.4	0	32.4	43.3	0	0	66.7	100	51.2	0
At least once a week	0	7.1	12.7	0	10.8	12.4	0	0	0	0	7	0
At least once in 2 weeks	33.3	21.4	6.3	0	24.3	13.4	0	0	16.7	0	2.3	0
At least once in a month	33.3	32.1	15.2	100	32.4	17.5	0	50	16.7	0	18.6	0
Daily	0	0	2.5	0	0	3.1	0	0	0	0	0	0
Only during festive periods	0	0	8.9	0	0	6.2	0	50	0	0	0	0
Only during school holidays	0	0	3.8	0	0	3.1	0	0	0	0	0	0

More than half of the households that consume other components of the fifth quarter indicated it is a traditional delicacy, except pork skins and fish remains which are not consumed by households in the high-income segment (table 31). In the middle and low income segments, between 17% and 37% of the households indicated that they consume these products in order to save money, with higher proportions being found in the low income segment. At

least 28% and 33% of the households in the middle and low income segments indicated that they consume these products because they supply the body with vitamins and minerals. Additionally, 50% of the households in the high end market cited medicinal properties, as the reasons for consuming bones and hooves. The latter benefit is mainly associated with minerals associated with consumption of bone soups.



Table 31: Benefits derived from consumption of other fifth quarter components

Type of fifth quarter	Segment	Vitamins and minerals Supplementation	Healing properties	Saves money	Traditional Delicacy	Ease of preparation	Others
Chicken Heads	High	0%	0%	0%	100%	0%	0%
	Low	6%	2%	34%	56%	2%	0%
	Middle	3%	3%	28%	63%	0%	3%
Chicken Legs	High	0%	0%	0%	100%	0%	0%
	Low	6%	1%	31%	58%	4%	1%
	Middle	0%	0%	27%	66%	2%	5%
Chicken Intestines	High	0%	0%	0%	0%	0%	0%
	Low	10%	0%	36%	51%	3%	0%
	Middle	6%	6%	22%	67%	0%	0%
Pork skins	High	0%	0%	0%	0%	0%	0%
	Low	17%	0%	17%	50%	17%	0%
	Middle	33%	0%	0%	67%	0%	0%
Fish remains	High	0%	0%	0%	0%	0%	0%
	Low	28%	6%	37%	23%	5%	1%
	Middle	33%	5%	29%	24%	5%	5%
Heads/ Hooves/	High	0%	50%	0%	50%	0%	0%
	Low	7%	9%	27%	51%	3%	3%
	Middle	13%	4%	25%	51%	4%	4%

The following reasons were considered by those who do not consume other fifth quarter components:

Majority of the respondents who do not eat the other components of the fifth quarter cited dislike as the reason for not consuming. This reason was observed across all the segments,

and was cited between 34% and 43% of the respondents across the 3 consumer segments. This was followed by cultural reasons as cited by between 20 and 33% of the households across the three segments and different components of the fifth quarter. Table 32 summarizes these findings.

Table 32: Reasons for not consuming other components of the fifth quarter

Reasons	Chicken heads			Chicken Legs			Chicken Intestines		
	High	Middle	Low	High	Middle	Low	High	Middle	Low
Not affordable	5%	2%	6%	7%	1%	4%	2%	1%	3%
Not accessible	0%	16%	14%	2%	16%	16%	2%	11%	13%
Religious reasons	0%	1%	0%	0%	1%	1%	0%	1%	0%
Lack of preparation knowledge	2%	2%	3%	5%	1%	3%	7%	3%	3%
Health concerns	15%	8%	9%	7%	8%	9%	15%	11%	12%
Not easy to prepare	0%	4%	4%	0%	5%	5%	0%	4%	4%
Do not get the quality I like	10%	5%	5%	7%	3%	7%	7%	3%	6%
cultural reasons	32%	21%	20%	33%	22%	20%	33%	26%	23%
Does not like	37%	41%	37%	40%	43%	34%	35%	39%	35%



4.10.9 Prices of Fifth quarter components in different markets

Prices for different fifth quarter components are presented in table 33 below. Results show that some of the fifth quarter products like gizzards and liver are priced as much as meat

across different segments. This explains why majority of the consumers are from high and middle income segments. On the other hand the low income segments are consuming low priced products like the chicken heads, legs etc. They also buy the smallest units of other highly priced products, usually a unit that would cost them KES 50 or less.

Table 33: Average prices for various fifth quarter products across different market segments

Type of Product	High	Middle	Low
Matumbo - Cattle (kg)	335	274	227
Gizzards (Kg)	450	393	237
Liver (cattle) (Kg)	540	400	360
Matumbo shoats (Kg)	325	254	256
Liver (shoats) (kg)	491	480	456
Chicken heads (0.25g)		28	17
Chicken Intestines (0.25g)		26	23
Chicken legs (0.25g)		36	27

4.10.10 In summary:

- Fifth quarter, in all the market segments is mainly consumed as a delicacy, to meet nutritional needs and in low income segments as a substitute for meat due to relatively lower prices compared to meat. There is also a growing perception among consumers that unlike red meat, these products do not contribute to cardiovascular diseases.
- The fifth quarter component most consumed in the high income and middle-income segments include liver, kidney, gizzards and *Matumbo*. In the low-income segment on the other hand, other products like fish remains, chicken legs and intestines in addition to *Matumbo*, gizzards, kidney and liver. These products are relatively cheaper, do not take a lot of time (hence fuel) to prepare and a small portion can be served to many people (a small piece in a soup bowl) than meat.
- There is no value addition of the fifth quarter components, as majority of the consumers use it as a basic food source. There is however potential to create more value by making quality

and hygienically prepared products accessible to high income segment at premium prices. Traders interviewed through KII Indicated that while the entire stomach plus intestines of goat is sold at KES 400-500, there are some buyers from neighbouring countries who buy the same a KES 1500.

- Demand for offal in the low income settlements in cities like Nairobi and Mombasa is higher than supply. There is over supply in the local markets around busy slaughterhouses in up country urban areas that do not have a large population of low-income people to consume these products, especially *Matumbo*. An example is the Mogotio slaughterhouse in Baringo which slaughters cattle to supply the Nakuru market with carcasses while the *Matumbo* are left behind due to high perishability. There is need to come up with some value addition processes which can be used to extend the shelf life of these products and therefore allow them to be delivered to cities which have relatively higher demand for the same.



4.11 CONSUMPTION PATTERNS FOR PROCESSED AND VALUE ADDED MEAT

4.11.1 Overview of Meat Processing and Value Addition in Kenya

Meat is processed through different methods which include smoking, curing, fermenting, drying, canning and salting. Processed meat is therefore any meat that has been modified through these processes in order to improve its taste or improve its shelf life. Once processed, the products are distributed through retailer outlets, targeting the high- to mid-income consumers. Moreover, products like the Kenyan smokies, sausages and hotdogs provide consumers in the low-income segments with an opportunity to access processed products.

Farmers Choice Ltd has continued to maintain its leadership of processed meat in the country. Other processors include Alpha fine foods, Quality Meat Packers and Kenya Meat Commission (KMC). Discussions with Famer's Choice revealed that about 80% of the red meat products produced by the facility is sold locally while 20.0% is exported to the East African region. About 75% of meat products from Quality Meat Packers is exported while 25.0% is sold locally to their shop outlets. The export markets include African and Middle East markets such as Tanzania, Uganda, Rwanda, South Sudan, Sudan, Democratic Republic of Congo, Bahrain and the United Arab Emirates. Kenyan meat processors have shifted focus to value addition for the local market and growing exports to the Middle East and Africa after losing the key European Union market in 2008 due to safety concerns. The euro zone was previously the biggest export market for Kenyan meat, accounting for 400,000 metric tons of processed beef annually.

Other than the processed products, there are other value-added products from meat that are mainly sold in the informal sector. These meat products have been traditional delicacies in many parts of the country. The products are made using traditional recipes through a very skilled process in order to come out with products that are similar to what the consumers consider as the traditional delicacy while others are made to

mimic the processed product of that kind. Such products include African sausage commonly called *mutura*, various types of *mshikaki* (skewers), meat balls and samosas. While most of these products are mainly found in the informal markets, some products like Samosa are also made with more improved hygiene standards in the formal outlets.

4.11.2 Level of Awareness of Different Products in the Market

Majority of the consumers (53% to 92%) in the high-end market are aware of the products that are sold in the formal channels. It was observed that only cured/aged meat is known by a minority of respondents in this segment (53%) among the products that are sold in the formal outlets. A relatively lower proportion of consumers in the high-income segment is aware of products in the informal sector like *mshikaki* (51%), African sausage/*mutura* (69%) and chicken soup (65%). Value added products like pork *mshikaki*, *mshikaki* from game animals, deep fried pork skin, and meat balls from fish remains are known by minority of consumers in this segment, who were found to range from 14-33%.

A few of the low-income earners are aware of the products in the formal outlets except sausages (93%), fish fillets (53%) and minced meat (64%). Hams, bacon, aged meat and burgers are only known by minority of the consumers in this segment as presented by 21% to 30% of the respondents in this segment. There is a greater proportion of low-income segment that is aware of products sold in both informal and formal sector like beef samosa, African Samosa and bone soup as reported by majority of consumers (77% to 86%) in these segments. It was also observed that certain products are sold in the informal channels only and are known by a minority of consumers in the high and middle segments (between 14% and 34%), mainly *mshikaki* (pork, beef, shoats and game) and meat balls.

The level of awareness of the products in the formal and informal outlets by consumers in the middle-income segment follows a similar pattern as that of the high-income segment. The proportions are however variable, as shown in table 34.



Table 34: Consumers' level of awareness of various processed and value added products

Type of Product	High		Medium		Low	
	Aware	Consumes	Aware	Consumes	Aware	Consumes
Sausage	92%	71%	94%	58%	93%	59%
Ham	65%	22%	41%	6%	21%	3%
Bacon	76%	29%	51%	12%	30%	3%
Canned Meat	71%	22%	61%	9%	44%	3%
Aged/cured meat	53%	6%	24%	6%	19%	3%
Burgers	73%	45%	49%	14%	30%	4%
Hot Dogs	80%	39%	56%	19%	41%	6%
Minced Meat	86%	57%	74%	41%	64%	17%
Fish Fillets	80%	51%	67%	29%	53%	15%
Beef Samosa	86%	63%	90%	52%	86%	44%
Chicken Samosa	65%	27%	50%	17%	50%	9%
Mshikaki (beef, goat and mutton)	51%	24%	47%	13%	39%	9%
Pork Mshikaki	31%	2%	18%	1%	16%	2%
Mshikaki - Game meat	24%	4%	17%	1%	12%	1%
Deep fried pork skin	14%	0%	17%	0%	17%	0%
Africa Sausage (Mutura)	69%	18%	80%	24%	77%	30%
Meat Balls	63%	24%	45%	12%	34%	6%
Meat Balls (fish remains)	33%	6%	40%	7%	44%	15%
Bone soup	80%	49%	86%	46%	78%	45%
Chicken soup	65%	45%	61%	27%	55%	23%

4.11.3 Proportion that consume different processed and value added product

Despite high level of awareness of different products in the formal outlets by consumers in the high- and medium-income segments, results show that only a smaller proportion of households in both segments are consuming these products. Specifically, it is observed that only sausages (71% of households), minced meat (57% of households), fish fillets (51% of households) and beef Samosa (63% of households) are consumed by majority of households in this segment. Products like ham, bacon, canned meat, aged/cured meat, chicken samosa and meat balls are consumed by minority of consumers in the high-income

segment who range between 6 and 24%. Similarly, products that are sold in the informal outlets are consumed by minority of consumers in the high-income segments, with proportion of consumers ranging from 0 to 6%.

As with the high-income segment, results show that despite the high proportion of households that are aware of the products sold in the formal channels, the proportion of households that consume such products is quite low. Specifically, results show that it's only sausage (58% of households), minced meat (41% of households) and beef Samosa (52% of households) are consumed by majority of the households in this segment. On the other



hand, products like ham, bacon, canned meat, aged meat, burgers, hotdogs and meat balls are only consumed by minority of households, all of them below 10% of the total households in this segment. Among the products sold in the informal sector, it is only bone soup that is consumed by a majority of consumers in this segment, as cited by 46% of the households. All other products that are sold in the informal sector are only consumed by less than 10% of the consumers in the middle-income segment, except Africa sausage/*mutura* (consumed by 24% of households) and chicken soup which is consumed by 27% of the households in this segment.

The only processed products that are consumed by majority of consumers in the low-income segment are sausages with 59% of the households consuming. Other processed products that are mainly sold through the formal channels are consumed by minority of households in this segment, between 3% and 6%. Value added products that are consumed by majority of consumers in this segment include beef Samosa (consumed by 44% of households), African Sausage (consumed by 30% of households), bone soup (45%) and chicken soup (27%). All other value-added products are consumed by minority of households in this segment ranging from 0-17%.

Table 35: Proportion of households that consume various processed and value-added meat products:

Type of Product	High		Middle		Low	
	Aware	Consumes	Aware	Consumes	Aware	Consumes
Sausage	92%	71%	94%	58%	93%	59%
Ham	65%	22%	41%	6%	21%	3%
Bacon	76%	29%	51%	12%	30%	3%
Canned Meat	71%	22%	61%	9%	44%	3%
Aged/cured meat	53%	6%	24%	6%	19%	3%
Burgers	73%	45%	49%	14%	30%	4%
Hot Dogs	80%	39%	56%	19%	41%	6%
Minced Meat	86%	57%	74%	41%	64%	17%
Fish Fillets	80%	51%	67%	29%	53%	15%
Mshikaki (beef, goat and mutton)	51%	24%	47%	13%	39%	9%
Pork Mshikaki	31%	2%	18%	1%	16%	2%
Mshikaki - Game meat	24%	4%	17%	1%	12%	1%
Deep fried pork skin	14%	0%	17%	0%	17%	0%
Beef Samosa	86%	63%	90%	52%	86%	44%
Chicken Samosa	65%	27%	50%	17%	50%	9%
Africa Sausage (Mutura)	69%	18%	80%	24%	77%	30%
Meat Balls	63%	24%	45%	12%	34%	6%
Meat Balls (fish remains)	33%	6%	40%	7%	44%	15%
Bone soup	80%	49%	86%	46%	78%	45%
Chicken soup	65%	45%	61%	27%	55%	23%
Nyirinyiri	6%	2%	9%	5%	6%	3%



Table 36: Consumption of processed and value added products by region

Product	Mombasa Metro			Nairobi Metro			Others		
	High	Mid	Low	High	Mid	Low	High	Mid	Low
Sausage	75%	39%	46%	100%	68%	75%	67%	63%	54%
Ham	25%	4%	5%	67%	9%	3%	13%	5%	2%
Bacon	25%	4%	4%	33%	17%	4%	30%	14%	3%
Canned Meat	8%	3%	4%	33%	5%	1%	27%	14%	3%
Aged/cured meat	0%	4%	5%	17%	3%	0%	7%	7%	4%
Burgers	25%	3%	2%	100%	14%	2%	43%	19%	5%
Hot Dogs	25%	3%	3%	67%	21%	4%	40%	26%	9%
Minced Meat	58%	33%	43%	100%	50%	14%	50%	42%	10%
Fish Fillets	33%	13%	15%	83%	20%	11%	53%	40%	18%
Mshikaki (beef, goat and mutton)	50%	30%	22%	33%	3%	7%	13%	9%	5%
Pork Mshikaki	0%	0%	3%	0%	2%	1%	3%	2%	2%
Mshikaki - Game meat	0%	0%	0%	17%	0%	1%	3%	3%	2%
Deep fried pork skin	0%	0%	0%	0%	0%	0%	0%	0%	0%
Beef Samosa	50%	34%	42%	67%	52%	48%	70%	60%	43%
Chicken Samosa	33%	6%	3%	17%	17%	7%	27%	21%	13%
Africa Sausage (Mutura)	25%	13%	17%	0%	12%	34%	20%	34%	34%
Meat Balls	17%	1%	8%	33%	11%	3%	27%	18%	7%
Meat Balls (fish remains)	0%	4%	6%	0%	5%	20%	10%	8%	15%
Bone soup	25%	50%	36%	50%	36%	52%	60%	47%	44%
Chicken soup	25%	20%	29%	33%	11%	15%	57%	38%	26%
NYIRINYIRI	0%	1%	0%	0%	0%	0%	3%	8%	5%

Results of analysis of consumption shows that Nairobi metro has the largest consumers of processed products while the other counties (Kisumu, Kakamega, Eldoret, Nakuru and Makueni) have the least proportion of households consuming these products. For instance, sausages are consumed by 100% of high-income consumers in Nairobi metro, it is only consumed by 67% of high-income segment in other counties and 75% of the high-income segment in Mombasa metro. Beef Samosa was found to be consumed by majority of households in the three market segments in the three regions. This may be attributed to differentiation of Samosa in pricing to allow people of different income levels afford the product. It was observed that quality of the product is variable, as the product is made to suite the purchasing power of the target market. Other products with similar trend

as Samosa were the bone soup and minced meat, with the latter having relatively fewer consumers in low income areas of Nairobi metro and other regions.

4.11.4 Sources of processed and value-Added Products

Results show that most of the processed products are sold through the formal channels mainly the supermarkets. A few of them for instance sausages are sold in the informal segments, through mobile vendors. It was however observed that a few of the high-income segments buy some of the value-added products from the informal vendors, especially the *mshikaki* and Africa Sausage. Similarly, there are some products though consumed by a small proportion in the low income segments are only bought from supermarkets. These include burgers, hams and bacon.



Table 37: Sources of processed and value-added products

Product	Where consumers buy from
Sausages	In the high income segment, 96.9% of consumers buy from supermarkets and 6.1% buy from butcheries; in the middle income, majority (61.6%) buy from supermarkets, 25.4% from roadside/street vendors; while the remaining buy from processors; in the low income, majority (65.8%) buy from roadside/street vendors and 19.8% buy from supermarkets, 5.7% from butcheries while the remaining proportion buys from mobile traders who sell cooked/grilled products and <i>nyama choma</i> joints.
Ham, Bacon	100% of households in the high income buy from supermarkets; in the middle- and low-income segments, 88-90% of consumers buy from supermarkets.
Cured/aged meat	100% of the households in the high income buy from supermarkets; there was no clear pattern where consumers in the low- and middle-income segments buy this product from, majority indicating they buy from butcheries and meat markets. Low level of understanding of cured meat was observed during the study.
Burgers and hot dogs	Supermarkets are the main sources of burgers in all the income segments as cited by 87% of high-income consumers, 71.4% % of middle income and 60% of low-income segments. Similarly, hot dogs are mainly bought from supermarkets as cited by 95% of consumers in the high income, 76.3% in the middle income and 70% from low income segment. In the low income, 20% buy from street vendors, while 30% just cited other places
Minced meat	In the high-income segment, 66.7% and 33.3% buy from supermarkets and butcheries respectively; In the middle-income segment, 48% buy from supermarkets, 45.7% from butcheries and the remaining proportion buys from meat markets and other sources; In the low-income segment, 71.8% buy from butcheries, 18.8% from supermarkets, while the remaining buy from other sources like roadside vendors and meat markets.
Fish fillets	In the high income, 76% buy from supermarkets, 12% from meat markets and 8% from butcheries; in the middle income, 44.9% buy from supermarkets, 16.9% from butcheries, 21.3% from meat markets and 12.4% from street vendors. In the low-income segments, 24.3% buy from butcheries, 6.4 from meat vendors while the remaining proportions buys from other sources, not well defined.
African Sausage (<i>Mutura</i>)	In the high-income segment, the sources of this product are quite variable. Results show that 33% buy from butcheries, 44.4% from <i>nyama choma</i> joints, 11.1% from road side vendors and another 11% from the supermarkets. A similar pattern is seen in the middle-income segments where 22.4% buy from butcheries, 10.4% from <i>nyama choma</i> joints and 67.2% from the roadside/street vendors. Majority of consumers in the low-income segments (74.1%), buy this product from road side/street vendors 11.7% from butcheries and <i>nyama choma</i> joints, each.
Mishikaki	This product is mainly consumed by households in the lower income segments and is mainly bought from road side vendors (71.7%) and <i>nyamachoma</i> joints (17.4%). The few consumers in the high and middle income segment who eat this product usually buys from <i>nyama choma</i> joints as cited by 30% of consumers in the middle income and 33% in the high income segment; butcheries as cited by 20% and 11.1 % of households in the middle and high income segments respectively; the other consumers in these two segments, had no defined source of the products, which is an indication of low levels of understanding of the product



Other value-added products like deep fried pork skins and meat balls from fish remains	Deep fried pork skins are sold in the low-income segment where 100% of the consumers buy from nyama choma joints located in their areas of residence, meat balls made from fish remains is sold to consumers in the low-income segments by road side vendors.
Meat Balls	In the high-income segments, majority of the consumers buy from supermarkets (61.5%), while another proportion buys from the informal channels like roadside vendors (23.1%) and mobile traders in cooked/grilled meat (7.7%). In the middle-income segment, the consumers buy this product from supermarkets (42.9%), road side vendors (28.36%) while the remaining proportion did not have any defined source. In the low-income segment, majority (64.5%) are buying from the roadside vendors, 12.9% from nyama choma joints and 9.7% from butcheries. The remaining proportion did not have any defined source.
Samosas	<p>In the high-income segment, 33% buy samosa from supermarkets, 20% from butcheries, 10% from mobile vendors while the remaining did not have a defined source; In the middle income, majority of the consumers (35%) buy beef samosa from roadside vendors, 17.5%, 9.2% from butcheries while the remaining proportion had no defined source. In the low-income segment, majority (73.3%) are buying from street vendors, 9.9% from butcheries while the remaining proportion had no defined source.</p> <p>Chicken samosa, as reported earlier is mainly bought by consumers from high income segment who mainly source from supermarkets (57%) with the remaining 43% Having a non-defined source; In the middle income, majority of the consumers buy chicken samosas from road side vendors (24%) and supermarkets (22%) while the remaining proportion does not have a defined source. Among the low-income segment, majority of the consumers buy chicken samosa from road side vendors (63%) and supermarkets (8.7%) while the remaining proportion has no defined source.</p>

Retailers who were interviewed indicated that they source their processed meat products from processors' distribution channels. Discussions with Farmer's Choice revealed that the program of production of small sizes sausages and distribution model had been extremely successful, both at providing a livelihood to thousands of people engaged in the trade and promoting the penetration of the company's brand of sausage among the low-income consumer segment.

FREQUENCY OF CONSUMPTION OF PROCESSED PRODUCTS

Frequency of consumption of processed and value-added products was found to be quite variable across the products and consumer segments. It was established that daily consumption is mainly by minority of consumers. Most of the processed products in the formal channels are consumed by the high- and middle-income segments on a weekly basis while majority of the low-income segments are mainly consuming processed less frequently, majority being after more than a month. Table 38 below provides a summary of frequency of consumption of different products by different consumer categories.



Table 38: Frequency of consumption of processed and value-added products by different consumer segments

Frequency	Products consumed
Daily	<p>a) High: Sausages (27.3%), Africa Sausage/mutura (33.3%)</p> <p>b) Middle: None</p> <p>c) Low: African Sausage (11%)</p>
3-4 times a week	<p>a) High: sausages (36.4%); beef samosa (26.7%); chicken samosa (14.3%); African sausage (33.3%)’ Bone soup (33.3%) and chicken soup (19%)</p> <p>b) Middle: sausages (20.6%)’ African sausages (16.4%)</p> <p>c) Low - None</p>
Once a week	<p>a) High: Sausages (30.3%); ham(38.5%); bacon (40%); canned meat (33.3%);burgers (39.1%); hotdogs (30%); minced meat (40.9%); fish fillets(20%); Beef samosa (40%); chicken samosa (28.6%); bone soup (20.8%);chicken soup (28.6%)</p> <p>b) Middle: chicken soup (11%); bone soup (14.3%); meat balls – fish remains (15.58%); African sausage (15.4%); beef samosa (23%); minced meat (13.4%); bacon 19.5%); ham (30%), sausages 24.3%</p> <p>c) Low: sausages (27.6%); beef samosas (27.8%); African sausage (21.8%); meat balls –fish remains (24%) and bone soup (19.5%).</p>
Fortnightly	<p>a) High: Canned meat (25%); hotdogs (20%); minced meat (29.6%); fish fillets (24%); beef Samosa (13.3%); chicken samosa (21.4%); African sausage/ mutura (22.2%), meat balls – beef and shoats (15.4%); chicken soup 19%</p> <p>b) Middle: sausages (15.1%); bacon (12.2%); hotdogs (11.9%); minced meat (23.3%); fish fillets (24.7%); beef samosa (23.7%); chicken samosa (14%); African sausage (13.4%); meat balls- fish remains (26.3%); bone soup (12.8%) and chicken soup (23.2%)</p> <p>c) Low: sausage 917.4%); ham (18.2%); fish fillet (12.5%); beef samosa (17%); African sausage (11.3%); meat balls – beef and shoats (25.3%; meat balls – fish remains (20%); bone soup (17.8%) and chicken soup (11.8%)</p>
Monthly	<p>a) High: ham (23.1%); bacon (19.5%); canned meat (33.3%); aged meat (100%); burgers (34.8%); hotdogs (35%); minced meat (14.8%); fish fillets (36%); chicken samosa (14.3%); African Sausage/ mutura (11.1%); meat balls – beef and shoats (30.8%); meat balls – fish remains; bone soup (25%) and chicken soup (28.6%).</p> <p>b) Middle: sausage (17.8%); ham (36.4%); bacon (19.6%); canned meat (18.9%) burgers (41.9%); hotdog (35.6%); fish fillets (24.7%); beef samosa (29.6%); chicken samosa (28%); African Sausage (14.9%); meat balls – beef and shoats (31.4%); meat balls –fish (15.8%); bone soup (25.1%); chicken soup (40.2%).</p> <p>c) Low: chicken soup (25.2%); bone soup (17.4%); meat balls – fish (18.7%); meat balls – beef and shoats (16.1%); African sausage (14.4%); chicken samosa (23.9%); beef samosa (23%); minced meat (34.1%); hot dogs (34.5%); burgers (35.7%); aged meat (11.8%); bacon (41.7%) ham (36.4%); sausages (18.8%)</p>
After more than a month	<p>High: Meat balls –fish (66.7%); meat balls – beef and shoats (46.2%); Chicken Samosa (21.4%); fish fillets (20%); Hot dogs (15%) and bacon (20%)</p> <p>Middle: Ham (35%);bacon (41.7%); canned meat (76.9%); red meat (75%); Burgers (41.9%); Hot dogs (39%); Minced meat (26.8%); fish fillets(30.3%); beef samosas (13.8%); chicken samosas (34%); <i>mutura</i> (29.9%); meat balls – beef and shoats (51.4%); Meat balls -fish (31.6%); bone soup (22.6%) and chicken soup (171%).</p> <p>Low: Sausages (25.5%); Aged meat (62.5%), ham (27.3%); bacon (41.7%); canned meat (76.9%); meat balls –bee & shoats; 45.2%; bone soup (26.5%), chicken soup(49.6%) ; burgers ((50%); hotdogs (55.2%);minced meat (48.2%); meat balls – beef and shoats (26.7%); fish fillets (48.6%); beef samosas (24.8%); chicken samosas(58.2%); Africa sausage / <i>mutura</i> (20.6%)</p>



4.11.5 Why Some Households do not consume some Processed and Value Added Products

1) Affordability: The proportions of households that cited affordability as a limitation to the consumption of processed value added products in the different income segment were as follows:

- a) High income segment: Bacon (18%); ham (18%)
- b) Middle income segment: Canned meat (26%); aged/cured meat (23%); burgers (24%); hotdogs (21%); minced meat (26%); fish fillets (34%); ham (23%), bacon (23%) and sausages (20%).
- c) Low income segment: sausage (32%); Hams (36%); Bacon (38%); Canned meat (42%); cured meat (33%); burgers (40%); hot dogs (36%); minced meat (45%); fish fillets (45%); chicken samosa (20%), beef samosa (22%)

2) Accessibility: The proportions of households that cited accessibility as a limitation to the consumption of processed value added products in the different income segment are as follows:

- a) High income: Canned meat (22%), aged meat (41%), fish fillets (36%), Mshikaki (46%), deep fried pork (23%), Chicken Samosa (59%).
- b) Middle income: Canned meat (21%); aged/cured meat (46%); hotdogs (27%); Burgers (21%), minced meat (36%), fish fillets (26%) ham (28%), chicken soup (28%), Meat balls (36%) and chicken samosa (46%).
- c) Low income: Ham (36%); bacons (35%); canned meat (34%); aged eat/cured meat (41%); burgers (38%); hot dogs (30%); minced meat (27%); fish fillets (27%); mshikaki

(36%); deep fried pork skins (23%); beef samosa (23%); chicken samosa (45%), meat balls (33%) and chicken soup (29%).

3) Health concerns: This is mainly associated with the hygiene and safety of the products. Most consumers indicated that some of the products like samosa could be made from meat from wild animals citing the recent reports of samosas made from cat meat in Nakuru. Furthermore a study by Karoki et al (2018) Isolated five genera of bacteria (which are potentially zoonotic) , namely, Staphylococcus spp. at 50.4%, Bacillus spp. at 19.5%, Streptococcus spp. 9.8%, Proteus spp. 2.4%, and E. coli spp. at 1.6%, from 80 African sausage samples. Such reports have discouraged many potential consumers from consuming these products. The proportions of households that cited health concerns as a limitation to the consumption of processed value added products in the different income segment are as follows:

- a) High income segment: Africa sausage (38%); Meat balls (16%); Bone soup (17%); Beef samosa (57%); Deep fried pork skins (16%); pork mshikaki (17%); hot dogs (28%); minced meat (37%); canned meat (37%); burgers (25%); sausages (31%); ham (17%) and bacon (18%)
- b) Middle income segment: sausages (20%); mshikaki (13%); beef samosa (22%); African sausage (20%) and bone soup (15%).
- c) Low income segment: beef Samosa (14%); African sausage (25%); meat balls (11%) and bone soup (13%).

4) Not getting the desired quality: The proportions of households that cited lack of desired quality as a limitation to the consumption of processed value added products in the different income segment are as follows:



- a) High income: sausage (15%); fish fillets (12%) and bone soup (17%)
- b) Middle income: bone soup (11%) and beef Samosa (12%)
- c) Low income segment – less than 10% for all products

5) No one in the household likes the products: The proportions of households where no one in the household like some of the processed value added products in the different income segment are as follows:

- a) High income segment: Sausage (15%); ham (34%); bacon (39%); canned meat (34%); aged meat (18%); burgers (14%); hotdogs (38%); minced meat (39%); fish fillets (16%); mshikaki (19%); deep fried pork skins (27%); beef samosa (20%); chicken samosa (17%); African sausage (40%); meat balls – cattle and shoats (38%); meat balls –fish remains (52%); chicken soup (44%)
- b) Medium income segment: sausages (29%); ham (27%); bacon (27%); canned meat (30%); aged meat (16%); burgers (28%); hot dogs (30%); minced meat (29%); fish fillets (20%); mshikaki (25%); deep fried pork skins (29%); beef samosa (30%); chicken samosa (16%); African sausage (49%);meat balls-beef and shoats(24%); meat balls –fish remains (44%); bone soup (34%) and chicken soup (29%)
- c) Low income segment: bone soup (36%); chicken soup (38%); mutura (44%); meat balls –fish remains (38%); deep fried pork skins (26%); Beef Samosa (22%); chicken samosa (14%); mshikaki (27%), minced meat (17%), sausage (28%) and ham (12%)

6) Other reasons: Results indicate that consumers who do not consume certain produce for other reasons such as ease of preparation, cultural reasons,

knowledge on how to prepare and religious reasons were the minority in all the income segments. Where these reasons were applicable, the proportion of the consumers who cited were less than 10% for all the products and income segments.

Suggestions on what should be done so that consumers who currently do not east some of the processed and value added products could consume in the future were as follows:

Process and package safely: This suggestion was made for the following products: mshikaki (31%); beef samosa (30%); chicken samosa (27%) African sausage (40%) and meat balls (37%)

- a) Create awareness on preparation methods: aged meat (20%); burgers (18%); hot dogs (18%); fish fillets (17%); minced meat (19%); beef samosa (25%); bone soup (27%) and chicken soup (27%).
- b) Publicize that they are compliant with religious values: ham (31%); canned meat (31%); hotdogs (26%) and burgers (20%).
- c) Reduce prices: Sausages (27%); canned meat (20%); aged meat (22%); burgers (22%); hot dogs (20%)’minced meat (25%) and fish fillets (26%)
- d) Make them available in the formal channels: Bone soup (21%); mshikaki (16%); chicken soup (18%) and meat balls (15%)

4.12 PREFERENCE FOR OUT OF HOME VERSUS HOME PREPARED MEAT

Majority of the respondents in the three segments prefer home prepared meat than out of home. The low-income segment has the highest proportion of households that prefer eating at home (94.1%) followed by middle income (86.6%) while high income segment has the lowest proportion (69.8%). At least 23.3% of households in the high-income segment have no specific preference between out of home and home prepared.



Below: Beef and chicken meat at a supermarket



Based on the correlation test results location of the consumer is not related to the preferred meat consumption points, $r(858) = -0.028$, $p = 0.415$. Home prepared meat is the most preferred model among the consumers in the different locations (Nairobi = 87.6%, Mombasa = 92.3%, Eldoret/Nakuru = 92.2%, Garissa = 80%, Kakamega = 81.4%, Kisumu = 94.4% and Makueni = 98.4%).

There is no linear relationship between the variables age of the household head and meat consumption points, $r(847) = 0.011$, $p = 0.756$. Age has no significant association with choice of Meat consumption points, $X^2(4, N= 847) = 6.794$. Home prepared meat is the most likely choice of consumption of meat in the three household head age groups, 18 – 35 (88.8%), and 36 – 50 (91.4%) and above 50 (96.8%).

There is however an association exists between the meat consumption model and the income level of the consumer, $X^2(4, N=858) = 32.62$, $p < 0.05$. Despite most of the consumers in the three income categories preferring to consume home prepared meat the high-income consumers also had a slightly high number (8.2%) preferring out of home meat compared to the middle (3.7%) and the low-income consumers (1.6%). Generally, a high income and middle-income consumers are more likely to consume meat out of home than the low-income consumers.

Table 39: Preference for out of home versus home prepared meat

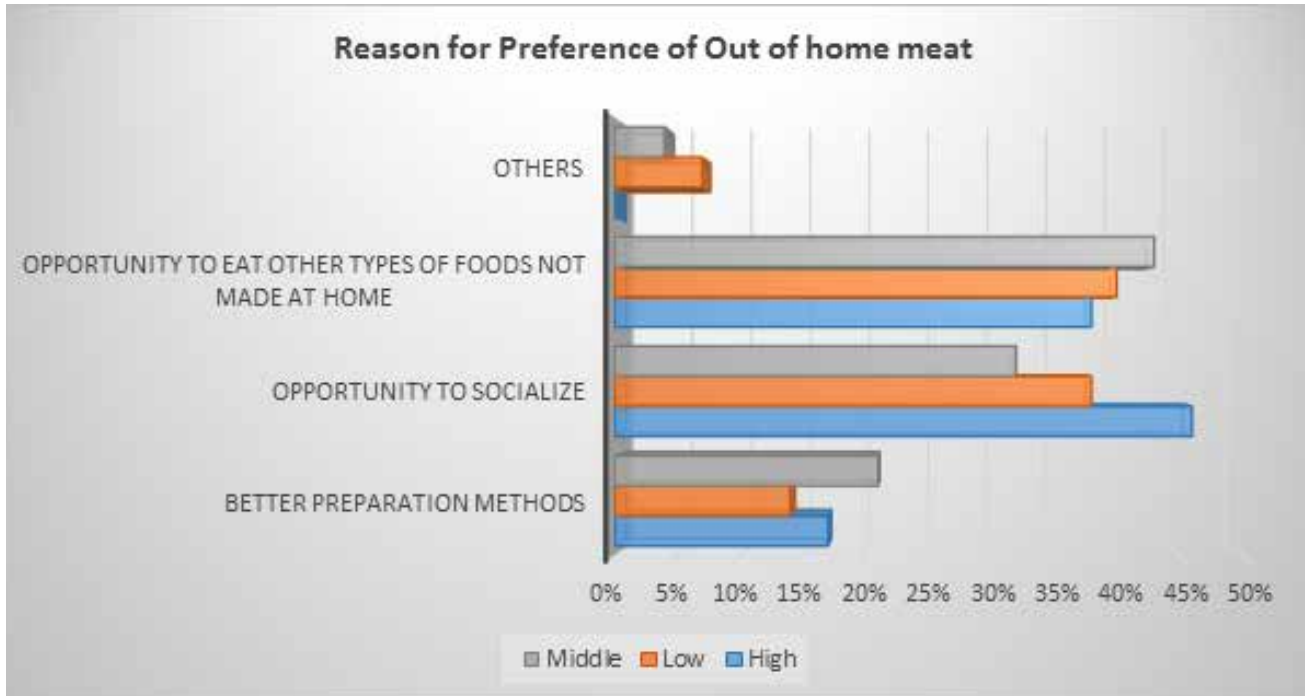
Segment	Preference	Percent
High income	Eating out of home	7.0
	Home prepared	69.8
	No specific preference(Either)	23.3
Middle income	Eating out of home	3.9
	Home prepared	86.6
	No specific preference(Either)	9.5
Low income	Eating out of home	1.6
	Home prepared	94.1
	No specific preference(Either)	4.3

4.12.1 Reason for preference of out of home meat

In the high-income segment, eating out of home is mainly preferred because it provides an opportunity to socialize (46%) and also provides an opportunity to eat other types of foods not made at home (38%). Opportunity to eat other types of foods not made at home was ranked highly (40%) in the medium and (43%) in the low-income segments followed by the opportunities to socialize (38%) in low income segments) and 32% in medium income segments respectively.



Fig 12: Reason for preference of out of home meat



4.12.2 Age bracket with highest preference for out of home meat

In the high-income segment, the age bracket that most prefers to eat meat out of home in majority of the households is the 20-35 years

bracket (53.8%) followed by 12-19 years (38.5%). Similarly, those between 20-35 years prefer out of home meat by majority of households in the middle- and low-income segments, as cited by 66.7% and 69% of households in the middle- and low-income segments respectively. Table 40 below summarizes these findings.

Table 40: Age bracket with highest preference for out of home meat

Segment	Age brackets	Percent
High income	Between 12 and 19 years	38.5
	Between 20 and 35 years	53.8
	Between 36 - 60 years	7.7
Middle in-come	Below 12 years	15.4
	Between 12 and 19 years	12.8
	Between 20 and 35 years	66.7
	Between 36 - 60 years	5.1
Low income	Below 12 years	3.4
	Between 12 and 19 years	10.3
	Between 20 and 35 years	69.0
	Between 36 - 60 years	17.2



Children who are below 12 years go out to eat meat in majority of households (54.5%) in high income segments than the other 2 segments. In middle and low income, the proportion that has children below 12 years going out to eat meat is relatively lower than high income segments, as presented by 36.1% while the low income segment the proportion with this age bracket going out to eat is the minority as cited by 17.1% of the households in this segment.

The most preferred meats when children below 12 years go out to eat is variable across

the income brackets. In high income segment, majority of the households indicated that they eat chicken meat (50%) and fish, goat meat and *nyama choma* goats in small proportions of 16.7% each. In the middle-income segment, they consume a variety of meat and meat products including beef (17%), chicken wings (15.4%), chicken meat (15.4%), fish (7.7%), *nyama choma* beef (23.1% and *nyama choma* goat (7.7%). In the low-income segment, they mainly consume chicken meat (40%), Beef (20%) and *nyama choma* /beef (20%).

Table 41: Most preferred meat type when children below 12 years go out

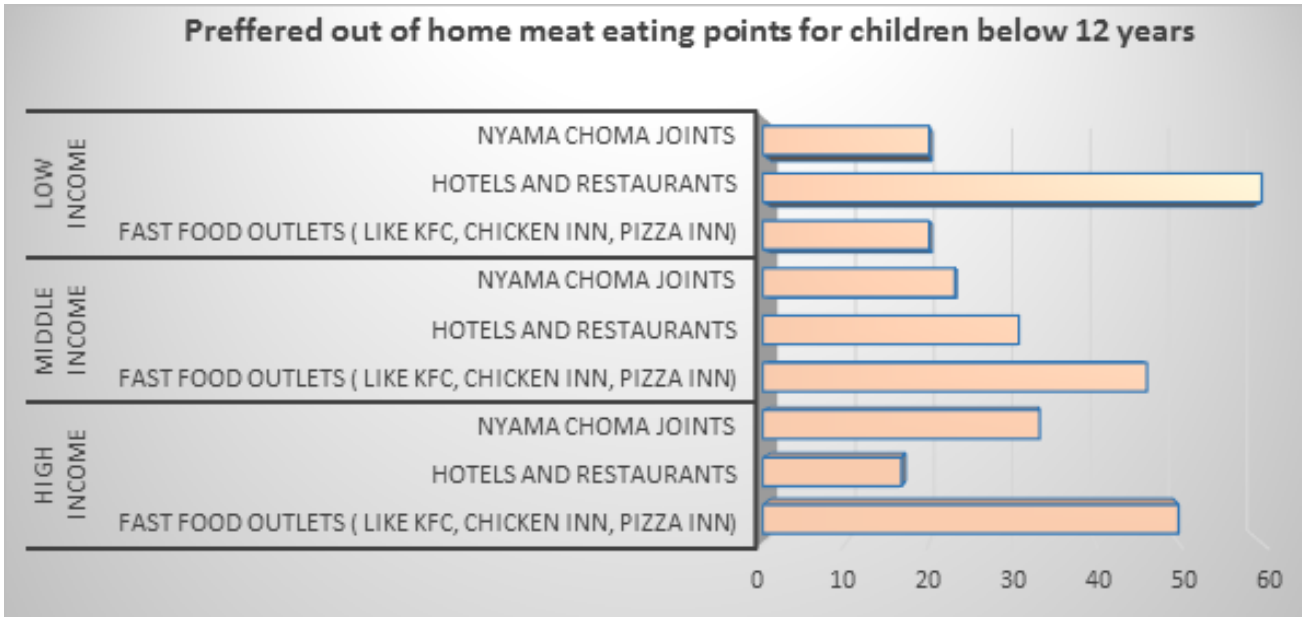
Segment	Preferred meat and meat product	Percent
High income	Chicken meat (fried, boiled)	50.0
	Fish	16.7
	Goat Meat (fried, boiled)	16.7
	nyama choma (goat)	16.7
Middle income	Beef (fried, boiled)	7.7
	Chicken meat (fried, boiled)	15.4
	Chicken wings	15.4
	Fish	7.7
	Grilled Pork	7.7
	Nyama Choma (beef)	23.1
	nyama choma (goat)	7.7
	Others	15.4
Low income	Beef (fried, boiled)	20.0
	Chicken meat (fried, boiled)	40.0
	Nyama Choma (beef)	20.0
	Others	20.0

The most preferred out of home eating place for children below 12 years are variable across different income segments. In the high-income majority prefer fast food outlets (50%) hotels and restaurants (16.7%) and *nyama choma*

joints (33.3%). The same preference was observed for the middle income, with 46.2% preferring fast food joints, 30.8% hotels and restaurants and 23.1% *nyama choma* joints.



Fig 13: Preferred out of home meat eating points for children below 12 years



4.12.3 Out of Home Meat Consumption for 12-19 years age bracket

The proportion of households with people of 12-19 years age bracket who eat at home was found to be more in the high income (41.7%) compared to middle income (27.3%) and low income segments (21.4%). At least 18.2% of households in the middle income segment and 7.1% in low income segment indicated that they do not know if members of the households in this age eats meat out of home.

When they go out, majority prefer to eat a wide range of meat and meat products, as shown in table 42 below. In high end, they prefer beef, chicken, grilled pork and nyama Choma (goats,) in equal proportion of households of 20% each. In the middle and low income, majority of the households indicated that they consume chicken (55.6% in middle income and 33.3% in the low income segment; nyama choma beef (50% of households in the low income segment. Chicken meat is also preferred in the low income segments as cited by 33.3% of households in this segment.



Table 42: Preferred meat type of home meat and meat products for 12 and 19 years bracket

Segment	Type of meat and meat products	Percent
High income	Beef (fried, boiled)	20.0
Goat Meat (fried, boiled) Grilled Pork nyama choma (goat)	Chicken meat (fried, boiled)	20.0
	20.0	
	20.0	
Middle income	Chicken meat (fried, boiled)	55.6
	Chicken wings	22.2
	nyama choma (goat)	11.1
	Others	11.1
Low income	Chicken meat (fried, boiled)	33.3
	Goat Meat (fried, boiled)	16.7
	Nyama Choma (beef)	50.0

The preferred out of home meat eating point in the high and middle income segments, is fast food joints as cited by 80% and 55% of the households respectively. Other preferred outlets in the high income are the nyama choma joints (20%) while in the middle income, other preferred outlets include hotels

and restaurants (11.1%) and nyama choma joints. In the low income segments, majority of the consumers prefer hotels and restaurants (66.7%), nyama choma joints and fast food outlets as cited by 16.7% of the consumers in this segment.

Table 43: Preferred out of home meat eating points for those aged 12 - 19 years

Segment	Type of outlet	Percent
High income	Fast food outlets (like KFC, Chicken Inn, Pizza inn)	80.0
	Nyama Choma Joints	20.0
Middle income	Fast food outlets (like KFC, Chicken Inn, Pizza inn)	55.6
	Hotels and restaurants	11.1
	Nyama Choma Joints	33.3
Low income	Fast food outlets (like KFC, Chicken Inn, Pizza inn)	16.7
	Hotels and restaurants	66.7
	Nyama Choma Joints	16.7



4.12.4 Out of home consumption patterns for 20 and 35 years age bracket

The proportion of households where people between 20 and 35 years go out to eat meat is quite high in the three segments. In the high and low income segments, 75% of the households have people this age bracket going to eat meat out of home, while this proportion is slightly higher (81.1%). The most preferred

meat by this age category is quite variable in all the income segments. In high income, majority of the households (33.3%) reported that they go to eat nyama choma (beef) followed by those who have members of this age category going out to eat chicken. About 11% reported that they go out to eat nyama choma goats, goat meat (boiled or fried) and to drink bone soup. In the middle and low income segment, this age category is seen to eat a wide range of meat types as shown in table 44 below.

Table 44: Preferred meat type when adults aged between 20 and 35 years go out

Segment	Type of meat	Percent
High income	Bone soup (cattle, sheep, goats)	11.1
	Chicken meat (fried, boiled)	22.2
	Chicken Soup	11.1
	Goat Meat (fried, boiled)	11.1
	Nyama Choma (beef)	33.3
	nyama choma (goat)	11.1
Middle income	Africa Sausage (Mutura)	6.7
	Chicken intestines (Fried)	3.3
	Chicken meat (fried, boiled)	16.7
	Chicken wings	3.3
	Fish	13.3
	Goat Meat (fried, boiled)	10.0
	Grilled Pork	3.3
	Nyama Choma (beef)	23.3
	nyama choma (goat)	16.7
	Others	3.3
Low income	Africa Sausage (Mutura)	9.5
	Beef (fried, boiled)	9.5
	Beef Samosa	4.8
	Bone soup (cattle, sheep, goats)	4.8
	Chicken meat (fried, boiled)	14.3
	Fish	9.5
	Goat Meat (fried, boiled)	14.3
	Lamb/mutton (fried/boiled)	4.8
	Nyama Choma (beef)	19.0
	nyama choma (goat)	4.8
	Pork(fried)	4.8



The preferred meat eating outlets for people in this age category was reported to be nyama choma joints as cited by 66.7% of households in high income, 50% in middle income and 52% of households in the low income segments. About 38% of households in the low income segments also go out to eat meat in the restaurants and

hotels. In the high income about 11% of the households reported that people of this age bracket prefer to eat in the fast food outlets as well as hotels and restaurants. In the middle income the proportion that cited these outlets were 16.7% for fast food and 20.0% for hotels and restaurants.

Table 45: Preferred out of home meat eating points for those aged 20 - 35 years

Segment	Preferred eating point	Percent
High income	Fast food outlets (like KFC, Chicken Inn, Pizza inn)	11.1
	Hotels and restaurants	11.1
	Nyama Choma Joints	66.7
	Others	11.1
Middle income	Fast food outlets (like KFC, Chicken Inn, Pizza inn)	16.7
	Hotels and restaurants	20.0
	Local butcheries	3.3
	Nyama Choma Joints	50.0
	Street Vendors	3.3
	Supermarket	6.7
Low income	Hotels and restaurants	38.1
	Nyama Choma Joints	52.4
	Street Vendors	9.5

4.12.5 Out of home consumption for people in the 36 - 60 age bracket

In the high-income segment, the proportion of households with people between 36 and 60 years who go out to eat meat is much lower (41.7%) than those who do not (58.3%). This proportion is even much lower in the low income in which only 21.2% of households have members of this age category going to eat out of home and another 33.3% who do not know. Similarly, the middle-income segment

has 37% of households that reported to have members of this age bracket going out to eat meat, while 14.8% do not know.

When they go out to eat meat, members of this age category in both the high- and medium-income segments prefer to eat nyama choma (goat meat) as reported by 40% and 42% of the households in the high and middle income segments respectively. In the low-income segment, people within this age bracket eat a wide range of products as cited by small proportions of households (10-20%).



Table 46: Preferred meat type when adults of 36 and 60 age bracket go to eat out

Segment	Preferred meat type	Percent
High income	Chicken meat (fried, boiled)	20.0
	Chicken wings	20.0
	Goat Meat (fried, boiled)	40.0
	nyama choma (goat)	20.0
Middle income	Beef (fried, boiled)	14.3
	Fish	14.3
	Nyama Choma (beef)	28.6
	nyama choma (goat)	42.9
Low income	Africa Sausage (Mutura)	10.0
	Chicken meat (fried, boiled)	20.0
	Fish	10.0
	Goat Meat (fried, boiled)	20.0
	Nyama Choma (beef)	10.0
	nyama choma (goat)	20.0
	Others	10.0

The most preferred outlet for people of this age category was reported to be nyama choma joints (40%) and hotels and restaurants (40%) in the high-income segments. In the middle income category, majority (71%) reported that people from this age category prefer nyama choma joints while smaller proportions of

14.3% reported that they prefer fast food and street vendors. In the low income segment, majority of the households (44.3%) reported that people of this age bracket prefer to eat at nyama choma joints (44.4%), hotels and restaurants (33.3%) and fast food outlets (22.2%).

Table 47: Preferred out of home meat eating points for 36 - 60 age bracket

Segment	Type of outlet	Percent
High income	Fast food outlets (like KFC, Chicken Inn, Pizza inn)	20.0
	Hotels and restaurants	40.0
	Nyama Choma Joints	40.0
Middle income	Fast food outlets (like KFC, Chicken Inn, Pizza inn)	14.3
	Nyama Choma Joints	71.4
	Street Vendors	14.3
Low income	Fast food outlets (like KFC, Chicken Inn, Pizza inn)	22.2
	Hotels and restaurants	33.3
	Nyama Choma Joints	44.4



4.12.6 Out of home meat consumption patterns for adults above 60 Years of age

Adults of above 60 years of age who go out to eat meat are the minority in all the market segment. In high- and low-income segments, only 9.1% and 3.8% of the household have adults in this bracket who go out to eat meat while none of households in the middle income segments reported to have anyone in this age bracket going out to eat meat. At least 9.1%, 39.3% and 15.4% of the households in the high, middle- and low-income segments indicated that they do not know if adults in this category go out to eat meat. The preferred meat type by adults of this age bracket when they go out to eat meat was reported to be nyama choma by 100% of households in the high income and chicken (fried or boiled) as reported by 100% of the respondents in the low income segment.

4.12.7 In Summary:

In all the income segments, the 20-35 age category constitute the majority of people who go out of home to eat meat and meat products; the main reasons for going out to eat meat is mainly to socialise and also as an opportunity to eat products not prepared at home. This category mainly prefer to go to nyama choma joints in all the three categories. Nyama choma beef and chicken (boiled or fried) is the most preferred by this category of respondents. The implication for this to meat traders is:

- (iii). Meat traders and processors should target *nyama choma* joints in their promotional activities, in order to tap into this market
- (iv). The nyama choma joints are the main drivers of out of home meat consumption for this age bracket and should therefore create conducive environment for socialization while also coming up with unique products to meet the needs for going out;

In the high income segment, children under 12 -19 years were also ranked second as far as preference for out of home meat consumption is concerned. Fast food outlets are most

preferred by this group. However the type of meat and meat consumed by this group is quite variable, with chicken, goat *nyama choma*, beef (fried/boiled), goat meat and grilled pork ranked equally. The equal ranking could be variations in the interpretation of fast foods across different regions where data was collected. Fast food outlets should be targeted with promotion of products for this age group.

The relatively low proportion of people of other age brackets (below 12 years, between 36 and 60 years and those over 60 years) who go out to eat meat, means that:

During KII and FGDs it was reported that there is too much publicity against eating meat, associating it with lifestyle diseases; this is in agreement with the earlier results that show health concerns are the main reasons for consuming some of the meat types. This may be the reason why there is relatively low consumption of out of home meat by people above 36 years. There is need for the meat traders, processors and stakeholders to come up with messaging to counter this negative publicity, while emphasizing on the safety in handling along the supply chain.

4.13 UTILIZATION OF HOME DELIVERY SERVICES

4.13.1 Utilization of Home delivery services by consumers

Business environment keep on evolving with new concept coming up one of them being home delivery of goods and services. The proportion of households that utilize home delivery services is the minority in the three income segments. Only 27.9% of households in the high income, 8.8% in the middle income and 2.3% in the low income segments reported to be ordering meat for home delivery. Respondents who order meat in the three income segments indicated that that everyone in the family like home delivery meat as cited by 71%, 81.5% and 91.7 % of households in the high, middle and low income segments respectively. The respondents that order food all indicated that ordering is done through phone calls.



The interpretation of the relatively low utilization of meal ordering services takes into consideration the out of home eating habits. According to the Key informants, the available home delivery services are mainly provided by fast food outlets with most of them focusing on chicken and burgers. As it was seen earlier in this report, people aged 20 and 35 years have the highest preference for out of home meat, while all those over 36 years, who go for out of home meat, still eat *nyama choma*. While this services can be easily provided by *nyama choma* joints, it will be very important for traders to take into consideration of how *nyama choma* is consumed in Kenya, where consumers prefer to go to select the specific meat before it is prepared. This is basically because there are no standard cuts in the *nyama choma* joints which consumers can just order at home as it is with chicken from fast foods. Secondly as shown above, most consumers who go out prefer to do so as a way of socializing and also to have variety. For this *nyama choma* market therefore, it will be of importance to note that:

- 1) The people who for some reason, are not able to go out for *Nyama choma* are likely to be excluded, but can be reached through home delivery services
- 2) There is need for *nyama choma* operators, or the fast food restaurants to package *nyama choma* for home delivery targeting those people in the high and middle income segments who are not able to go out for some reasons. This will require coming up with standard and pieces for specific prices, to enable ordering.

4.13.2 Utilization of home delivery services by retailers

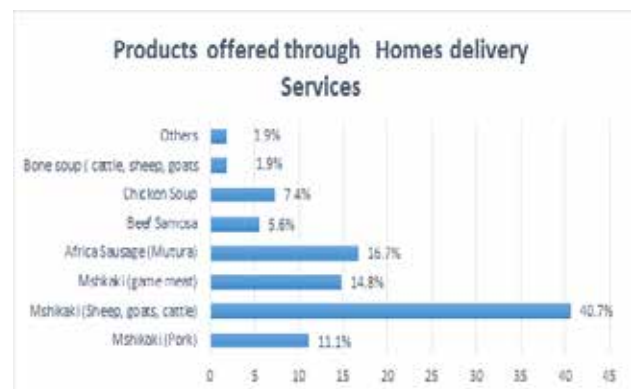
Results from analysis shows that majority of retailers (78.0%) do not utilize home delivery model of business while 22.0% are using it. On why they have not adopted this method, 62.2% cited that their customers prefer to select for

themselves, 16.3% indicated that they don't have a system through which orders can be placed and 11.2% indicated that this will increase the cost of doing business. Minority cited that they don't have extra staff to offer this form of service.

The types of meat ordered from retail outlets through home delivery services are summarized in Figure 14 below. Majority of traders who offer home delivery services (40.7%) provide delivery services for *Mshikaki* (Sheep, goats, cattle) and African Sausage (16.7%). The most common meat ordering systems employed by their respective customers was said to be through voice call as cited by 87.3% traders, 7.3% uses SMS while 1.8% were said to use WhatsApp. The level of satisfaction with this businesses model was rated as very satisfied as cited by 56.4% respondents and 43.6% were satisfied.

Traders reported that consumption of some of the value added products like *mutura* is associated with people of low social economic status and informal settlements which limits some of the consumers of high and middle income segments from buying these products. Some, according to traders, usually park their cars quite a distance from where the street vendors are to avoid being associated with the street products. This can be addressed by promoting the value-added product like *mutura* as healthy products and ensuring that the health concerns by consumers are addressed.

Fig 14: Products offered through homes delivery services





5 Objective 2 and 3: Current Knowledge Levels, Gaps And Information Awareness On Cold Meat Practices In Kenya

5.1 MEAT PRESERVATION AT THE HOUSEHOLD LEVEL

Majority of households in the high- and middle-income segments use refrigeration to preserve meat, as reported by 92.3% and 51.6% of the households respectively. In the middle income segment, 33.4% however indicated that they

do not preserve because meat is consumed the same day it is bought. In the low income segment, majority of the households (54.1%) do not preserve but rather consume meat the same day it is bought, while some 12.7% preserve by boiling. Table 48 presents these findings.

Table 48: Most preferred meat preservation method

Segment	Preservation method	Percent
High income	Boiling	4.7
	Refrigeration for a few days	95.3
Middle income	Boiling	12.7
	No preservation, meat is consumed the same day	33.4
	Others	1.0
	Preservation in honey	.3
	Refrigeration for a few days	51.6
	Salting	1.0
Low income	Boiling	22.7
	Drying	4.7
	No preservation, meat is consumed the same day	54.1
	Others	.4
	Preservation in honey	.2
	Refrigeration for a few days	13.7
	Salting	2.0
	smoking	2.2



5.2 PROPORTION OF HOUSEHOLDS WITH COLD STORAGE EQUIPMENT

At least 97.7% of households in the high income have cold storage equipment. In the middle and low income segments, 56.3% and 12% of households respectively reported to be having cold chain equipment in their households. The type of equipment owned by majority of households is the refrigerators as reported by 76.2% of households in the high income, 90.2% in the middle income and 88.7% of households in the low income segments. At least 23.8% of households in the high income segments have deep freezers.

Majority of households in the high income segment, who do not have cold storage indicated that they do not like cold meat

and meat products (50%) while another 50% indicated that they don't need cold storage since they buy what they can consume in a day. In the low income, the reason given by majority of households for not having cold storage is that they can't afford (48%) and that they buy what they can consume in day (24%). Similarly reasons given by households in the middle income affordability (42%) and buying enough for a day (26%). Table 49 summarizes these findings.

The main reasons given for not owning cold chain the consumers in the three market segments implies that there is need to create awareness on the health benefits of cold storage beyond preservation. They also need to be educated on what to demand from the retailers, so that they buy products of good quality.

Table 49: Reasons for not owning cold storage in some households

Reasons for not owning cold storage	High	Middle	Low
I cannot afford	0%	42%	48%
We do not like cold meat and meat products	50%	14%	11%
I have no power supply	0%	3%	4%
High cost of power	0%	8%	7%
I buy what we can consume in a day	50%	26%	24%
High maintenance costs	0%	6%	4%
Not aware about cold chain storage	0%	1%	3%

For those who have the cold storage equipment, meat is stored for an average of 9 days in the high-income segment, 4.9 days in the middle income and 3.6 days in the low-income segment. When asked the frequency of utilization of the cold storage equipment, majority in the high-income segment (72.8%) reported that they always use the equipment while another 16.7%

indicated that they utilize very frequently. In the middle-income segment, 33.5% reported that they utilize always, 24.9% occasionally, 31.8% very frequently and 3.4 % very rarely. In the low-income segment, 44% reported that they use the equipment occasionally, 23% very frequently, and 8. % very rarely.



Table 50: Frequency of utilization of the meat cold chain

Segment	Frequency	Percent
High income	Always	73.8
	Occasionally	7.1
	Rarely	2.4
	Very Frequently	16.7
Middle income	Always	33.5
	Occasionally	24.9
	Rarely	6.4
	Very Frequently	31.8
	Very Rarely	3.5
Low income	Always	16.4
	Occasionally	44.3
	Rarely	8.2
	Very Frequently	23.0
	Very Rarely	8.2

The consumers gave a number of reasons why the cold chain is not utilized frequently as presented in table 51. Results show that in the three segments, those who are not utilizing their cold storage equipment frequently reported that they do not have excess meat to store, as all meat bought is consumed, as shown by 63%, 68% and 69% of households in

the high, low- and medium-income segments respectively. A relatively smaller proportion in the three segment, reported the need to reduce energy, which was cited by 25%, 20% and 24% of households in the high, low and middle income segments respectively.

Table 51: Reason meat cold chain equipment is not frequently utilized

Segment	No Excess meat/All meat bought is consumed at Once	To reduce cost of energy	The cold chain equipment breaks down	Others
High	63%	25%	0%	13%
Low	68%	20%	0%	11%
Middle	69%	24%	1%	6%

5.3 PREFERENCE FOR COLD AND HOT CHAIN MEAT BY CONSUMERS

Hot chain meat is preferred by majority of consumers in all the market segments with the low income segment having the highest number of those who prefer meat from hot chain (85.7%) compared to the middle income (59.8%) and high income segment (46.5%). Two main reasons were given for preferring

meat from hot chain; the first reason was assurance of safety as reported by 45% of consumers in the high-income segment, 69% in the low income and 58% in the middle income segments. The second reason is that quality of meat is maintained after passing through or storing in cold chain as expresses by 55% of the consumers in the high income, 31% in the low and 42% in the middle income segments.



Table 52: Preferred meat handling chain when purchasing meat

Segment	Type of meat handling Chain	Percent
High income	Both	34.9
	Cold Chain meat (Frozen, chilled)	16.3
	Hot chain meat (Fresh meat)	46.5
	Neither	2.3
Middle income	Both	30.7
	Cold Chain meat (Frozen, chilled)	8.5
	Hot chain meat (Fresh meat)	59.5
	Neither	1.3
Low income	Both	8.4
	Cold Chain meat (Frozen, chilled)	5.7
	Hot chain meat (Fresh meat)	85.7
	Neither	.2

The Chi square test revealed that the preferred meat handling chain did not differ by the family age group, $X^2(6, N = 850) = 5.89$, $P = 0.436$. This means that age group does not have an effect on the choice of the meat handling chain. Most respondents in the three age groups preferred the hot chain meat, 18 – 35 (76.1%), 36 – 50 (71.7%), above 50 (81.3%). Chances are high that a consumer from any age group will most likely buy meat from the hot chain compared to the cold chain.

There was however a significant association between location of the respondent and the preferred meat handling chain, $X^2(18, N = 860) = 110.299$, $p < 0.05$. The meat consumers from Mombasa are most likely to use the cold chain system (21.4%) compared to the consumers in other location (Nairobi = 5.2%, Eldoret/

Nakuru = 1%, Garissa = 2.9%, Kakamega = 2.8%, Kisumu = 2.8%, Makueni 6.6%).

There was a strong correlation between Level of income and the meat handling chain, $r(860) = 0.302$, $p < 0.05$. Preference for the two chains was not equally distributed, $X^2(6, N = 860) = 97.64$, $p < 0.05$. The high income earners had a higher preference for the cold chain (16.3%) compared to the middle (8.3%) and Low (5.7%). The low income consumers had a high preference for hot chain meat (85.7%).

Reasons why consumers do not prefer meat from cold chain

Lack of awareness on the benefits of the cold chain was ranked as the main reason for not consuming meat from cold chain as shown by 58%, 50% and 46% of the responses in high, low and middle income segments. The main reason why meat from cold chain is not preferred by consumers was lack of awareness of the benefits. This was followed by consumer perception that stored meat has lost its taste as shown by 17%, 23% and 22% of responses in high, low and middle income segments. Availability of chilled meat in local shops was ranked the lowest, as cited by 13%, 7% and 10% of the responses in high, low and medium income segments respectively. Table 53 summarizes these findings

Table 53: Reasons why consumers do not prefer meat from cold chain

Reasons	High	Middle	Low
Not aware of the cold chain system	13%	22%	20%
I am not aware of the benefits	58%	46%	50%
Frozen/chilled meat not available in local shops	13%	10%	7%
It Has lost good taste/ Overstayed	17%	22%	23%



5.4 CONSUMER PERCEPTIONS ON COLD CHAIN MEAT

Majority of the respondents are in agreement that freezing or chilling meat is a safe preservation methods as reported by 98.3% of respondents in the high income, 75% in the middle income and 58.6% in the low income segment. It is however observed that there is a proportion did not agree (18.9%) and 22.6% that is undecided in the low income segment while the middle income segment has 13% and 12% as undecided respectively.

Majority of consumers in the high income segment (88.4%) agree that the nutritional value of meat is maintained in chilled/frozen meat, than in the middle (62%) and low income segments (36. %). It is observed that in low income segment, almost an equal proportion is either undecided (30.2%) or in disagreement (33.1%).

Majority of the high income segment consumers (83.7%) are in agreement that the taste of meat is not affected after chilling or freezing. However in the middle and low income segment, the proportion that agree with this statement was quite low compared to the high income statement as represented by 47.7% and 28% of respondents in the middle and low income segments respectively. In low income segment, the proportion that disagree on this statement (49%) is much higher than the proportion that is in agreement (28%). At least majority of consumers in the three segments were in agreement that chilling of meat preserves the meat and ensures safety for consumers as reported by 83.7% of consumers in the high income, 71.3% in the middle income and 51.6% in the low-income segments.

At least 16.3% of respondents in the high income, 25.4% in the middle income and 29.6% in the low-income segment agreed with the statement that there are no known benefits of chilling/freezing meat while 9.5%, 19.9% and 25.4% in the high, middle- and low-income segments respectively were undecided as far as this statement is concerned. This means that there is a knowledge gap on the benefits of chilling/freezing meat especially among the middle- and low-income segments.

At least 16.7%, 30.7% and 51.7% of the consumers in the high, middle- and low-income segments were in agreement that the nutritional value of meat is lost once meat is chilled or frozen. Majority of consumers who disagreed with this statement were from high income segment (73.8%), followed by middle income consumers (49.3%) while the low-income segment had the minority (22.9%).

Majority of consumers in the low-income segment (62.3%) and middle-income segment (46.3%) were in agreement with the statement that meat chilled/froze meat has lost its taste while majority of consumers in the high-income segment (66.7) disagreed with this statement. Cold meat storage is seen by majority of consumers in the high-income segment (78.6%) as a way of managing budget, mainly by buying in bulk.

The analysis shows that the negative perceptions regarding meat from cold chain are more pronounced in the low income and to some extent the middle-income segments with majority believing that meat loses its taste and nutritional value and they do not consider it as fresh meat. According to FGD and KII responses, these perceptions stems from belief that best taste and nutritional value is found in meat that is slaughtered on the same day, which they consider fresh. This is also built on some level of mistrust that they have with retailers, through a belief that there is a high likelihood of retailers freezing old stock to avoid losses and thereafter sell as frozen meat. As such they consider it safe to buy meat that is slaughtered the same day.

Having a large proportion of consumers who either agree or are undecided that the benefits of freezing/chilling meat are not known in all the market segments, especially the low income and middle segments shows that there is a knowledge gap regarding the benefits of cold chain, beyond preservation. This necessitates consumer education, to change these perceptions to enhance their level of understanding of meat quality.



Table 54: Consumer perceptions on cold chain

Perception	High income			Middle income			Low income		
	Agree	Dis-agree	Unde-cided	Agree	Dis-agree	Unde-cided	Agree	Dis-agree	Unde-cided
Freezing/ chilling meat is a safe preservation method	95.3	2.3	2.3	75	13	12	58.6	18.9	22.6
Nutritional value of meat is maintained in chilled meat	88.4	7	4.7	62	21.8	16.2	36.8	33.1	30.2
taste of meat is not affected even after freezing/ chilling	83.7	11.6	4.7	47.7	40.3	12	28	49	23
Chilling of meat preserves the meat and ensures safety for consumers	83.7	2.3	14	71.7	12.7	15.6	51.6	20.2	28.2
There are no known benefits of chilling/ freezing meat	16.3	65.1	18.6	25.4	49.2	25.4	29.6	31.2	39.2
Chilled/ frozen meat has lost its nutritional value	16.7	73.8	9.5	30.7	49.3	19.9	51.7	22.9	25.4
Frozen/ chilled meat has lost its taste	31	66.7	2.4	46.1	39.5	14.4	63.2	16.8	20
Frozen / chilled meat is not fresh	27.9	65.1	7	47.4	37.6	15	64.6	15.6	19.7
Buying and cold storage of meat helps to manage household budget	78.60	9.5	11.9	51	22.2	26.8	0	22.1	32.5



5.5 UTILIZATION OF COLD CHAIN IN THE MEAT RETAIL

5.5.1 Level of investment in Cold Chain in the Meat Retail

Cold chain management in meat supply is of utmost importance for the maintenance of quality and safety of meat and meat products. Although supermarkets sell chilled and frozen meat products, results from consumers discussed in earlier chapters of this report show that majority of butcheries in Kenya still prefer purchasing fresh meat products at traditional markets where meat is displayed on counters or hung on hooks. Among the retail outlets interviewed, 86% (n=21) from high end markets, 75% (n=116) and 62% (n=117) have some cold chain equipment.

In addition to interviews to the sampled retail outlets, a random census was done around Kiamaiko and Dagoretti to establish the penetration of cold chain within a busy meat market. It was established that within a radius of 50 meters, there were 17 butcheries selling red meat with 2 of them selling pork meat. Only 8 out of 17 had deep freezers while the rest 11 did not resulting to 47.1% penetration around that radius. In another 50-meter radius around Dagoretti, there were 23 butcheries out of which 7 had deep freezers resulting to 30.4% penetration around that area. In the coastal region however, majority of the butcheries have deep freezers which is necessitated by high prevailing temperatures that could otherwise lead to meat spoilage.

However, discussions with the owners revealed that the deep freezers are rarely used, because customers prefer fresh hanged meat. Majority of the retailers indicated that they do not preserve their meat/meat products, 1.4% indicated that they lease cold storage, 12.2% indicated that they sold meat directly to their customers ensuring they finish their meat before it spoils.

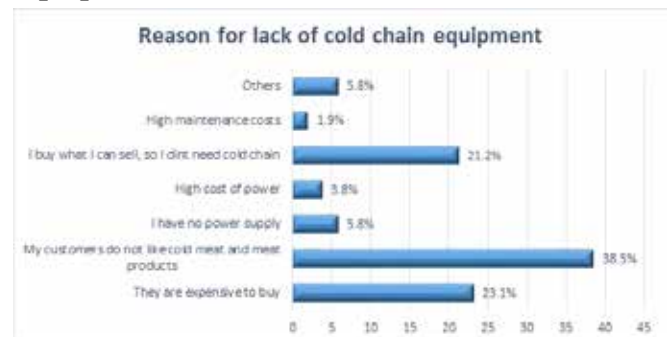
Observation made in the slaughterhouses that were visited revealed that they all have deep freezers and cold rooms in order to comply with the law. Utilization of these facilities in the slaughterhouses is however facilities low, except for the export. It was also observed

that almost 98.0% vehicles used for transport of meat are not refrigerated. The few that have refrigeration services are those that deliver meat to high end hotels, processors and some of the supermarkets.

5.5.2 Reason for lack of cold chain equipment

Majority of retailers (30.5%) reported that they have not invested in cold chain equipment because their customers do not like cold meat and meat products. About 23.1% cited that cold chain equipment are expensive while high cost of power and power failure hindered adoption of cold chain to some extent. Further analysis shows that 1.9% felt that it has high cost of maintenance while 21.2% indicated that they buy only what they can sell in a day. Discussions with traders revealed that they had experienced heavy losses due to power failure while few had bought generator to provide power in case of failure. This resulted in increased operational cost. The chart below summarizes the findings.

Fig 15: Reason for lack of cold chain equipment

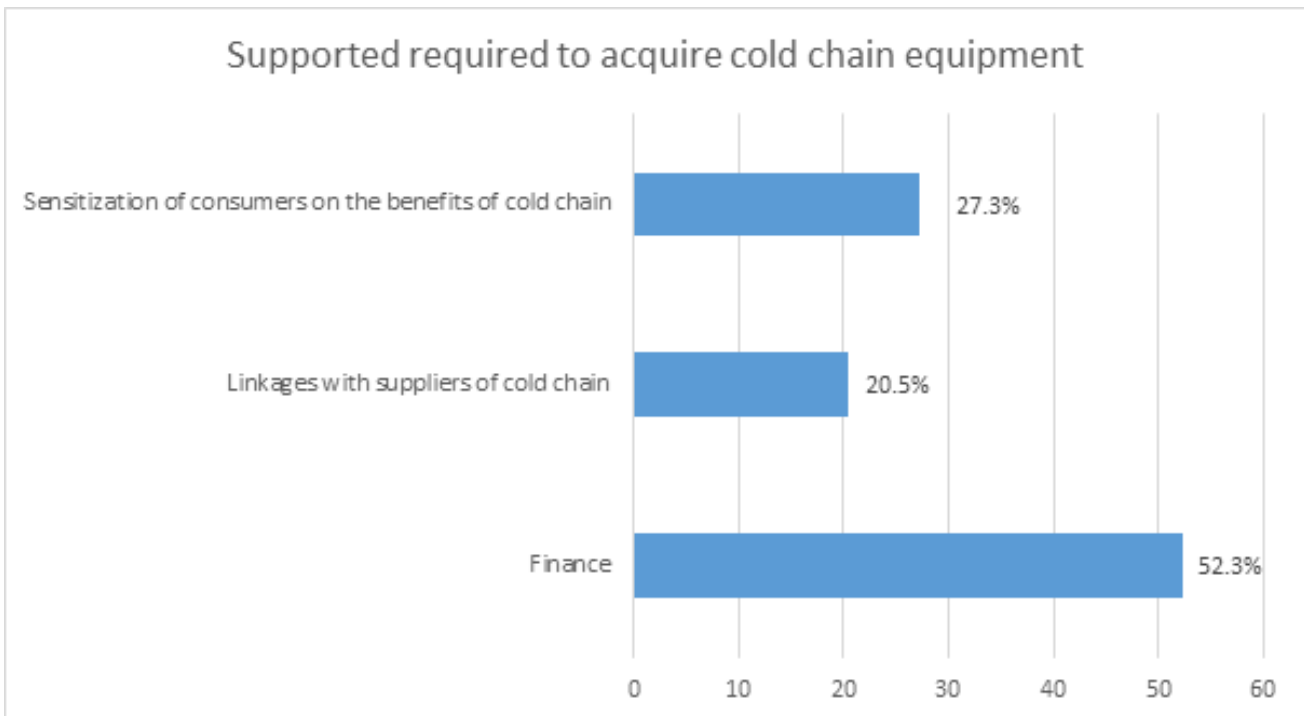


5.5.3 Supported required for retailers to acquire cold chain equipment

About 60.0% of retailers who had no cold chain facility indicated that they would like to be supported to get the equipment while 40.0% they are okay without one. Of 60% that need support, 52.3% of support needed is in form of finance, 20.5% is in form of linkages with suppliers of cold chain while sensitization of customer of the benefits of cold chain was cited by 27.3% of the retailers.



Fig 16: Support required to acquire cold chain equipment

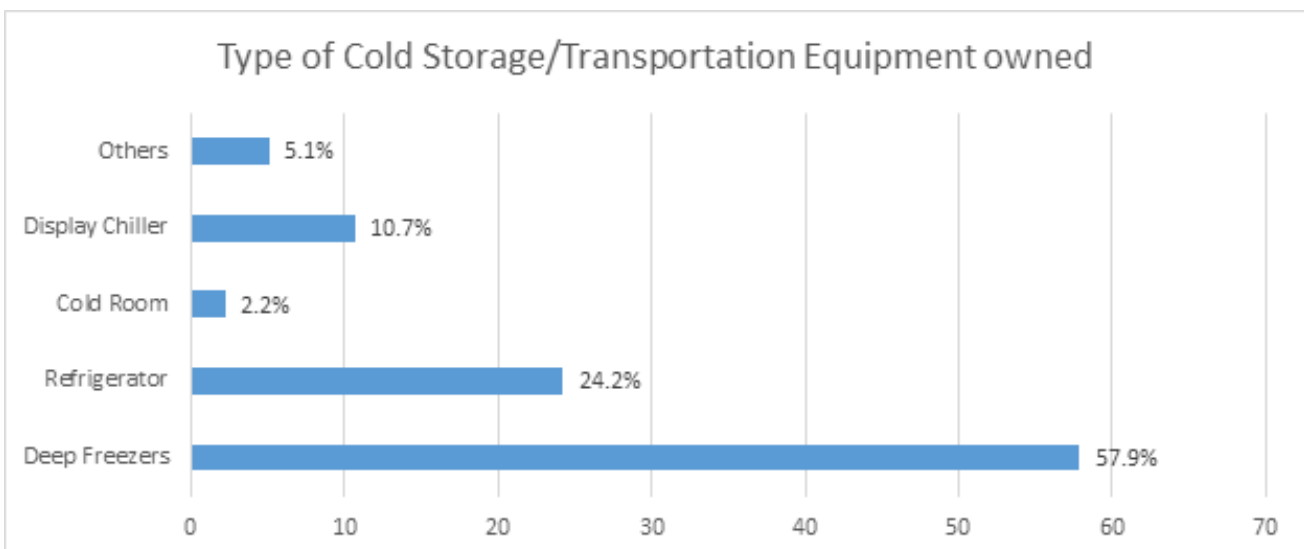


5.5.4 Type of Cold Storage/Transportation Equipment owned

There is a wide range of options and technologies for producing cold conditions for food handling, processing, storage and transport. Some are relatively simple and inexpensive, while other technologies intended to achieve the same results are more sophisticated and complex to

manage. About 57.9% of the retailers indicated that they have deep freezers, 24.2% had refrigerator, and 10.7% have display chillers while 2.2% indicated they have a cold room. The main source of power for cold chain in all sampled area was hydroelectricity.

Fig 17: Type of cold storage/transportation equipment owned



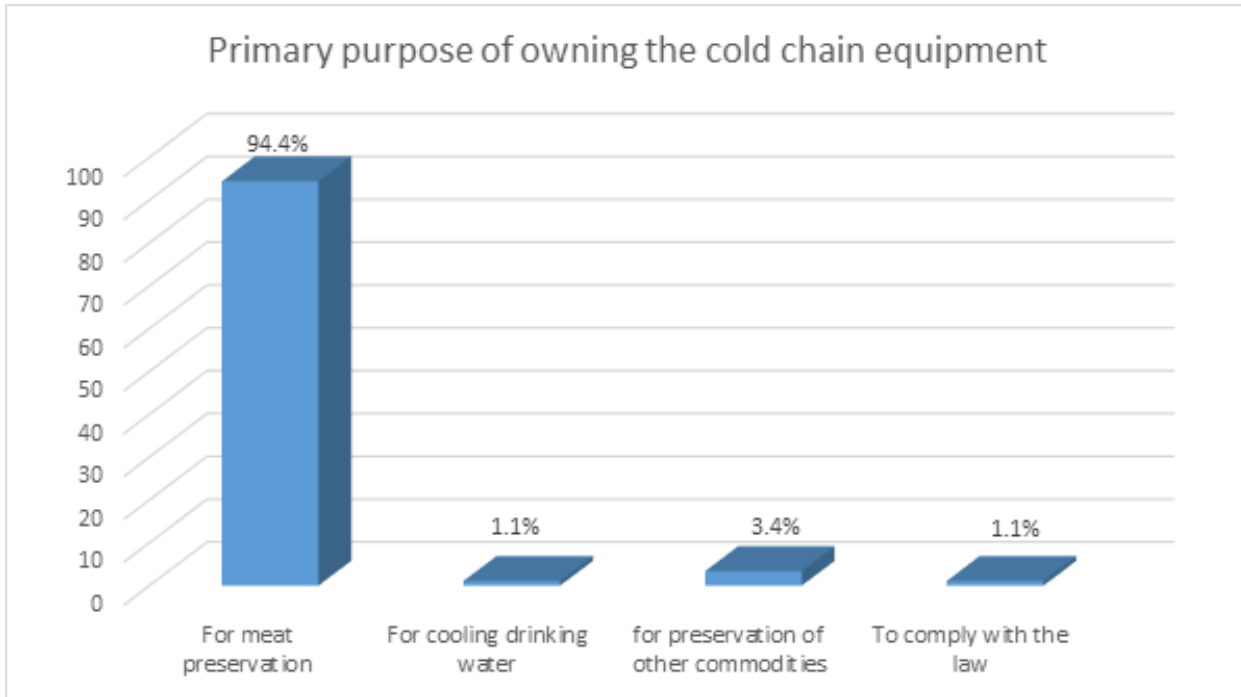


5.5.5 Primary purpose of owning the cold chain by Retailers

Majority of traders who had a cold chain equipment (94.4%) reported that they had bought for meat preservation, 3.4% for

preservation of other commodities while 1.1% had it to comply with law and for cooling drinking water consecutively. If refrigeration is not applied in time, produce may decay to a point where the use of cold chains to prolong a product's shelf life is no longer feasible.

Fig 18: Primary purpose of owning the cold chain equipment



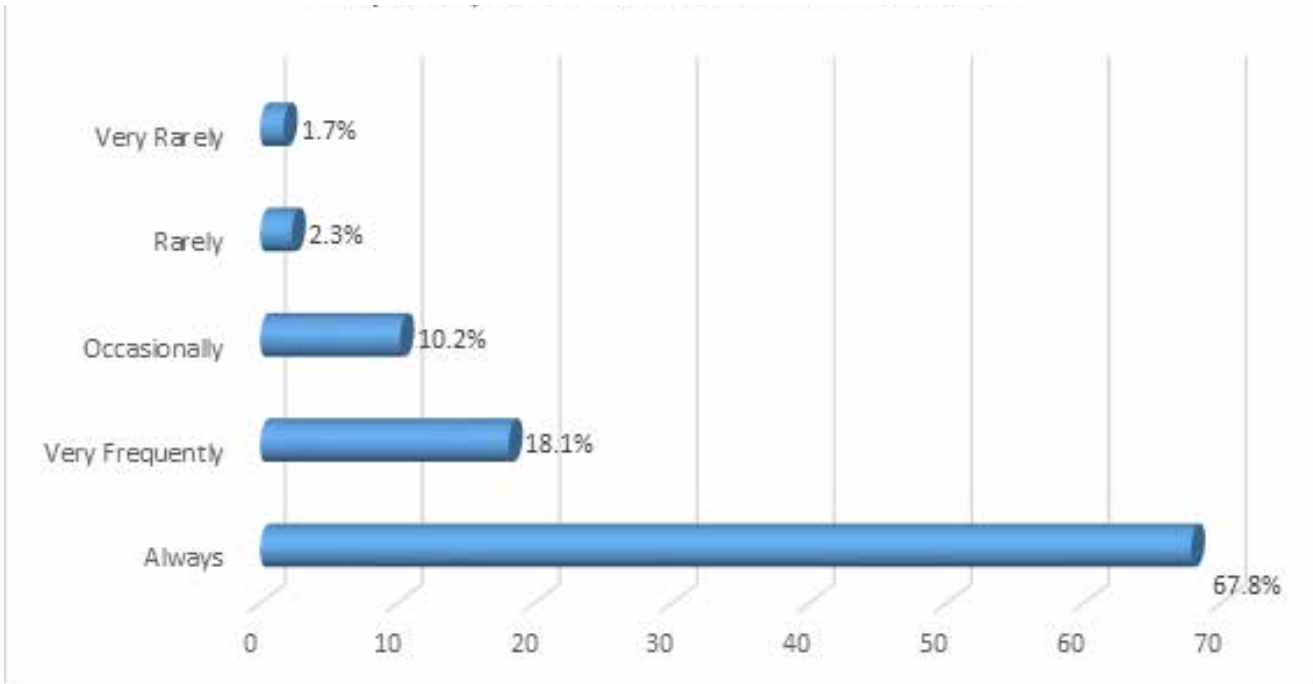
5.5.6 Frequency of Utilization of the Cold Chain by Retailers

About 88.8% of retailers indicated that their cold chain was in use at the time of the survey while 11.2% indicated that the equipment was not in use. On the frequency of use, 67.8% cited that they always use the equipment while others use it inconsistently. Discussions with traders revealed that they use the deep freezers to store leftover meat at night, after which it is hanged the following day in the morning. Traders claimed that they are careful not to let the consumers know that

they keep meat in the deep freezers, lest they refuse to buy from them. In butcheries that also do *nyama choma*, traders reported that it is important for *nyama choma* meat to be stored in the deep freezer overnight, before it is roasted. As such they utilize their deep freezers on a daily basis. On further probing these traders, it was observed that meat is stored in the deep freezers as soon as it arrives from the slaughterhouses, before it is allowed to drain the myosin acid. This is an indication of knowledge gaps in the utilization of cold chain among the retailers.



Fig 19: Frequency of utilization of the cold chain



5.5.7 Reason Cold Chain is Currently Not In use – Retailers Perspective

In this study, about 60.0% traders did not use cold chain because they had no excess stock to preserve, 20.0% stated that their customers don't like cold meat, 5.0% were avoiding using it so as to reduce energy cost while 15.0% cited that theirs had broken down. The retailers further reported that about 74.7% of their customers prefer to buy fresh meat while 26.5% prefers meat from cold chain. These findings are in agreement with the finding in the consumer segment, where consumers have greater preference for fresh meat (meat that has not passed through the cold chain).

During Key Interviews with traders, it was reported that they are aware that meat from the cold chain is safe and good for consumers, but their consumers are demanding fresh meat. One trader from Kaloleni, Kilifi reported

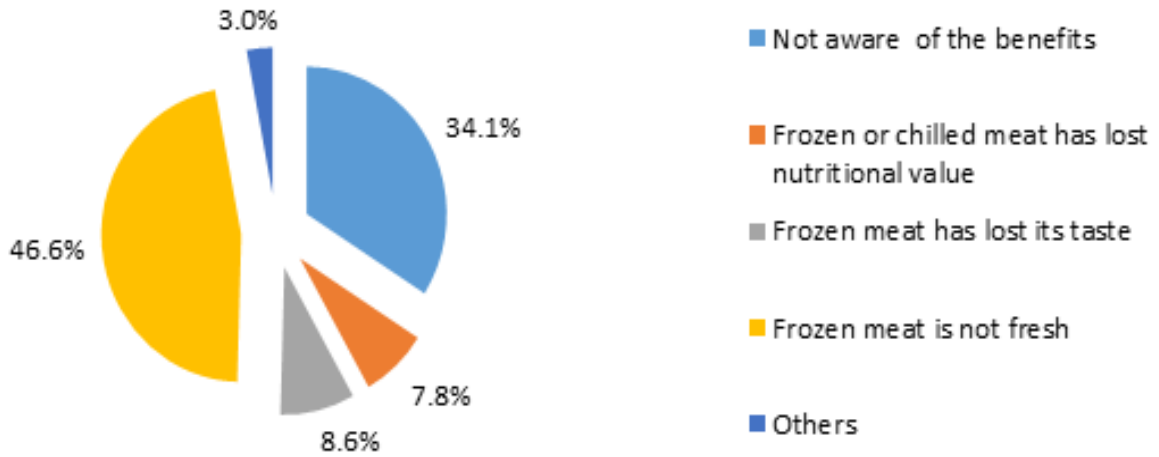
that he was advised by the doctor to first hang the meat for 4 hours after slaughter, before selling to consumers, a practice that he has been personally applying leading to successful management of his arthritic condition.

5.5.8 Reasons why consumers were not buying meat from cold chain

Retailers cited various reasons as to why their customers do like to buy meat from cold chain with majority of them (46.6%) reporting that their customers perceive that frozen meat as not fresh, 34.1% indicated that their customers were not aware of benefits of chilled or frozen meat while 8.6% indicated that frozen meat loses its taste. About 7.8% felt that meat loses its nutritional value as result of being frozen. These findings are in agreement with the earlier findings from interviews with consumers.



Fig 20: Reasons why consumers were not buying meat from cold chain



5.5.9 Challenges Experienced by Retailers when Using Cold Chain

In this study, 31.8% of retailers cited that high cost of power was the main challenge they face in meat retail followed by 31.8% who cited frequent power outages. These challenges were mainly reported by traders in the low-income segments, because of their high sensitivity to cost of doing businesses. As seen in both the retail and consumer survey, majority of consumers buy enough for a day which is also reflected by the meat traders who buy enough stock for a day or two. This is mainly in the low income and some of the middle-income segments. In such cases, the retailers need to be trained on handling of meat, to ensure that it is safe for the consumers, even without refrigeration.

5.5.10 Spoilage of Meat and Meat Products

Results from analysis shows at least 49% of retailers have never incurred losses of meat due to spoilage. Overall, only 7.1% of retailers indicated that they always incur meat spoilage, 9.7% incurs occasionally while 29.4% cited that meat spoilage occurs very rarely. Fish spoilage was the highest as cited by 90.2% who indicated they always incur fish spoilage, followed by pork, mutton and *matumbo*. These loses could be prevented by use of cold chain effectively.



Table 55: Types of losses incurred by retailers as a result of meat spoilage

Type of loss in the retail outlet	Never	Rarely	Occasionally	Very Rarely	Always
Pork due to spoilage	48.1	14.8	3.7	33.3	
Mutton due to spoilage	34.7	20.0	2.9	40.6	1.8
Chicken due to spoilage	55.1	12.4	1.1	31.5	
Goat Meat due to spoilage	27.6	17.2		55.2	
Fish due to spoilage	2.7	2.0	0.8	0.4	90.2
Camel due to spoilage	43.5	15.6	1.4	39.5	
Intestines due to spoilage	28.0	20.0	8.0	44.0	
Gizzards due to spoilage	66.7			33.3	
Liver due to spoilage	42.0	19.0	1.0	38.0	
Gizzards due to spoilage	58.8	11.8	5.9	23.5	
Kidneys due to spoilage	40.7	15.1	1.2	43.0	
Pork skins due to spoilage	50.0		50.0		
Fish remains due to spoilage		100.0			
How often do you lose Heads/ Hooves due to spoilage	50.0		50.0		
Average	42.1	19.1	9.7	29.4	7.1

5.5.11 Retailers' Perception of Effect of Cold Chain on Quality of Meat

Majority of traders had positive perception toward use of cold chain where 80.6% agreed that nutritional value of meat is maintained in chilled meat where 10.3% felt that it affect nutritional level. About 27.7% felt that the taste of meat is not affected even after freezing/chilling, 22.7% indicated that there are no known benefits of chilling/freezing meat while 32.8% felt that frozen /chilled meat is not fresh. It is observed that some proportion of traders are in agreement with some of the negative perceptions about meat that has

passed through cold chain. This is notable for 30.3% who are in agreement with statement that frozen/chilled meat has lost its taste, 32.8% who agree that frozen are chilled meat is not fresh, and the 22.7% who agree that there are no known benefits if chilling/freezing meat together with 19.1 who are undecided on the same.

As with the consumers, agreement with negative perceptions or being undecided on the same is an indication that there are gaps as well as awareness on the benefits of cold chain. Again there is general perception among the retailers and consumers alike that the cold chain equipment is more used for preservation than quality enhancement purposes.



Table 56: Perception of retailers on effect of cold chain on quality of meat

Perception	Agree	Undecided	Disagree
Nutritional value of meat is maintained in chilled meat	80.6	9.1	10.3
The taste of meat is not affected even after freezing/ chilling	64.8	7.9	27.3
Chilling of meat preserves the meat and ensures safety for consumers	86.5	6.0	7.5
There are no known benefits of chilling/freezing meat	22.7	19.1	58.2
Chilled/frozen meat has lost its nutritional value	17.5	17.9	64.5
Frozen/chilled meat has lost its taste	30.3	10.4	59.4
Frozen /chilled meat is not fresh	32.8	11.2	56.0

5.6 COMMUNICATION MESSAGES RELATED TO MEAT AND MEAT PRODUCTS

At least 39% of consumers in the high income, 34% in the middle income and 36% in the low-income segments could recall having seen an advertisement concerning meat and meat products. The message that consumers recall most was promoting and advising on meat safety and standards as shown by 31% of responses in the high income, 22% in the low income and 27% in the middle-income segments. The high-income segment could also recall advertisements on new meat products in the market (15%), new meat outlets in the market (19%) and health and hygiene tips in meat handling. In the low-income segment, messages that are recalled include health and hygiene tips in meat handling (32%), new meat outlets in the market (15%) and new meat products in the market (11%). Other messages that consumers in the middle-income segments could recall include new meat products in the market (18%), new meat outlets in the market (18%) and health and hygiene tips in meat handling (25%). Table 57 below summarizes these findings.

Table 57: Meat Related advertisement messages that consumers could recall

Type of message	High	Middle	Low
Promoting and advising on meat safety and standards	31%	27%	22%
New meat products in the market	15%	18%	11%
New meat outlets in the market	19%	18%	15%
Discounted prices for some meat products	8%	9%	6%
Health and Hygiene tips in meat handling	23%	25%	32%
Cannot recall	4%	3%	14%

The main source of information regarding meat and meat products in the market was found to be variable. In the high-income segment, the main information source was found to be social media as shown by 28% of the responses, followed by retail outlets (24%). Others include relatives and friends (21%) and TV (20%). In the low-income segment, the major channel was reported to be relative and friends (32%), retail outlets, TV (18%) and radio (16%). The main channel used by consumers in the middle-income segment include relatives and friends (25%), retail outlets (23%), social media (14%) and radio (11%).



Table 58: Source of information regarding meat and meat products offered in the market

Source of Information	High	Middle	Low
Retail outlets	24%	23%	22%
Relatives and friends	21%	25%	32%
TV	20%	24%	18%
Radio	4%	11%	16%
Social media	28%	14%	7%
SMS platforms	3%	1%	0%
Other Platforms	0%	1%	1%

6 Objective 4: Critical analysis on the market intervention, need for a sustainable cold chain retail and consumption practices in Kenya

6.1 A SUMMARY OF THE KEY CHARACTERISTICS OF EACH CONSUMER SEGMENT

This section presents an analysis of factors that limit the consumption of meat and fifth quarter components cross the three consumer segments. Based on this analysis the critical limiting issues have been identified and key market intervention generated with the aim of

increasing meat consumption in the country. The section starts with a summary of the key characteristics of each of the consumer segments, in relation to meat consumption as summarized in table 59 below. This aims at giving the meat traders a highlight of characteristics of different consumer segments to improve product development and their promotional activities

Table 59: A summary of meat consumption patterns across the different consumer segments

Description	High Income	Middle income	Low Income
Proportion of consumers belong to each segment	They form 4%of the total consumers	They form 36%of the total consumers	They form 60%of the total consumers
Expenditure patterns	Mean expenditure of KES 119,305 per month; food expenditure constituting 16.6% of the total household expenditure.	Mean expenditure of KES 40,984 per month; food expenditure constituting 28.8% of the total household expenditure	mean expenditure of KES 21,777 per month, with food expenditure constituting 41.8% of the total household expenditures
Household size	5	4	5
Occupation	Majority are in fulltime employment mainly as managers and professionals; a few are in self-employments, largely at Medium enterprises	Majority are in full time employment, mainly as professionals and in the sales and services sector; a few are in self-employment as SME level	Majority are in self-employment, almost 25% are at micro enterprises level unemployed; those in employment are minority, working as technicians, casual and elementary workers
Budgetary share for meat (all meats combined) against total household food expenditure	25%	22%	17%



Budgetary share for red meat only against total household food expenditure	14%	13%	10%
Determinants of type of meat to buy	Health concerns and safety	Health concerns and to a small extent the amount of money available	Money available
What limited access to quality meat	Fluctuations in quality and limited differentiation of products	Fluctuations in quality, limited differentiation of products and freshness of the products	Affordability, price fluctuations and freshness of meat
What determines the frequency of buying meat	Mainly guided by the household menu; purchases increases during festive seasons, but not much changes during school holidays	Guided by menu, available money; increases purchases during school holidays and during festive seasons	Guided by available money; purchases increase to a small extent during school holidays and during festive seasons
Per capita meat consumption (all meat) Kg/capita/ year	17.37	14.66	13.2
Per capita red meat consumption	18.20	16.43	10.61
Market share (all meats)	Fish -29%, Beef -25%; Chicken -25%; Goat -17%; pork 3% and mutton 1%	Fish -28%; Beef -25%; goat -23%; Chicken -20%; pork 3% and mutton1%	Fish -51% (mainly <i>omona</i> and other cheap species);beef -19%; goat -14%; chicken-11%; port 14% and mutton 1%
Market share – Red meat	Red meat -43%; Fish -29%; others 22%	Red meat -49%; fish 28%; others 23%	Red meat -34%, fish 51% and others 15%
Determinants of quantity of meat to be bought	No of people who will take the meal	Amount of money available and number of people who will take the meal	Amount of money available
Preferred meat buying outlets	Butcheries in the malls and supermarkets; estate butcheries and home slaughter	Estate butcheries	Estate butcheries
What drives choice of outlets	Hygiene and cleanliness of premises; convenience/nearness; ability to get desired quality; cleanliness and presentation of staff; ability to get desired meat cuts	Hygiene and cleanliness of premises; convenience/nearness; freshness of meat; ability to get desired quality;	Hygiene and cleanliness of premises; convenience/ nearness; freshness of meat; affordable prices



Decision making (where to buy meat, how much meat to buy, quality of meat; and who is responsible for purchasing meat	In majority of HH, main decision maker is the female gender either as household head or spouse of household head in the female and male headed households respectively	In majority of HH, main decision maker is the female and male gender either as household head or spouse of household head in the female and male headed households respectively	On majority of HH main decision maker is the female and male gender either as household head or spouse of household head in the female and male headed households respectively
Who prepares and cooks meat	House managers and female gender as HH head or spouse in the female and male headed households respectively	House managers and female gender as HH head or spouse in the female and male headed households respectively	Female gender as HH head or spouse in the female and male headed households respectively
Reasons for decreased red meat consumption	Health concerns, uncertainty of the genuineness of meat in the market	Health concerns, uncertainty of the genuineness of meat in the market	Reduced incomes; health concerns
Which processed products supplied in the formal channels are they aware of?	80-92% are aware of Sausages hotdogs, minced meat, fillets, beef samosas 65-70% are aware of ham, bacon, canned meat, burgers, chicken samosa, 53% are aware of aged/ cured meat,	94% are aware of sausages; 50-90% are aware of bacon, canned meat, hotdogs, minced meat, fish fillets, beef samosa, chicken samosa 24% are aware of aged/ cured meat	93% are aware of sausages; 41-86% are aware of hotdogs, minced meat, fish fillets, beef samosa, chicken samosa, canned meat 20-30% are aware of bacon and burgers 19-21% are aware of ham and cured meat
Which processed products supplied in the formal channels do majority consumer?	71 % Consume sausages 51-63% consume: minced meat, fish fillets, beef samosa, 39-45% consume: Burgers and hotdogs 22-29% consume ham, bacon, canned meat, chicken samosa 6% consume aged/cured meat	50-52% consume beef samosa and sausages 41% consumes minced meat 11-29% consume bacon, burgers, hotdogs, fish fillets, chicken samosa 6-9% consume aged meat, canned meat and ham	59% consumes sausages; 44% consumes beef samosa, 15-17% consumes fish fillets and minced meat 3-9% consumes ham, bacon, canned meat, aged meat, burgers, hotdogs and chicken samosa



Which value added products from the informal outlets are they aware of?	<p>Over 50% are aware of <i>Mshikaki</i> (Beef mutton, goat meat), African Sausage (<i>mutura</i>), meat balls, bone soup, chicken soup</p> <p>14-33% are aware of: <i>mshikaki</i> (game meat), pork <i>mshikaki</i>, deep fried pork skins, meat balls from fish remains</p>	<p>61-86% are aware of African sausage, chicken and bone soup</p> <p>40-50% are aware of meat balls fish remains), meat balls (red meat) and <i>Mshikaki</i> (game meat</p> <p>17-18% are aware of pork <i>mshikaki</i>, <i>mshikaki</i> game and deep fried pork skins</p>	<p>77-78% are aware of African sausage and bone soup;</p> <p>44-45% are aware if meat balls(fish remains) and chicken soup;</p> <p>34-39% are aware of meat balls (red meat) and <i>mshikaki</i> (red meat)</p> <p>12-17% are aware of <i>mshikaki</i> game meat and deep fried pork skins</p>
Which value added products from the informal outlets do majority of them consume	<p>45-49% consumes bone and chicken soup</p> <p>18-24% consumes African sausage and meat balls from red meat</p> <p>1-6% consumes meat balls (fish remains), pork <i>mshikaki</i> and <i>mshikaki</i> from game meat</p> <p>0% consumes deep fried pork skins</p>	<p>46% consumes bone soup</p> <p>24-27% consumes African sausage and chicken soup</p> <p>1-7% consumes meat balls(fish remains), <i>mshikaki</i> game</p> <p>0% consumes deep fried pork skin</p>	<p>30-45% consumes African sausage and bone soup</p> <p>15-23% consumes chicken soup, meat balls (fish remains)</p> <p>1-9% consumes pork <i>mshikaki</i>, <i>mshikaki</i> game and meat balls from red meat</p> <p>0% consumes deep fried pork skins</p>
Preferred outlets for processed products	Mainly from supermarkets, a few buy minced meat from butcheries	Mainly from supermarkets, a few buy minced meat from butcheries	Mainly from street vendors with a few products like burgers and bacon coming from supermarkets
Preferred outlets for the value added products sold in the informal markets	<i>Nyama choma</i> joints and butcheries	<i>Nyama choma</i> joints and street vendors	Street vendors



What fifth quarter components do they consume?	<p>0% consumes fish remains, pork skins, chicken intestines</p> <p>2-10% consumes chicken legs (home slaughter), chicken heads (home slaughter), head and hooves</p> <p>17-25% consumes cattle and shoats matumbo, kidneys, gizzards</p> <p>41% consumes liver (sheep and goats)</p> <p>54% consumes liver (cattle)</p>	<p>1-14% consumes pork skins, chicken legs (home slaughter), fish remains, chicken heads (home slaughter)</p> <p>17-29% consumes Matumbo for cattle and shoats, gizzards, kidney, head and hooves</p> <p>32%liver for sheep and goats</p> <p>44% consumes Matumbo for cattle</p> <p>56% consumes liver (cattle)</p>	<p>1-15% consumes pork skins, chicken intestines and chicken heads</p> <p>17-29% consumes fish remains, heads, hooves, chicken legs, kidneys, liver for shoats</p> <p>36% consumes Matumbo (shoats)</p> <p>51% consumes Matumbo for cattle</p> <p>53% consumes cattle liver</p>
What limits their consumption of fifth quarter	Health concerns and quality	Health concerns, accessibility	Health concerns accessibility
Meat preservation practices	Refrigeration and freezing	Refrigeration and freezing; small proportion prefers to eat meat the same day it is bought	Meat is eaten the same day it is bought
Preferred meat handling chain	Prefers both cold and hot chain meat	Prefers both cold and hot chain meat	Have the highest preference for hot chain meat
Main source of information on meat	Social media, TV, and retail outlets	Relatives and friends, TV, retail outlets	Relatives and friends; retail outlets,



6.2 ANALYSIS OF FACTORS LIMITING MEAT AND FIFTH QUARTER CONSUMPTION

This section summarizes the factors that limit the consumption of meat and fifth quarter in general. These factors are thereafter categorized as key issues to guide in determination of the marketing interventions. The analysis has come up with 4 key issues which include consumer health and safety concerns, pricing, limited product differentiation and gaps in knowledge and awareness among consumers and retailers. Table 60 presents this analysis.

Table 60: Analysis of key issues in meat consumption trends

Key Issues	Specific Findings from the Study
Concerns regarding consumer safety and health	<ul style="list-style-type: none">– Health concerns (drug residues, fear of lifestyle diseases associated with cholesterol, unhygienic handling of meat especially in the high and middle income segments)– Genuineness of products in the market –assurance that the meat is not from game animals, uninspected stolen animals and dead carcasses– Emerging trend on increasing consumption of red meat and increasing preference for white meat for fear of cardiovascular and autoimmune diseases.– Health concerns are rated as the main reason for increasing consumption of white meat and reduction of red meat consumption– Health concerns, among the high- and middle-income segments in relation to most of the value-added products that are sold in the informal market (e.g. the African sausage, Matumbo etc.)– Limited awareness of most of the products in the high-end markets by consumers in the low-income segments and vice versa.
Pricing	<ul style="list-style-type: none">– Affordability among the low-income segments– Price fluctuations as a challenge limiting access to quality meat by low income segment– Increasing market share for low cost fish like <i>omena</i> among the low-income consumers– Reduced incomes contributing to reduced intake of red meat among the low-income segments



Limited product differentiation	<ul style="list-style-type: none">- Subjective definition of quality among consumers and retailers- Fluctuation in meat quality as a main challenge to accessing quality meat by high- and middle-income segments- Lack of value addition of fifth quarter, especially the Matumbo to extend their shelf life- Limited differentiation of fifth quarter products, increase their consumption, especially among the high- and middle-income segments- No standard <i>nyama choma</i> products for home delivery, which is likely to exclude the people who do not prefer eating out of home; furthermore, most of <i>nyama choma</i> joints are found in clubs and bars, mainly serving the middle-income segments.- Mutton and sometimes goat meat associated with odours by certain categories of consumers- Low penetration of processed products in the low income segments, which is mainly limited by pricing, yet this is the largest market for meat and meat products- Kenyan meat processors have shifted focus to value addition for the local market and growing exports to the Middle East and Africa after losing the key European Union market in 2008 due to safety concerns.
Limited Knowledge and awareness	<ul style="list-style-type: none">- High preference for hot chain meat by consumers especially in the low and middle income segments- Low levels of awareness some of the processed products among different market segments, especially aged/cured meat, special meat cuts, ranch meat and pure grass fed meat among others- Increased negative publicity of red meat, and promotion of white meat contributing to increased preference for white meat (Not backed by data)- Majority of consumers especially in the middle and low income segments agreed while others were undecided on a number of statements that depicted the negative perception in cold chain such as ‘cold storage affects taste and nutritional value of meat, and that the benefits of freezing/chilling meat are not known in all the market segments.- Cold chain equipment are available in most of the retail outlets, but largely used for preservation of meat and not quality enhancement- While majority of retailers are somehow aware of other benefits of cold chain beyond meat preservation, the practice is to give what the customer wants i.e. ‘fresh meat’/meat slaughtered the same day.



6.3 OPPORTUNITIES IN THE MEAT SECTOR

There are a number of opportunities in the meat sector that can be used to enhance growth and competitiveness of the sector.

These include:

- a) Fifth quarter value: The industry is yet to generate significant value from the fifth quarter. Value addition would prolong their shelf life to allow products to be moved from one urban town to another depending on the demand. In addition, clean well prepared fifth quarter products are also a delicacy for high- and middle-income segments
- b) Utilization of cold chain along the supply chain: This will enhance quality by reducing bacterial loads on meat and reversing the increase in autoimmune diseases which are caused by increased consumption of hot chain meat. This increases consumer confidence in red meat and ultimately promotes consumption of the same.
- c) Processed and value-added products in the formal and informal channels respectively: Meat consumption can be increased by making available the value added products that are mainly sold in the informal markets to the formal outlets especially the samosas and African sausage. This will involve supporting entrepreneurs to come up with such unique products that address the concerns of the middle and high income segments. Similarly more processors can come up with meat products that

are appropriately packaged for low income segments.

- d) Home delivery services: The study shows that there is a proportion of people who do not prefer going out to eat meat. This segment can be easily reached with well packaged red meat products that are home delivered through a model similar to the chicken delivery by the fast foods.
- e) The growing nyama choma culture: according to the study, majority of people above 19 years of age have a preference for nyama choma. More value can be extracted from nyama choma outlets through creation of new value added products, development of products for home delivery services and also using the joints for dissemination of messages related to safe handling of meat.

6.4 MARKET INTERVENTIONS TO ADDRESS KEY ISSUES IN THE MEAT CONSUMPTION TRENDS IN THE COUNTRY

An analysis of the key issues limiting consumption and the recommendations for market interventions to address these factors are presented in table 61. The major recommendations hinge around innovations in product differentiation to meet the needs of different consumer segments and promotion/awareness creation. There will be need in policy level interventions which have been covered in detailed in the next chapter of this report.



Table 61: Recommendation on market interventions to address the key issues limiting meat consumption

Key Issue	Recommendations for Market interventions
Health concerns	<ol style="list-style-type: none"> 1. Review policy and legal framework to enhance safety and address quality concerns (see the chapter on policy and legal framework) 2. Butcherries serving the high income consumers should innovate and come up with hygienically produced fifth quarter components and other value added products. 3. Support entrepreneurs to engage in livestock finishing in order to produce animals that meet market needs in terms of carcass quality. This also addresses the health and safety concerns through enhanced disease screening before slaughter. 4. Strengthening meat inspection (ante and post mortem) and exploring adoption of effective traceability systems 5. Enforcement of the provisions of the meat act on meat handling from slaughter to the slaughter outlets 6. Research institutions to explore technologies for detection of drug residues in the source markets.
Pricing/ Affordability	<ol style="list-style-type: none"> 7. The meat traders and processors to come up with meat products for low income segments that can effectively compete with low cost fish, at the current price of KES 20-30 per units.
Product differentiation	<ol style="list-style-type: none"> 8. KMT to come up with a program to support innovations in value addition of meat and fifth quarter, in order to diversify the product offering for different market segments. This means supporting the process of proof of concept and later commercialization of such products. 9. Train the meat traders on meat grading, meat cutting and pricing to enable them come up differentiated products (meat and fifth quarter). This will enable consumers get value for money, since the pricing will be linked to quality 10. Support the meat traders to come up with standard grading system (mainly adopt the KMC grading system) and thereafter form a body for self-regulation. 11. Support entrepreneurs to come up with differentiated meat products for instance the branding certain products like ranch meat or range /grass fed meat from a certain region as a unique product in the market; butcherries could also be branded based on specific products they . This enhances targeting and also addresses the consumer health and safety concerns. 12. Support the <i>nyama choma</i> operators to come up with standard units of <i>nyama choma</i>, of specific characteristics, targeting the food delivery system.



Knowledge and awareness	<ol style="list-style-type: none">13. Review of policies and regulations in order to explicitly link use of cold chain with meat quality (see the chapter on policy and legal framework)14. KMT to support a program for educating consumers on nutritional and health benefits of red meat and the relationship between meat handling and health, in order to counter the ongoing negative publicity15. Promote the use of cold chain along the meat supply chain as a way of improving the safety and quality of meat through education of consumers and meat traders
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7 Policy and legal framework governing the meat industry in Kenya

7.1 LEGAL AND POLICY PROVISIONS

The following are the laws and policies that are used to regulate the beef industry in Kenya:

- 1) **Public Health Act** – An act of Parliament to make provisions for securing and maintaining health
- 2) **Animal Diseases Act** – An act of parliament to provide for matters relating to the diseases of animals.
- 3) **Meat Control Act** – An act of Parliament to enable control to be exercised over meat and meat products intended for human consumption and over slaughterhouses and places where such meat is processed and to provide for import and export control over such meat and meat products.
- 4) **Food, Drugs and Chemical Substances Act** – An act of parliament to make provision for the prevention of adulteration of food, drugs and chemical substances.
- 5) **Prevention of Cruelty to animals' Act** – An act to make better provision for the prevention of cruelty to animals; to control experiments on animals.
- 6) **National Bio Safety Authority Act** – aims at facilitating responsible research and minimizing risks that may be posed by genetically modified organisms.
- 7) **Veterinary Surgeons and Veterinary Para Professionals act** – An act of Parliament to make provision for training, registration and Licensing of Veterinary Surgeons and Veterinary para professionals to provide for matters relating to animal health services and Welfare.
- 8) **Fertilizers and Animal Foodstuffs Act** – An act of parliament to regulate the importation, manufacture and sale of agricultural fertilizer and animal foodstuffs and substances of animal origin intended for the manufacture of such fertilizer and foodstuffs.
- 9) **Kenya Meat Commission Act** – An act of parliament to establish a commission to purchase cattle and small stock, and to acquire, establish and operate abattoirs, meat works, cold storage concerns and refrigerating works for the purpose of slaughtering cattle and small stock, processing by products, preparing hides and chilling, freezing, canning and storing beef, mutton, poultry and other meat foods for export or for consumption within Kenya.
- 10) **Uplands Bacon Factory Act** – An act of parliament to provide for the constitution of the Uplands Bacon Factory (Kenya) limited.
- 11) **Cattle Cleansing Act** – An act of parliament to provide for the cleansing of cattle
- 12) **Rabies Act** – An act of parliament to provide for the suppression of rabies
- 13) **Animal Breeding Policy (in Draft form)** – Aims to promote sustainable use, development and conservation of its domestic and emerging animal genetic resources.
- 14) **Livestock feeds Policy (in Draft form)** – Will detail standards that manufacturers have to maintain while making feeds.



7.2 GAPS IN THE LEGAL AND POLICY FRAMEWORK

7.2.1 Kenya Livestock Breeding Policy and National Beef Breeding Program Not Finalized

The study established that the market demands quality animals i.e. mainly young animals of between 3 and 4 years old, and with an average weight of 175 Kg dressed weight. These standards are largely met by livestock produced in the private ranches in among others Laikipia, Voi, Taita Taveta and a few operational feedlots. In the pastoralists' markets of Kajiado and Narok ecosystem (cattle and dorper sheep) are most preferred in the markets by most of the traders. These are preferred because they are well built and produce tender meat, due to their relatively young age at slaughter. These attributes are associated with the continued introgression of superior breeds mainly Sahiwal to the Maasai zebu which the Maasai pastoralists have been doing over time.

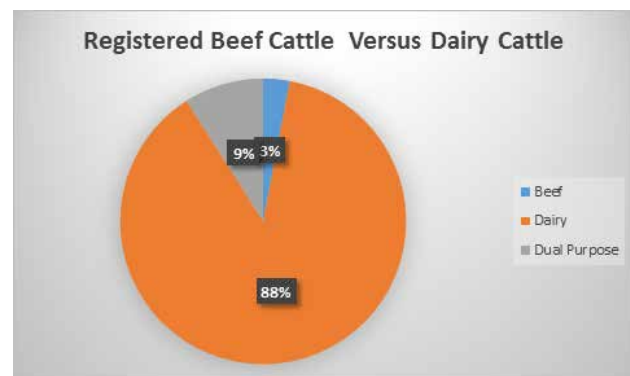
Good genetic materials remain the foundation for production of quality animals in the meat industry. The study established that:

1. Kenya has no livestock breeding policy⁹ or a national breeding program for beef animals to provide guidelines on improvement of beef cattle in the country.
2. There is very limited institutional framework in place, to support beef cattle breeding in the country. It was observed that only 7,889 beef cattle

⁹ The current livestock breeding policy and bill and livestock feeds policy and bill are in draft form awaiting presentation to stakeholders.

were registered with the Kenya Stud book in the last ten (10) years as opposed to 74,988 dairy cattle over the same period (see figure 21), most of them are owned and managed by private ranches in Kenya.

Fig 21: Beef Vs Dairy registration at Kenya Stud Book; 2007 to 2017



According to the KSB, a total of 200 dairy breeds' inspectors have been trained for the last 10 years. The KSB is however not clear how many beef breeds inspectors have been trained over the same period indicating that the list is in the custody of the breed societies most of whom are not actively involved in promoting breed improvement. The current registration fee for cattle stands at Ksh 400 for pedigree, Ksh 300 Appendix, Ksh 300 intermediate and Ksh 250 for foundation. The fee is paid once in the lifetime of the animal.



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
Aberdeen	16.00	9.00	12.00	15.00	23.00	20.00	11.00	16.00	11.00	15.00	15.00	163.00
Boran	632.00	232.00	1,120.00	804.00	338.00	697.00	819.00	525.00	694.00	964.00	458.00	7,283.00
Brahman	-	-	-	-	9.00	-	-	-	-	29.00	22.00	60.00
Hereford	-	-	-	-	-	-	6.00	-	2.00	-	-	8.00
Red poll	-	11.00	3.00	-	82.00	2.00	38.00	13.00	60.00	2.00	6.00	217.00
Limousine	-	-	-	-	7.00	-	-	-	-	11.00	8.00	26.00
Piemontese	-	-	-	-	26.00	-	-	-	-	12.00	4.00	42.00
Santa getridis	-	-	-	-	20.00	-	1.00	-	-	17.00	5.00	43.00
Ayrshire	1,449.00	505.00	2,024.00	2,174.00	2,754.00	2,215.00	1,830.00	1,918.00	1,075.00	1,220.00	917.00	18,081.00
Fleckvieh	-	-	-	-	-	8.00	2.00	2.00	9.00	4.00	-	25.00
Friesian	4,381.00	1,776.00	5,124.00	5,940.00	6,370.00	5,553.00	4,846.00	5,928.00	4,316.00	4,383.00	3,730.00	52,347.00
Guernsey	151.00	65.00	153.00	245.00	275.00	208.00	170.00	220.00	159.00	48.00	41.00	1,735.00
Jersey	137.00	202.00	289.00	211.00	299.00	285.00	326.00	179.00	193.00	226.00	320.00	2,667.00
Belgian Blue	1.00	-	-	-	-	-	-	-	-	-	-	1.00
Brown swiss	-	-	18.00	3.00	1.00	77.00	7.00	15.00	31.00	5.00	1.00	158.00
Charolais	43.00	73.00	82.00	2.00	2.00	29.00	15.00	-	3.00	10.00	4.00	263.00
Galloway	-	-	-	-	-	-	-	-	-	-	-	-
Sahiwal	24.00	26.00	59.00	190.00	458.00	493.00	101.00	47.00	171.00	93.00	570.00	2,232.00
Simmental	-	-	-	-	3.00	-	-	-	-	43.00	15.00	61.00
Pool (cross breeds)	121.00	34.00	200.00	458.00	626.00	543.00	760.00	572.00	385.00	636.00	184.00	4,519.00
	6,955.00	2,933.00	9,084.00	10,042.00	11,293.00	10,130.00	8,932.00	9,435.00	7,109.00	7,718.00	6,300.00	89,931.00

Source: Kenya Stud Book

Recommendations for Beef Breed Improvement in Kenya

There is need for:

1. The Ministry of Agriculture, Livestock and Fisheries to bring stakeholders together in order to finalize and operationalize the breeding policy and thereafter develop a national beef breeding program to guide the breed improvement agenda.
2. Increased engagement of relevant institutions in the beef breeding program. These include the Kenya Stud Book, the Livestock Recording Centre, Livestock Breeders Association and the national Sahiwal / Boran Studs.
3. Undertake a comprehensive study on the beef breed societies in Kenya, review their structure, mandate and capacities and recommend strengthening strategies.
4. To devolve the Kenya Stud book and Livestock recording services to the county level (47 counties). KSB offices are currently located only in Nakuru, Nyeri and Eldoret. Devolving the Stud book will enable improve standards of beef animals through inspection and

certification of beef animals and also facilitate trace back of livestock sold from each county.

5. KSB to train beef livestock inspectors at County level (47 Counties) on animal registration and performance evaluation. This will enable grow beef standards right from production,

7.2.2 Strengthening Meat Inspection Services:

There has been a lot of concerns by consumers on safety of meat in the market, citing the fear of consuming drug residues in meat, game meat in butcheries and butcheries selling meat from dead carcasses. A suspected trader in game meat for instance was arrested in Naivasha with over 200Kgs of game meat destined for Nairobi¹⁰. The trade in illegal game meat stems from the fact that majority of consumers cannot differentiate game meat from beef or mutton. Pastoralists on the other hand have limited access to animal health care and therefore administers drugs to sick animals by themselves. In most cases, animals that do not show signs of recovery after treatment are taken to the market for slaughter, to avoid losses.

¹⁰ George Murage, The Star Newspaper, December 02, 2018.



Meat inspectors from the department of veterinary services have the capacity to detect drug residues in carcasses if the drugs had been administered 30 days before slaughter. This however is a lengthy process, involving visual assessment, palpation and incisions on the carcasses. For a thorough inspection, to the level of assessment of drug residues, one vet can effectively cover about 60-80 carcasses in a day. At the moment, slaughterhouses especially those dealing with large number of carcasses are not adequately staffed with inspectors in a manner to allow thorough inspection of carcasses for drug residues. For instance, Dagoretti complex has 4 meat inspectors (one for each slaughterhouse) against a daily kill of 400-600 cattle per day. The following recommendations have been made to help address this gap:

- a) There is urgent need to increase the number of meat inspectors from the current 33¹¹ in export slaughter houses and 2,000 in local (county slaughter houses). The aim is to have one inspector handling a maximum of 60 carcasses to ensure thorough inspection. According to former Cabinet Secretary for agriculture, Felix Kosgey, the average age of meat inspectors in Kenya is 52 years¹². With the upcoming abattoirs across the country and the current demand, more meat inspectors will be needed. Increase in Meat inspectors can be achieved through:

- i. Training more meat inspectors at the MTI.

- ii. Enrolling Vets and AHA's who have gone into private practice or joined the private sector into meat inspection.

- b) Provide more refresher courses to meat inspectors (especially certificate holders), with greater emphasis on detection of drug residues in meat and detecting pregnant animals. Almost 50% of female animals slaughtered particularly donkeys are pregnant. This poses a problem of dealing with foetuses.
- c) The research institutions like KALRO and ILRI to explore technologies that can detect drug residues in live animals. This technology could be applied to live animals in the source markets, to ensure that the producers take responsibility.
- d) Kenya Veterinary Board (KVB) to crack down on quacks who have invaded meat inspection. KVB should also issue all meat inspectors with badges for identification.
- e) Kenya Veterinary Board and the Kenya Poisons and Pharmacy board should intensify surveillance and ensure severe punishment is meted to Agro dealers selling injectable directly to producers.
- f) Licensed meat inspectors should be stationed at the Livestock markets to conduct ante mortem examinations. Some livestock producers present sick animals or treated animals before drug withdrawal period to the market with full knowledge of the negative effects it causes. Traders who buy these animals make losses when they are condemned at the slaughter houses. Ensuring animals are inspected before they are presented to the market will help curb this practice.

¹¹ Dr Charles Ochuodho, Senior Deputy Director, Veterinary Diagnostic Services

¹² Agatha Ngotho, The Star Newspaper, June 10, 2014.



7.2.3 Regulation of the Meat Sector

According to the Public Health Act CAP 242, 131, 1, No person shall sell or expose for sale or import or bring into any market or have in his possession without reasonable excuse any food for man in attainted, adulterated, diseased or unwholesome state, or which is unfit for use, or any food for any animal which is in an unwholesome state or unfit for their use, and any medical officer of health, *veterinary officer*, sanitary inspector, *meat inspector* or police officer of or above the rank of Inspector may seize any such food, and any magistrate on the recommendation of the medical officer of health, a sanitary inspector or *a veterinary officer* may order it to be destroyed, or to be so disposed of as to prevent it from being used as food for man or animal as the case may be.

Whereas this act expressly describes the role of Medical officer of health, Veterinary officer and other officers in regard to meat hygiene, this study established that in practice, there is a misconception that the role of the veterinary officer and meat inspector ends at the slaughter house and that the role of ensuring hygiene and compliance at the butchery belongs to the public health. At the moment, live animal, slaughter process and meat inspection is regulated department of Veterinary Services in the Ministry of Agriculture Livestock and Fisheries through the Kenya Meat Control Act which. Thereafter, once the meat gets to the butchery, the Ministry of Health take over the regulation of meat in the butchery through the public health act. This creates a loophole through which unscrupulous traders have managed to bring meat from wild in the butcheries.

The veterinary professionals have the capacity to identify meat from different carcasses in butcheries. However their mandates as far as prosecution is limited to the slaughterhouses. At the butchery, they rely on the cooperation of public health officials to prosecute anyone found selling unsuitable meet. To effectively regulate the meat sector the following is recommended

- a) There is need for the government to review the existing legal framework, i.e. Meat Control Act CAP 356 and the

Public health act CAP 242 to remove the ambiguity and the existing loopholes in the law.

- b) There is need to review the two acts and have butcheries regulated under the Ministry of Agriculture, Livestock and fisheries through the Meat Control Act.

7.2.4 The law does not explicitly link cold chain with quality enhancement, but instead it is recommended for meat preservation

The study shows that consumers largely prefer hot carcass chain i.e. meat that is slaughtered the same day. The consumers perceive this as a sign of freshness as opposed to meat that may have stayed for some days in cold storage. Red meat has been blamed for the high incidences of lifestyle diseases in the country. As a result a lot of negative publicity is going on, led by proponents of health and wellness as well as medical personnel. This study has clearly shown that consumers are shunning away from red meat, in favour of white meat. Consumers are not getting full information on why red meat is linked to lifestyle diseases which is all about post slaughter meat handling. Consumers need to know that if they let meat to drain and have it pass through the cold chain, there is no more risk of lifestyle conditions. Majority of the meat retailers who were interviewed are aware of this linkage, but they are forced to offer consumers what they want, and that is fresh meat, to fill this knowledge gap, the following recommendations have been made:

- c) Review the Meat Control Act and explicitly include the use of cold chain as a quality enhancement measure.
- d) Consumer education on meat handling so that they can develop a preference for cold chain meat, which is much safer for their health
- e) Undertake massive promotion red meat consumption as a health source of protein in order to counter the negative publicity



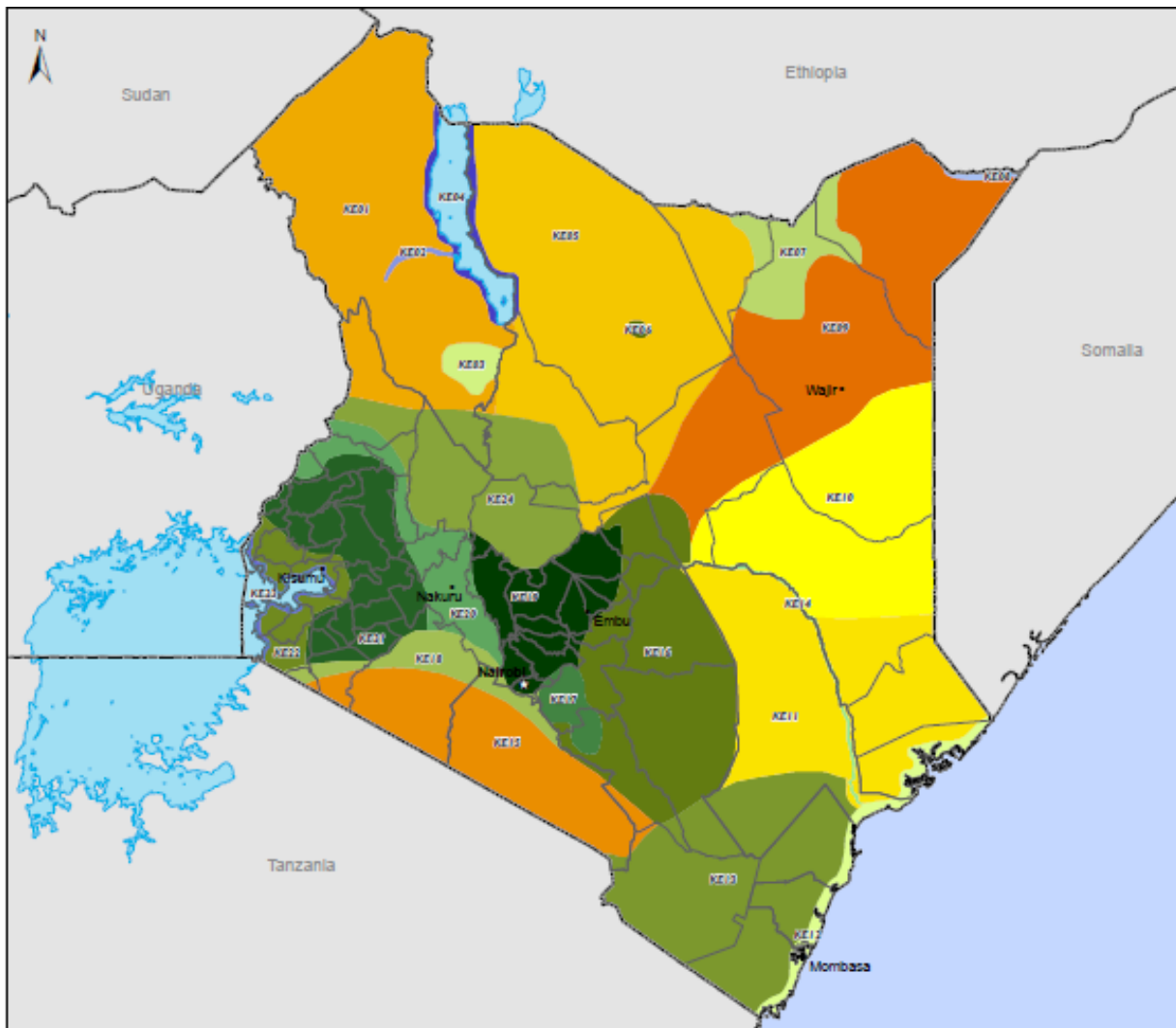
- f) Consumer education on meat quality and safe handling in order to demand quality meat from the retailers, while also lobbying for enforcement of the existing legal framework. Meat inspectors should be more involved to provide public education. This could be by for example – ensuring butcheries are well labelled on the meat they offer (Beef, Goat meat, Pork, Camel Meat) to inform decision making by the consumers.
- g) Capacity building of other meat handlers, including traders - There is need to tap into the knowledge, experience and expertise of meat handlers e.g. butchers who have practiced for long and use this knowledge to develop a training curriculum. The curriculum would then be used to roll out a certificate course for meat handlers. At the moment, high end butcheries sponsor employees to study at the meat training institute in Athi River.
- h) There is need to lobby the government to Zero rate meat handling equipment in the interest of consumer protection. This will ensure traders buy recommended meat handling equipment thus improving meat hygiene and quality.

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9. List of Annexes

9.1 ANNEX 1: KENYA GENERALIZED LIVELIHOOD ZONES 2010



- KE01 - Northwestern Pastoral Zone
- KE02 - Turkwell Riverine Zone
- KE03 - Northwestern Agropastoral Zone
- KE04 - Lake Turkana Fishing Zone
- KE05 - Northern Pastoral Zone
- KE06 - Marsabit Marginal Mixed Farming Zone
- KE07 - Northeastern Agropastoral Zone
- KE08 - Mandera Riverine Zone
- KE09 - Northeastern Pastoral Zone
- KE10 - Eastern Pastoral Zone
- KE11 - Southeastern Pastoral Zone
- KE12 - Coastal Medium Potential Farming Zone
- KE13 - Coastal Marginal Agricultural Mixed Farming Zone
- KE14 - Tana Riverine Zone
- KE15 - Southern Pastoral Zone
- KE16 - Southeastern Marginal Mixed Farming Zone
- KE17 - Southeastern Medium Potential, Mixed Farming Zone
- KE18 - Southern Agropastoral Zone
- KE19 - Central Highlands, High Potential Zone
- KE20 - Western Medium Potential Zone
- KE21 - Western High Potential Zone
- KE22 - Western Lakeshore Marginal Mixed Farming Zone
- KE23 - Lake Victoria Fishing Zone
- KE24 - Western Agropastoral Zone

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